COX'S BAZAR

Inclusive Growth Diagnostic

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List of abbreviations

ADB	Asian Development Bank
ARI	Acute respiratory infections
ARRS	Agricultural and Rural Statistics survey
BAMBEIS	Bureau of Educational Information and Statistics
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
CBPS	Cox's Bazar Household Panel Survey
CIESIN	Center for International Earth Science Information Network
DGHS	Directorate General of Health Services
DHS	Demographic and Health Surveys
EMRCR	Emergency Multi-Sector Rohingya Crisis Response
ESCAP	UN Economic and Social Commission for Asia and the Pacific
EU	European Union
FLFP	Female labor force participation
GAGE	Gender and Adolescence: Global Evidence
GDP	Gross Domestic Product
GIEP	Guideline on Informal Education Program
GoB	Government of Bangladesh
GOST	Geospatial Operations Support Team

GW	Gigawatt
HIES	Household Income and Expenditure Survey
HRSL	High Resolution Settlement Layer
ICT	Information and communication technology
IHS	Inverse hyperbolic sine
IOM	International Organization for Migration
ISCG	Inter Sector Coordination Group
ISIC	International Standard Industrial Classification
IT	Information technology
JOSM	Java OpenStreetMap Editor
km	Kilometer
LCFA	Learning Competency Framework and Approach
LFP	Labor force participation
LFS	Labor Force Surveys
LGED	Local Government Engineering Department
LGIs	Local government institutions
MICS	Multiple Indicator Cluster Survey
MSMEs	Micro, small, and medium enterprises
NGOs	Non-governmental organizations
NOAA	United States National Oceanic and Atmospheric Administration
NTL	Nighttime lights
NTMs	Non-tariff measures
OCHA	Office for the Coordination of Humanitarian Affairs (United Nations)
OD	Origin-destination
OSM	OpenStreetMap
RHD	Roads and Highways Department
RMG	Readymade garment
SAE	Small Area Estimation
SARI ITC	Severe Acute Respiratory Infection Isolation and Treatment Centres
SDGs	Sustainable Development Goals
SEZ	Special economic zone

SMEs	Small and medium enterprises
SNSP	Safety Net System for Poorest
SPS	Sanitary and Phytosanitary
TBT	Technical Barriers to Trade
TFP	Total factor productivity
Tk	Bangladeshi Taka
TVET	Technical and vocational education and training
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner on Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAT	Value added tax
WASH	Water, sanitation, and hygiene
WB	World Bank
WBG	World Bank Group
WDI	World Development Indicators
WDR	World Development Report
WFP	World Food Programme
WTO	World Trade Organization

Executive Summary

Background

Over the past two decades, Bangladesh has achieved an economic transformation enabling formidable reductions in extreme poverty and remarkable human development progress. Between 2000 and 2015, Bangladesh lifted more than 25 million people out of poverty. However, the structural transformation of the country's economy remains incomplete, and economic growth has not benefited all regions and population groups equally.

The district of Cox's Bazar, in southeastern Bangladesh, is an instructive context to understand how long-standing and newer growth opportunities and constraints manifest at the local level, remote from Bangladesh's major growth poles of Dhaka and Chittagong. Potentially exacerbating Cox's Bazar's pre-existing development challenges, the district is hosting a large influx of displaced Myanmar nationals (Rohingya). More than 884,000 people have crossed into Bangladesh from Myanmar, the vast majority since August 2017, more than doubling the population living in the Cox's Bazar upazilas of Teknaf and Ukhia, which had higher poverty rates than the rest of the district prior to the arrival of Rohingya.

The local economy of Cox's Bazar district cannot spontaneously generate the growth and jobs needed to accompany such a rise in population density. The district's potential for inclusive growth continues to be constrained by its lack of integration to the national economy and the latter's growth drivers. Beyond physical connectivity, the district is poorly connected with growth sectors in economic terms, with the current economic structure comprising largely of low-productivity services and agriculture. Several factors limit the inclusivity of the current growth model, based on export-oriented, labor-intensive manufacturing. Key constraints affecting Cox's Bazar include: poor human capital and skills; barriers to women's economic participation; and a business environment that favors older, established, larger firms to the detriment of new, small firms which tend to be dynamic and innovative. Consequently, local growth opportunities which leverage the district's natural endowments, such as tourism and aquaculture, remain largely unrealized.

As the response to the Rohingya crisis moves to the medium term, a fresh assessment of local development challenges and options is needed. The post-2017 humanitarian and host government response in Cox's Bazar district was successful at meeting the basic needs of the Rohingya population. Humanitarian assistance has been estimated to account for 84 percent of the total per capita consumption of displaced Rohingya in 2019. This response has evolved as conditions and population needs change, and it will continue to do so. The humanitarian effort has the potential for generating new economic opportunities for the host population but can only be effectively leveraged once the district's structural development challenges are addressed. Support for recently displaced Rohingya and host communities forms part of a broader development agenda for Cox's Bazar district.

This diagnostic seeks to understand the implications of new and pre-existing drivers and constraints to inclusive growth in Cox's Bazar in a context of important data and evidence gaps. The diagnostic: (i) analyzes Cox's Bazar's economy before the recent Rohingya influx; (ii) identifies changes in key factor markets and how they are related to the influx; (iii) analyzes key constraints to current and future growth and poverty reduction; and (iv) identifies data, evidence gaps and areas for intervention. The value addition of this diagnostic comes through new analysis of existing and recently collected datasets, combined with geospatial analysis on travel times and accessibility, to provide insights at district and sub-district level.

As a diagnostic based on currently available data, this report prepares the way for a future second phase of work. Currently, key evidence gaps remain that prevent the identification of specific economic sectors for investment and impede quantifying negative and positive spillovers of increased humanitarian assistance and the Rohingya influx on the local economy. A second phase of work will aim to fill existing data gaps and foster dialogue with stakeholders (local government, private sector, development partners, and humanitarian agencies) to build consensus on areas for intervention.

Key findings and evidence gaps

Cox's Bazar remains disconnected from existing forces of growth and income generation in Bangladesh. Travel times from the growth poles of Dhaka and Chittagong are too long. Poor transport infrastructure makes it costly for firms to be based in Cox's Bazar and for local workers to reach jobs outside the district. Unions around Chakaria have some connectivity with Chittagong, but Teknaf and Ukhia, bearing the brunt of increased population density, will remain largely disconnected even after planned infrastructure upgrades.

The local private sector is largely disconnected from the national growth model, which has relied on export-oriented, labor-intensive manufacturing. The readymade garment industry boom at the national level has largely left Cox's Bazar behind. Absent concerted

effort, any new growth sectors in the national economy risk doing the same. Currently, Bangladesh's major firms, mostly based in Dhaka and Chittagong are unlikely to move operations from those centers to Cox's Bazar. Moreover, fledgling local comparative advantages in Cox's Bazar, for example in tourism, need policy shifts to facilitate foreign direct investment and an upgraded regulatory framework to promote ecological sustainability. Similarly, for any expansion in the district's fisheries sector, for example in shrimp exports, policy changes are needed to help local industry meet export standards.

More generally, the majority of Cox's Bazar's small, informal firms are disadvantaged by the challenging business environment at the national level. The business environment in Bangladesh favors established, connected firms and sectors, and disadvantages new entrants, including young, small establishments and investors trying to expand or start their business. Moreover, access to finance is a pervasive constraint for firms in Cox's Bazar. Around 60 percent of firms in Cox's Bazar report credit to be the major impediment to business, compared with 40 percent of firms in Chittagong and Bangladesh. More than 80 percent of firms in Bangladesh report that they use their own sources of finance; the same is true for about 90 percent of firms in Cox's Bazar. Continued access and quality issues have limited businesses' ability to leverage digital technologies, with less than 1 percent of businesses in Cox's Bazar reporting the use of information technology in their daily operations in the last Economic Census.

Cox's Bazar's economy cannot readily harness new economic opportunities because of its low human capital and skills base. With a large share of illiterate adults and a weak education system, Cox's Bazar remains poor in human capital. The lack of locally available skilled labor may be one reason why the local economy primarily relies on low-productivity agriculture and services and has not been able to effectively leverage promising geographic and economic endowments for tourism, hospitality, or aquaculture. In turn, given the structure of the local economy, it is not surprising that there are limited returns to education until tertiary level. Financial pressures and social norms are the major constraints that keep Bangladeshi children in Cox's Bazar from attending school and force them to drop out of school early.

Economic inclusion through productive and remunerative labor market participation for both men and women is constrained by low educational attainment, limited access to well-paying jobs, and physical distance from the country's growth poles. These constraints are further compounded for women through differential access to productive inputs and assets compared to men; women's role in home-based and caretaking activities; market failures and institutions; and social norms constraining women's mobility. Women's potential to generate incomes and engage in productive, paid work outside the home and the farm is further constrained by prevailing norms around asset ownership, home- and care-related responsibilities, and mobility.

Finally, the demographic profile of the population in Cox's Bazar underscores the need for basic investments in early childhood interventions, maternal and child health, and expanding access to electricity. The population of Cox's Bazar district was already younger than the national average, and this has been reinforced by the arrival of an even younger Rohingya population. Among both populations, the relatively early age at marriage and motherhood can pose risks to maternal and child health. The district's children lag behind in key markers of early childhood development, with a higher propensity to be malnourished than the national average. Limited access to improved sources of drinking water and sanitation affects both hosts and displaced Rohingya and has important implications for child nutrition. Even among the host community, access to electricity averages only 11 hours a day. Expanding access to electricity, including through the use of renewables, and clean cookstoves can yield disproportionate benefits for children and women. Investing in the early years of the district's young population will be critical to address inequality and increase the productive potential of the population.

Growth drivers

In light of these constraints, and based on the existing evidence base, this report identifies four sets of key growth drivers in the district. These may be classified into major growth drivers, which aim to leverage pre-existing growth opportunities and ease structural constraints to inclusive growth, and secondary growth drivers, which take advantage of emerging opportunities.

Concerted efforts to promote local comparative advantage offer a first major growth driver. These efforts, for example in tourism and hospitality and aquaculture, can leverage the district's natural endowments, while ensuring and promoting ecological sustainability. Activating these growth opportunities will require a conducive business environment that promotes ecologically responsible investments, provides a level playing field, and establishes linkages with the local economy. Investments in connecting and facilitating infrastructure will help develop these value chains and linkages. These will also need to be accompanied by investments in specific labor market skills for the host community, so that new job opportunities in these sectors are accessible to the local population.

The second major growth driver identified in the report is improving connectivity within Cox's Bazar, and from the district to the rest of the country. For the district to leverage its natural endowments, its transport network and infrastructure will need to be developed through the use of multiple modes, while increasing capacity to handle high traffic volumes and reducing travel times for people and goods. Within the district, the lack of connective infrastructure currently limits access to existing clusters of economic activity and growth, new growth potential, and equitable access to services including tertiary education.

If fostered appropriately, two secondary factors could transform the growth trajectory of Cox's Bazar. The first is the Matarbari energy complex and deep seaport. Proactive measures are needed to connect the Matarbari complex to Cox's Bazar district physically and in employment terms. This requires identifying the skill profiles needed in the complex and investing in corresponding local skills development, including for value chains such as transport and storage. Links are possible to the fledgling growth cluster in Chakaria and some northern unions. Large, export-oriented firms remain unlikely to move a significant share of their operations to Matarbari unless the district has the necessary infrastructure to connect to international markets and Dhaka and Chittagong. Finally, expanding power transmission and distribution capacity can directly benefit the host community in the district.

An additional secondary factor is the economic potential linked to the Rohingya camps and the inflow of humanitarian and development assistance. Evidence points to increasing economic activity near the camps, proxied by the growth in nighttime lights. Indeed, Cox's Bazar is one of few Bangladeshi districts outside of Dhaka and Chittagong displaying signs of growth on this proxy indicator in recent years. The aid economy appears to be generating new types of work for the host community, not necessarily restricted to the immediate environs of camps. The presence of humanitarian workers and organizations in the district is likely to spur greater demand for housing, office space, transportation services, restaurants, and hospitality services, and for local facilitation such as translation services. Potential exists to increase local procurement for the humanitarian effort, if the district's economy can reliably cover basic needs for displaced Rohingya. This will require supporting local farmers and fishers to create well-managed producer and marketing organizations.

Table ES1: Inclusive growth drivers for Cox's Bazar, potential payoffs, and constraints

Potential drivers of inclusive growth	Growth potential	Constraints to inclusive growth
Tourism	• High-value international orientation, ecologically sustainable • Job creation	• Lack of infrastructure, branding • Lack of skills
Aquaculture	• Export oriented • Job creation; links to assistance economy	• Small scale; need certification, quality standards • Lack of skills/technology adoption, infrastructure
Connective infrastructure	• Improved travel times for people and goods, access to jobs and services	• Reliance on road transport, limited volume capacity, congestion
Humanitarian assistance	• Job creation, ancillary services • Increased demand for local production	• Lack of coordination with government investments • Need aggregation and capacity building for scale
Matarbari port and energy complex	• Backward and forward linkages can create jobs and growth	• Inherently capital intensive • Needs skills, building linkages with local firms, connective infrastructure

Development interventions by multilateral agencies such as the World Bank are designed to support both host communities and the displaced. By facilitating partnerships between the humanitarian community and government, development agencies can support investments in service delivery and monitoring in the district, while strengthening national systems. Local government institutions need greater capacity in last-mile service delivery and advocacy for local people's needs in development priorities.

Taken together, these findings call for a comprehensive, evidence-based, multi-sector approach to improve inclusive growth and welfare in Cox's Bazar. This includes raising living standards by investing in portable assets such as health and education; removing distortions in the local investment climate; and creating a level playing field for the district's private sector, with access to adequate services and infrastructure. Improving physical and economic connectivity to growth opportunities, while investing in local people's capacities and skills, will open a wider set of economic opportunities for all in Cox's Bazar.

Policy recommendations

The report's policy recommendations aim to foster inclusive economic growth in local communities by increasing the productive capacity of the population and its range of economic opportunities, while investing in children early to ensure a firm foothold for their future potential. These recommendations focus on ways to expand the economic pie, as well as the ability of different groups to benefit from that growth. Policy recommendations focus on areas with a comparatively solid evidence base, while encouraging investments in more and better data.

The recommendations follow the Green, Resilient, and Inclusive Development (GRID) framework. Given the district's natural endowment and its exposure to climate risk, all development interventions must, at a minimum, do no ecological harm and, where feasible, invest in pathways to ecologically responsible and sustainable livelihoods. At the same time, investments are needed to build resilience in the local economy and livelihoods, enabling populations to bear risk and uncertainty without eroding productive assets and capital. Finally, leveling the playing field in terms of access to services, jobs, and growth opportunities is essential to tap into the productive potential of all residents of the district, and build resilience among the Bangladeshi and Rohingya communities.

Figure ES1: Key policy recommendations

Early investments in productive potential

Access to clean water, improved sanitation, and electricity

- Inclusive – Expand access to private sources of clean water, and reduce reliance on shared sources, particularly in host communities close to Rohingya camps.
- Inclusive – Broaden access to improved sanitation facilities across the district.
- Inclusive – Increase water, sanitation, and hygiene (WASH) investments in camps to reduce reliance on shared facilities.
- Inclusive – Promote investments in electricity distribution and transmission capacity to increase the number of hours of grid electricity across the district, particularly in host communities close to camps.
- Green – Invest in solar and wind-based energy generation to expand access to electricity. Improve coordination between international organizations and local government to expand programs and subsidies to increase the use of solar panels.
- Resilient – Modify the scheme of national electricity prices to achieve a cost recovery rate, which is essential to the sustainability of the system.
- Resilient – Strengthen local government mandates, allowing community preferences to be reflected in budget allocations and expenditures, particularly outside Municipal and City Corporations.
- Resilient – Strengthen links and communication between local government entities and humanitarian agencies to better align resource use with local needs and strengthen institutional capacity to respond to development needs.

Maternal and child health

- Resilient – Expand nutritional programs among hosts, including early detection of child malnourishment and programs for good nutrition practices among young mothers, awareness and adherence to vaccinations, and pre- and post-natal care. This can increase resilience among vulnerable host households in the context of COVID-19 in the short term, and of undernourishment in the medium term.
- Inclusive – Increase coordination between humanitarian actors and local government to expand nutritional programs already present in camps to host communities. This can guarantee access to basic nutrients for all children.
- Inclusive – Expand social assistance support to female-headed households, particularly those headed by young mothers, so that they do not have to trade off caring for young children and earning a living.
- Inclusive – Expand programs to close immunity gaps among children living in camps, and protect against future infectious outbreaks through scale-up and strengthening of routine immunization services.

Investing in productive capacity

Human capital and skills

- Inclusive – Provide pro-poor scholarships and conditional cash transfers to women, the economically disadvantaged, and students at higher risk of dropping out.
- Resilient – Promote business and vocational skills programs to foster self-employment in service-related activities.
- Inclusive – Pilot and expand implementation of the Myanmar curriculum for Rohingya children in camps, while easing mobility and safety concerns to increase enrollments.
- Inclusive – Provide education certification for primary and secondary school completion for Rohingya children.
- Resilient – Expand programs that: provide psychosocial support to Rohingya youth and adolescents; expand awareness of and access to sexual and reproductive health services; and support survivors of sexual and gender-based violence and trauma.
- Inclusive – Improve school learning environments and teacher-student ratios to boost education quality and reduce dropouts.
- Inclusive – Promote support from development partners for government efforts to strengthen human capital and skills. This includes encouraging private-sector entities involved in infrastructure and tourism to develop employment-oriented skills and vocational training programs, better preparing youth for employment in these sectors.
- Resilient – Invest in market-relevant skills for migrants. This can boost migration's potential as a welfare driver, reducing pressure on local labor markets.
- Resilient – Implement a system for ongoing real-time health surveillance.

Resilient livelihoods

- Green - Review and reform input subsidy policies with a special focus on fertilizers. Complement with extension services for more efficient fertilizer use, and environmentally friendly alternatives for improving soil quality.
- Inclusive - Expand mechanization for seed establishment, crop protection, irrigation, and harvesting, particularly among small farmers.
- Inclusive - Expand the collateral registry's mandate to include movables and immovables as collateral. This will broaden access to credit.
- Resilient - Expand infrastructure projects to protect populations from environmental disasters. This will increase the resilience of local communities.
- Resilient - Develop the insurance sector to expand access to insurance instruments among farmers and households.
- Green - Improve environmental and forest regulations to manage climate risk.
- Green - Given climate-change and environmental risks, sector-specific measures will be needed to help farmers adapt their cropping systems and fisheries activities.

Expanding economic opportunities

Private sector-led job creation

- Resilient/Green – A package of coordinated interventions are needed to radically change the orientation and earnings potential of tourism and aquaculture. To realize the potential of the tourism sector, concerted effort is needed, including in attracting foreign investment, infrastructure and information and communication technology (ICT) services, marketing, and environmentally sustainable tourism infrastructure and planning. Fishing and aquaculture development could be fostered, if complementary investments are made to facilitate storage, transport, marketing, and quality and standards assurance and certification.
- Inclusive – Expand initiatives to use locally sourced and procured food for food assistance in Rohingya camps.
- Green – Create conditions for hosts to take advantage of rising demand for local products due to the Rohingya. A larger local market reduces transaction and marketing costs for perishable products and, by limiting reliance on imports, has the potential to reduce the carbon footprint. This could spur diversification in production and encourage local farmers to invest in productive improvements.
- Green – Expand low-skill job opportunities in farming, construction, and environmental restoration close to camps.
- Resilient – Engage the private sector in humanitarian assistance by sharing technological capabilities and expertise, adapting business models to sell goods and services to the Rohingya.

Market integration and connectivity

- Inclusive – Increase tracking and monitoring capacity for shipments. Introduce a regulatory system to ensure that large and small transport operators can meet appropriate quality and safety standards.
- Resilient – Promote investment in storage, transport, marketing, quality and standards assurance, certification, and other sector-specific needs for tourism and hospitality, aquaculture, and high-value crops.
- Resilient – Upgrade infrastructure and ICT services for the international business clientele.
- Inclusive – Ease connectivity challenges so that Cox's Bazar's northern unions can exploit their comparative advantage as a hub for non-agricultural activities.
- Inclusive – Connectivity investments focused on upgrading existing networks can lower the cost of accessing jobs, inputs, and markets, while better connecting southern Cox's Bazar to more economically vibrant northern unions.
- Inclusive – Adapt the policy and regulatory framework on infrastructure development to include multiple transport modes, service quality, and road safety.
- Inclusive – Improve quality and expand access to digital infrastructure in the district through fiber-optic infrastructure, 4G capacity expansion, and telecom towers.

Bridging evidence gaps

- Strengthen statistical capacity to produce and share subnational expenditure data. This will help policy makers and stakeholders better understand how expenditure relates to health, education, and other outcomes and can enable efficiency gains in public spending.
- Foster investments in data and evidence on constraints to firm entry, growth, and dynamism that are specific to the district. Similarly, invest in data and evidence on the potential for improved linkages with local businesses to deliver new investments in tourism and aquaculture, as well as on how government, humanitarian, and development investments may affect job creation in Cox's Bazar.
- Promote research on how the Rohingya influx has affected service delivery. Apply research results to inform an appropriate policy response.
- Invest in research to generate evidence on new employment opportunities for women and school dropouts in the camp-related economy, as well as on how more inclusive vocational programs might be linked to productive opportunities for work.
- Promote research to understand how the large influx of humanitarian assistance has affected local host communities, both in terms of potentially increasing competition for low-skill jobs, and providing new work and income-earning opportunities for hosts, including better-educated youth.

Government and partners can act now to leverage opportunities for inclusive growth in Cox's Bazar, while filling evidence gaps. The results of this diagnostic can inform that work. Government can play a critical role in coordinating private, public, humanitarian, and development actors to leverage local growth potential and help capitalize on the district's natural advantages. Meanwhile, important data and evidence gaps remain and will need to be filled to better understand: (i) how the local economy is evolving in response to the Rohingya influx; (ii) sector-specific challenges to growth for the local private sector; and (iii) the potential for humanitarian and development interventions to work at scale to improve the livelihoods of hosts and the displaced.

CHAPTER 1.

Introduction

Over the past two decades, Bangladesh has achieved an economic transformation enabling formidable reductions in extreme poverty and remarkable human development progress. The expansion of labor-intensive manufacturing and exports, primarily garments, has driven the country's economic gains, which have supported sustained per capita income growth. Between 2000 and 2015, Bangladesh lifted more than 25 million people out of poverty. Robust jobs growth has been accompanied by increasing labor force participation among women, which rose by 10 percentage points between 2003 and 2016, from 26 to 36 percent (Farole and Cho 2017).

However, the structural transformation of Bangladesh's economy remains incomplete, and since 2015, unsolved pre-existing constraints and emerging risks (including the COVID-19 pandemic) have threatened to slow the country's progress. A large share of the workforce is un- or under-employed, and average educational attainment is low. Agriculture still accounts for 40 percent of employment, despite its declining contribution to economic growth. Urban poverty reduction has stagnated, while a suboptimal business environment and regulations limit private sector growth (Zafar et al. 2020). Connectivity challenges make it harder to integrate markets within Bangladesh and link the country to regional and global markets. Growth in the agricultural and service sectors has slowed, while deteriorating competitiveness in the readymade garment (RMG) industry, the absence of diversified exports, and the impacts of COVID-19 have constrained job creation in manufacturing. To date, asset accumulation and income diversification from the rural sector have been the main drivers of household welfare gains. However, the marginal return of accumulation is reaching a limit, and constraints to taking advantage of these returns are slowing growth and poverty reduction.

These structural issues are not uniform across the country and could exacerbate regional disparities. Subnational disparities affect not just poverty reduction and local economic growth, but also resilience and the capacity of subnational entities to manage exogenous shocks such as climate-change-related disasters or demographic shifts. Indeed, equity and spatial development considerations are becoming increasingly important in Bangladesh, given the need to foster new sources of inclusive growth, leverage local endowments, and mitigate local challenges in light of the reemerging East-West welfare divide (Hill and Genoni 2019).

The district of Cox's Bazar is an instructive context to understand how long-standing and newer growth constraints and opportunities in Bangladesh manifest at the local level—and how local action can accelerate national agendas.[1] **Opening growth paths in Cox's Bazar can boost livelihoods for all district residents while advancing country-wide economic inclusion and development goals.** Leveraging these opportunities require understanding Cox's Bazar's distinctive geography and development trajectory. Historically, the district's location at the southeastern tip of Bangladesh and its lack of connectivity to the major growth poles of Dhaka and Chittagong (Map 1-1) have constrained its growth options. Combined with its relatively low endowment in assets and human capital, the district's distance from urban drivers of growth and job creation has largely excluded Cox's Bazar from the garment-industry boom.

Cox's Bazar's location, bounded by the Bay of Bengal to the south and the west and sharing a border with Myanmar to the east, also determines potential comparative advantages for tourism and international trade, which have remained largely untapped. This locational advantage allows for the planned construction of a new energy complex and deep-sea port at Matarbari, in the district's Maheshkhali upazila (subdistrict). This is one of a number of fast-track mega-projects which are being prioritized by the Government of Bangladesh.[2] These projects are critical to national growth, improving the competitiveness of Bangladesh's exports, and expanding access to international trade.

[1] Administratively, Bangladesh is divided into eight divisions and 64 districts, with each district further divided into upazilas or sub-districts. Each upazila is comprised of a number of unions, consisting of several villages, with the exception of urban and metropolitan areas, which are designated as paurasavas (municipalities) or city corporations. Chittagong and Cumilla are the only two city corporations in Chittagong division (of 12 in the country). Within Cox's Bazar district, there are four metropolitan areas – in Cox's Bazar Sadar, Chakaria, Maheshkhali, and Teknaf.

[2] These projects include, for instance, the Padma Multi-Purpose Bridge Project; Dhaka Metro Rail Project and the Dhaka Elevated Expressway; and the construction of single line dual gauge railway track from Dohazari to Cox's Bazar via Ramu and Ramu to Gundum, near Myanmar.

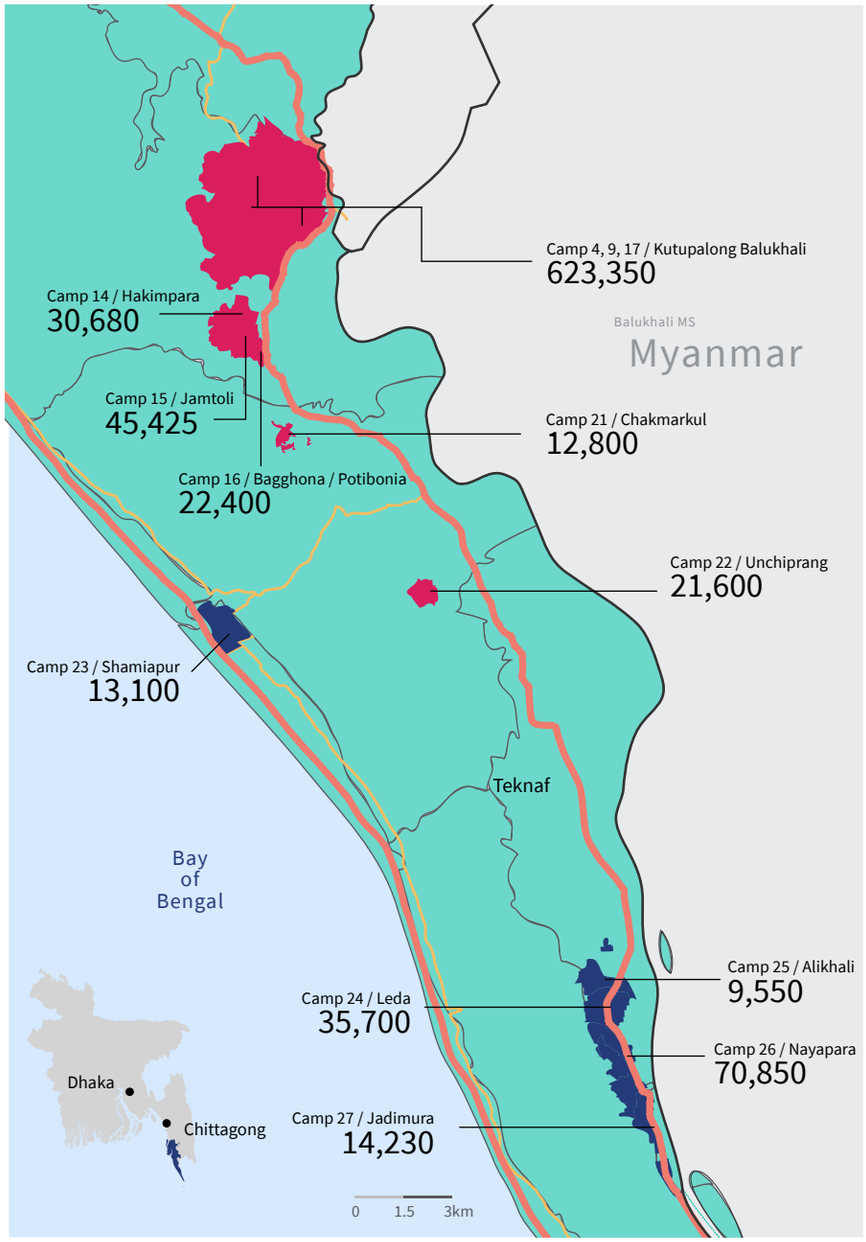
Map 1-1: Bangladesh and Cox's Bazar district: major roads and seaports[3]

Source: Outline shape file, Bangladesh Bureau of Statistics; transport data © OpenStreetMap contributors.

Cox's Bazar is hosting a large influx of recently displaced Myanmar nationals (the Rohingya), whose presence signals new inclusive growth challenges and opportunities. Cox's Bazar hosts more than 884,000 displaced Myanmar nationals, of whom 725,000 Rohingya have crossed into Bangladesh from Myanmar since August 2017. The influx has more than doubled the population living in the Cox's Bazar upazilas of Teknaf and Ukhia (see Map 1-2 for location of main camps), which had higher poverty rates than the rest of the district prior to the influx (Map 1-3 and Map 1-4 show zila (district) level pre-Rohingya population density and poverty estimates; see also Box 1).

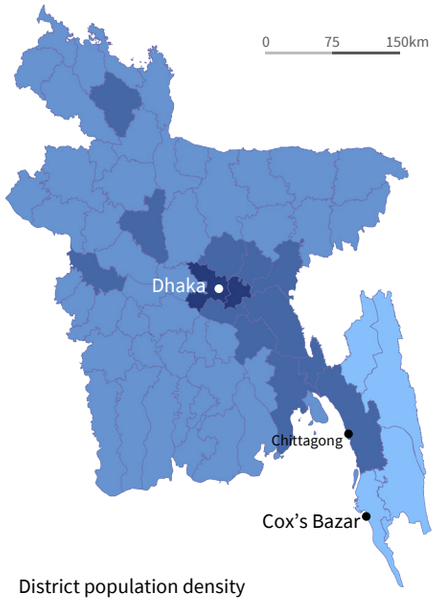
[3] All transport data used in the maps in this report are from Open Street Map,© OpenStreetMap contributors.

Map 1-2: Locations of recently displaced Rohingya camps in Teknaf and Ukhia upazilas as of May 2018



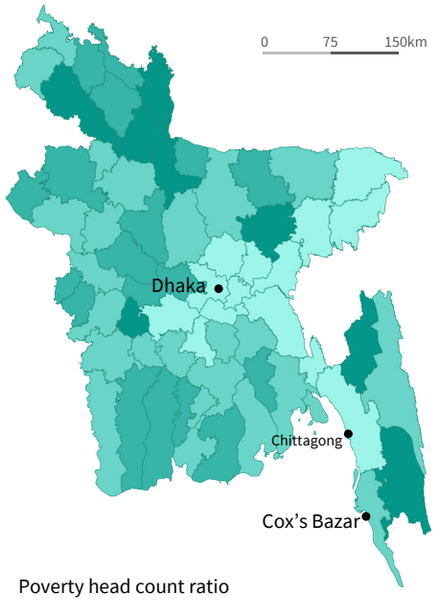
Source: Inter Sector Coordination Group, Cox's Bazar, 2018.

Map 1-3: Population density by zila, estimated 2018 (does not include Rohingya population)



Source: World Bank staff estimates based on Population Census 2011.

Map 1-4: Poverty headcount by zila, 2016 (upper poverty line)



Source: World Bank 2020b, based on HIES 2016.

Highly localized within these two upazilas, the Rohingya influx and the arrival of significant aid resources have brought major changes to a district that, before the influx, reported poor development outcomes relative to national averages. Prior to the Rohingya influx, Cox's Bazar already had a comparatively large share of its population working in the primary sector (43 percent versus 38 percent nationally), lower literacy rates (55 percent versus 60 percent nationally), and less access to electricity (52 percent versus 76 percent nationally) (Household Income and Expenditure Survey, HIES, 2016). Additionally, the sudden increase in population density, unaccompanied by growth, places unprecedented pressures on the area's natural resources in a context of high vulnerability to natural calamities like cyclones and floods.[4]

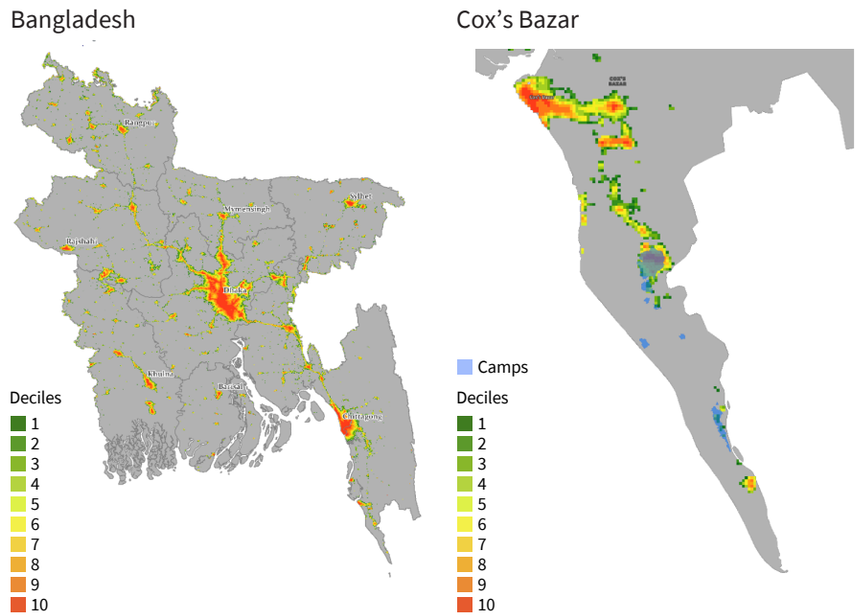
[4] Both Cox's Bazar and Chittagong have been identified as South Asian cities which are at risk of all four major hazards: flooding, earthquakes, landslides, and cyclones (Ellis and Roberts 2016).

The Rohingya influx has been accompanied by a large-scale humanitarian response, in a context of weak local governance that has made it harder for host communities to make their voices heard (Fox and Menon 2008). Between 2017 and 2020, an average of US$634 million annually was allocated to the Rohingya crisis response.[5] The humanitarian effort has been largely successful in delivering basic needs and food security to the displaced population (World Bank 2020c). However, local governments have limited funds and capacities to collaborate actively in the response. In general, district and local governments in Bangladesh have a limited role in charting policy and shaping public investments. As a result, there are often few avenues for local communities to influence policy agendas that may affect their welfare. In particular, elected local government representatives rarely participate in the identification, appraisal, approval, implementation, and monitoring of investment projects funded through the Annual Development Plans (World Bank, forthcoming). In this context, durably aligning the interests of displaced Rohingya people and local host communities in Cox's Bazar has proved challenging.

Growing economic activity around Rohingya camps may already be advancing economic convergence within Cox's Bazar and may be contributing to a positive national trend. Bangladesh's two major urban growth poles, Dhaka and Chittagong, remain outliers in their concentration of economic activity. However, there is some recent evidence which is suggestive of increasing economic activity in some districts, including Cox's Bazar. Using nighttime lights (NTL) as a proxy of economic activity, the concentration of economic activity in the Dhaka-Chittagong corridor is readily evident, as are marked regional disparities in economic density (Map 1-5). However, over the period 2014 to 2019, the Gini coefficient of the average NTL intensity between districts by year fell from 0.44 to 0.37, and from 0.28 to 0.20 if the top 10 percent of districts in NTL density (primarily in the Dhaka-Chittagong corridor) are excluded. In 2014, Cox's Bazar ranked 46th out of 64 districts in NTL intensity (proxying economic activity), whereas by 2019, its rank had improved to 33rd. Among all the districts in the country, Cox's Bazar was the only one that moved up in the ranking by more than 10 places in this period. Most of the NTL intensity change in Cox's Bazar took place after 2017, in areas near the Rohingya camps and along the road connecting Cox's Bazar Sadar to the upazilas of Teknaf and Ukhia. This is suggestive of increasing economic activity (and electrification), potentially related to the influx of Rohingya and associated humanitarian assistance and aid flows.

[5] United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) Financial Tracking Service. "Bangladesh: 2020 Joint Response Plan for Rohingya Humanitarian Crisis (January-December)." https://fts.unocha.org/appeals/906/summary

Map 1-5: Nighttime lights as a marker of economic activity, Bangladesh and Cox's Bazar, 2019



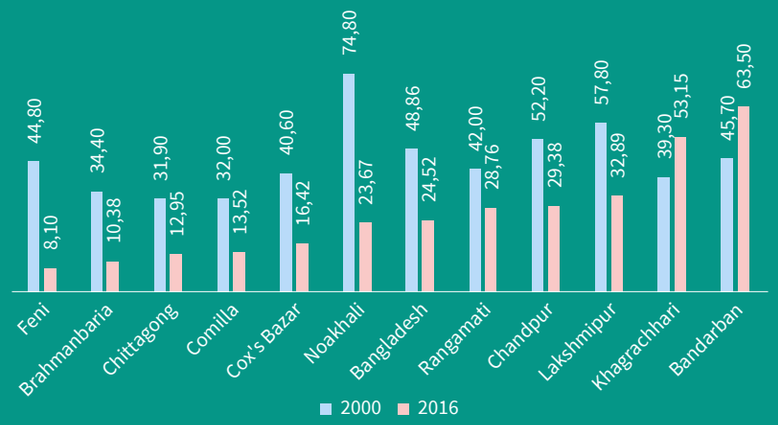
Source: World Bank staff calculations using United States National Oceanic and Atmospheric Administration (NOAA) nighttime light intensity data.
Note: Deciles created using nighttime light intensity from March 2019, excluding values below 0.1.

Box 1: Poverty in Cox's Bazar

Cox's Bazar as a whole has relatively low poverty rates compared to the national average, but some of its sub-districts are much poorer. According to Bangladesh's latest poverty assessment, the national poverty headcount rate (upper poverty line) was 24.5 percent in 2016, while the poverty rate in Cox's Bazar district stood at 16.5 percent (World Bank 2019a), among the lowest in Chittagong division. In fact, between 2000 and 2016, the district's poverty rate dropped 24 percentage points (Figure B1-1). However, significant disparities exist within Cox's Bazar. According to 2010 small area poverty estimates, prior to the Rohingya influx, the two upazilas of Teknaf and Ukhia had high poverty rates (38.2 and 37.8 percent respectively). These rates placed Teknaf and Ukhia,

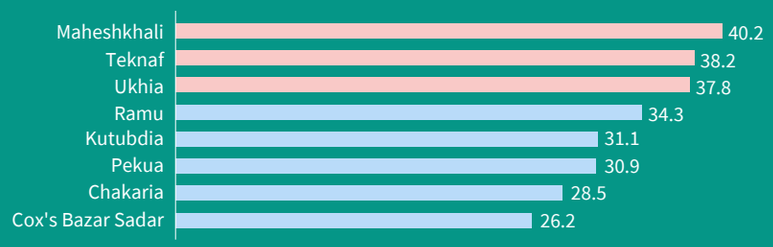
along with Maheshkhali, on par with some of the poorest districts in the country (Figure B1-2). As Figure B1-3 shows, average per capita expenditure in Cox's Bazar Sadar is almost 20 percent higher than in Teknaf and Ukhia, and these differences are statistically significant. A simple average of per capita expenditure between Teknaf and Ukhia is still 10 percent lower than the average for Cox's Bazar Sadar, Chakaria, Pekua, and Ramu.

Figure B1-1: **Poverty rate, districts in Chittagong division versus Bangladesh, 2000 - 2016**



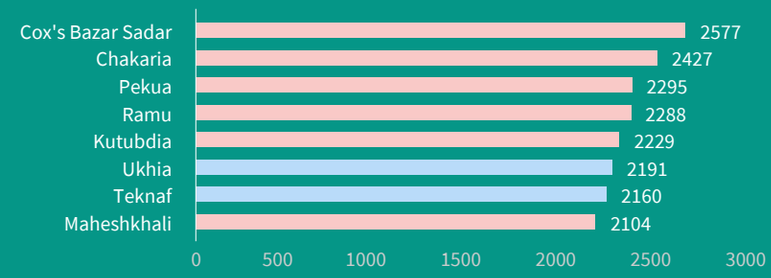
Source: Staff calculations using HIES 2000, HIES 2016-17, and Census 2001.
Note: Figures present the national upper poverty rate by division and district. The poverty rate for 2000 was calculated using Small Area Estimation (SAE)

Figure B1-2: **Poverty rate, upazilas in Cox's Bazar, 2010 small area estimates**



Source: Ahmed et al. (2010).

Figure B1-3: **Monthly per capita expenditure (Tk), upazilas in Cox's Bazar, 2010 small area estimates**



Source: Ahmed et al. (2010).

This diagnostic seeks to understand the implications of new and pre-existing drivers and constraints to inclusive growth in Cox's Bazar. The diagnostic will: (i) analyze Cox's Bazar's economy before the recent Rohingya influx; (ii) identify changes in key factor markets and how they are related to the influx; (iii) analyze key constraints to current and future growth and poverty reduction; (iv) pinpoint opportunities to accelerate inclusive growth, addressing the needs of host communities and displaced Rohingya; and (v) identify areas for intervention along with data and evidence gaps. The value addition of this diagnostic comes through new analysis of existing and recently collected datasets, combined with geospatial analysis on travel times and accessibility, to provide insights at district and sub-district level (Box 2). As a diagnostic based on currently available data, this report prepares the way for a future second phase of work. That phase will focus on filling existing data gaps and involve dialogue with a range of stakeholders (local government, private sector, development partners, and humanitarian agencies) to build consensus on areas for intervention.

Box 2: **Data sources for this diagnostic**

The Cox's Bazar Inclusive Growth Diagnostic draws on several existing and newly available datasets that allow for analysis at the national, regional, district, and sub-district level. These include census data and sample surveys, as well as administrative and geospatial data. The report's principal data sources are the following:

The **Cox's Bazar Household Panel Survey (CBPS)** was designed to assess the implications of the 2017 Rohingya influx into the Bangladeshi district of Cox's Bazar on the living standards and welfare of the host population. The CBPS is the result of a partnership between the Yale Macmillan Center Program on Refugees, Forced Displacement, and Humanitarian Responses (Yale Macmillan PRFDHR); the Gender & Adolescence: Global Evidence (GAGE) program; the Poverty and Equity Global Practice of the World Bank; and the State and Peacebuilding Fund (SPF) administered by the World Bank. The sampling strategy for this survey aimed to produce reliable statistics for the Rohingya living in camps and the host population living in Cox's Bazar district. To distinguish between host communities that are more or less affected by the arrival of the Rohingya, the survey's sampling strategy uses a threshold of three hours' walking time from a campsite to define two strata for hosts, in addition to the stratum comprised of Rohingya in camps: (i) host communities with potentially high exposure to the displaced Rohingya, and (ii) host communities with potentially low exposure. The CBPS baseline implemented in 2019 and subsequent phone surveys are representative at the strata level.

The **Household Income and Expenditure Survey (HIES)** is the main official source of information about household consumption, poverty, and income in Bangladesh. HIES 2016/17 data was collected from April 2016 through March 2017 and, unlike previous rounds of the survey, is representative at the district level and division level - by rural and urban areas.

The **Economic Census 2013** is the most comprehensive enumeration of the full set of economic units belonging to Bangladesh. The third economic census was conducted between March and May 2013 across the country and aimed to measure the structural changes in Bangladesh's economy during the preceding decade (BBS 2015a). The Economic Census includes all non-agricultural establishments in the country.

Bangladesh's **Population Census 2011** is the most complete data set containing information about the size of the country's population, as well as socio-economic and socio-demographic characteristics. The population census provides data at national, division, zila, and thana-upazila levels and distinguishes urban and rural populations. The population census was conducted in March 2011 (BBS 2015b).

This inclusive growth diagnostic also draws on other surveys and administrative data from the Bangladesh Bureau of Statistics (BBS). Among these

sources are the Annual Yearbook of Agricultural Statistics (BBS 2017), District Statistics Cox's Bazar (2011), Annual Primary School Census (2018-2019), and the Agricultural and Rural Statistics survey (ARRS 2018), as well as data from the Bangladesh Bureau of Educational Information and Statistics (BAMBEIS 2018), the Demographic and Health Survey (DHS 2014), and the Multiple Indicator Cluster Survey (MICS 2019).

Spatial analysis has been conducted using data on administrative boundaries (Local Government Engineering Department [LGED] 2018), schools (all types) (LGED 2018), OpenStreetMap (OSM late April 2020), and High-Resolution Population Density Maps (Facebook and CIESIN 2018). The latter is a gridded population model distributing 2018 projections of census data per union to pixels deemed inhabited by a country-specific convolutional neural network built by Facebook. Essentially, the model allocates population only to where residential buildings are detected, leaving uninhabited areas blank, improving accuracy.

This diagnostic follows in spirit the framework put forth in *World Development Report 2009: Reshaping Economic Geography* (WDR 2009). The WDR argued that the economic integration of lagging or underdeveloped areas can be fostered through interventions that promote *density* and agglomeration economies, reducing *effective distance* between labor and the areas where the returns to labor are the highest, and reducing barriers to integration of markets—or *division*—within and across countries. Applying this framework to Cox's Bazar district, this report examines the constraints and opportunities facing the district in light of an exogenous increase in population density, in the context of lagging socio-economic development and limited economic linkages between the Rohingya and the host community. Cox's Bazar, particularly the southern sub-districts that are most affected by the population surge, remain distant from national growth poles in terms of transport connectivity and of effective links to the economic sectors that have driven growth, exports, and employment in Bangladesh. However, the district enjoys two new opportunities to turn this state of play into an advantage. These are the planned investments in and around the Matarbari port and energy complex, and the significant inflow of humanitarian assistance into Teknaf and Ukhia. Importantly, these potential advantages for inclusive growth can only become operative on certain conditions: if targeted policies are in place to help the people of Cox's Bazar grasp the emerging opportunities; if institutions respond effectively to local preferences; and if there are favorable conditions for market forces to work.

This report is organized as follows: Chapter 2 examines the state of fundamental endowments in the district, including demography, geography, and human capital. It also reviews the district's existing stock of connecting infrastructure. How these endowments shape Cox's Bazar's economic structure and the welfare and livelihoods of its residents is the focus of Chapter 3. Chapter 4 highlights constraints to inclusive growth and identifies opportunities for investment and policy action to advance inclusive development. Chapter 5 presents recommendations for policy and programming and suggests areas for further study.[6]

[6] Some sections of this report could not be completed as planned, due to COVID-19-related travel and other restrictions. Affected components primarily include a planned assessment of the current delivery model of humanitarian assistance, along with documentation of pilot initiatives inclusive of the host community. The diagnostic's narrative has been updated to reflect developments in Cox's Bazar since the outbreak of the pandemic and the imposition of restrictions on some forms of economic activity. New data collection is planned in the second phase of work to understand how local economic activity has evolved since the 2017 Rohingya influx.

CHAPTER 2.

Fundamentals: People, land, and infrastructure

This chapter examines fundamental endowments that shape growth potential and competitiveness in Cox's Bazar. It highlights endowment gaps that have constrained the district's success in advancing inclusive growth, but also distinctive assets that hold promise for the future. The chapter discusses four areas: demographics; human capital and living conditions; geography; and connective infrastructure.

Demographics and density

Cox's Bazar district accounts for just 1.7 percent of Bangladesh's total population, but the district's population has been growing relatively fast. Cox's Bazar district's estimated population growth rate of 2.33 percent over the 2016-2021 period is more than one-and-a-half times the national average of 1.39 percent, and the highest among zilas (districts) in Chittagong division (BBS 2015). Assuming that the district's population growth rate has remained steady in recent years, the estimated population of Cox's Bazar (excluding recently displaced Rohingya) in 2019 was 2.5 million (BBS 2019).

The arrival of displaced Myanmar nationals (Rohingya) in 2017 has dramatically altered the demographic profile of Cox's Bazar. Cox's Bazar's location, particularly its long land border with Myanmar, has made it a natural refuge for displaced Myanmar nationals. Within a four-month period beginning in August 2017, the most recent major influx of displaced Rohingya from Myanmar increased the population living in Cox's Bazar by 31.7 percent. These displaced people joined over 150,000 Rohingya who had already arrived in Cox's Bazar since the late 1970s (UNHCR 2018).[7] While the Rohingya community represents less than 1 percent of Bangladesh's total population and 3 percent of the population of Chittagong division, it comprises 40 percent of the population of Cox's Bazar district (relative to 2011 census population estimates, which do not include Rohingya). While a 1 percent increase in population may have limited effects, a 40 percent increase in population can be expected to place substantial pressures on local infrastructure, markets for food basic necessities, and labor markets.

Within Cox's Bazar, the two upazilas most affected by arriving Rohingya have been Teknaf and Ukhia, which border Myanmar. Before the recent influx, around 45,000 and 123,000 Rohingya were already living in Teknaf and Ukhia, respectively. In the second half of 2017, the influx of displaced Rohingya increased the population living in Teknaf and Ukhia by 38 percent and 150 percent, respectively (The absolute numbers of newly arriving Rohingya reached some 125,000 persons in Teknaf and 600,000 in Ukhia.) This implies that the share of the Rohingya community in the total population of these upazilas rose sharply. In Ukhia, displaced Rohingya now account for as many as 4 out of 5 inhabitants. In Teknaf, 4 out of 10 persons are now displaced Rohingya (Map 2-1 and Map 2-2). In light of these shifts, Ukhia is now the most densely populated upazila in Cox's Bazar district, overtaking Cox's Bazar Sadar, and followed by Teknaf (Map 2-3 and Map 2-4).[8]

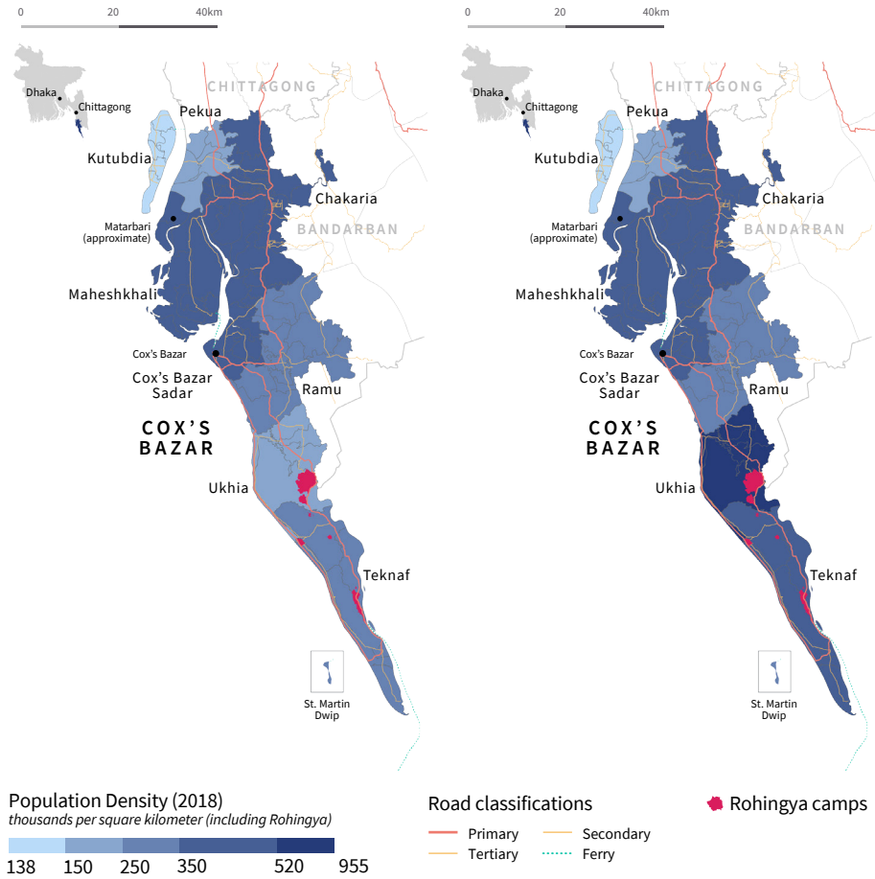
The population of Cox's Bazar district is younger than the national average, and this has been reinforced by the arrival of an even younger Rohingya population. About 30 percent of Bangladesh's population is made up of children in the 0–14 age group; for Cox's Bazar district, this figure is some 10 percentage points higher, at about 40 percent (Figure 2-1). The recently displaced Rohingya population is overwhelmingly young: 50 percent of the arriving Rohingya are under 15 years of age. Combined, these demographic characteristics of host and Rohingya communities have important implications for education and health-sector needs going forward (UNDP 2018).

[7] UNHCR estimates that there were 168,000 Rohingya in Cox's Bazar prior to the 2017 influx. See https://data2.unhcr.org/en/situations.

[8] Population at upazila level has been estimated using the population growth rate for Cox's Bazar included in Population projection of Bangladesh: dynamics and trends 2011-2061 (BBS 2015).

Map 2-1: Population of Cox's Bazar district, by upazila, pre-2017 Rohingya influx[9]

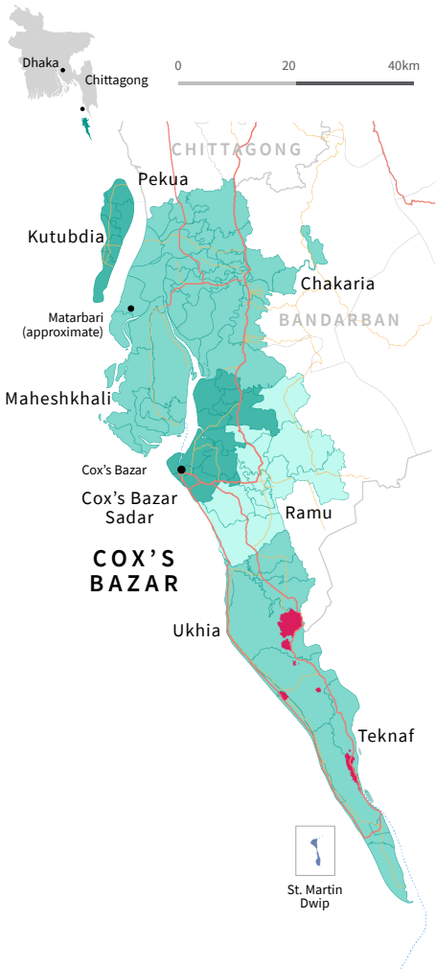
Map 2-2: Population of Cox's Bazar district, by upazila, post-2017 Rohingya influx



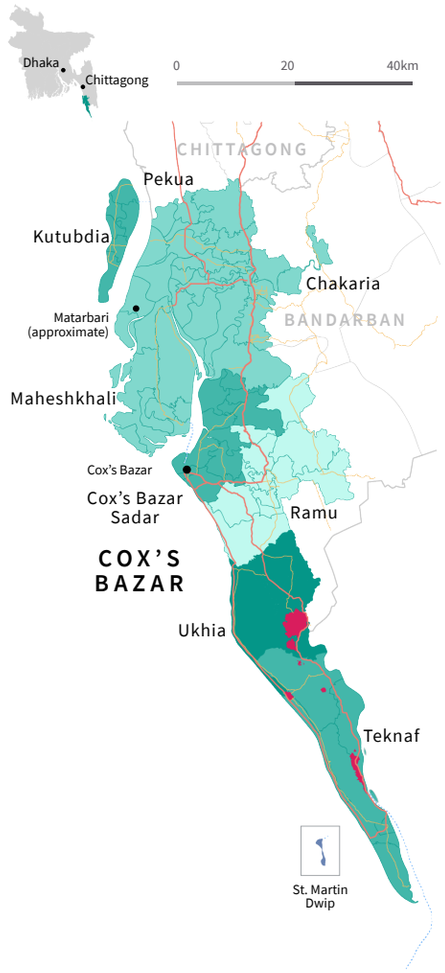
Source: LGED, OpenStreetMap, HRSL, UNPD, ACAPS.
Notes: Scalar adjustment of 2011 census based on UN Population Division growth estimates

[9] Population for 2017 has been estimated by applying the estimated population growth rate to Cox's Bazar district and using the share of each upazila in total district population from Population Census 2011. Since Population Census 2011 counted only Bangladeshi citizens, the pre-influx population numbers presented here have been adjusted to incorporate the displaced population known to have settled in Bangladesh before August 24, 2017. Data on growth rates is available in Population projection of Bangladesh: dynamics and trends 2011-2061 (BBS 2015). Data on the displaced population present before August 2017 is available at https://data2.unhcr.org/en/situations

Map 2-3: Population density by upazila, before 2017 influx, including pre-2017 displaced Rohingya

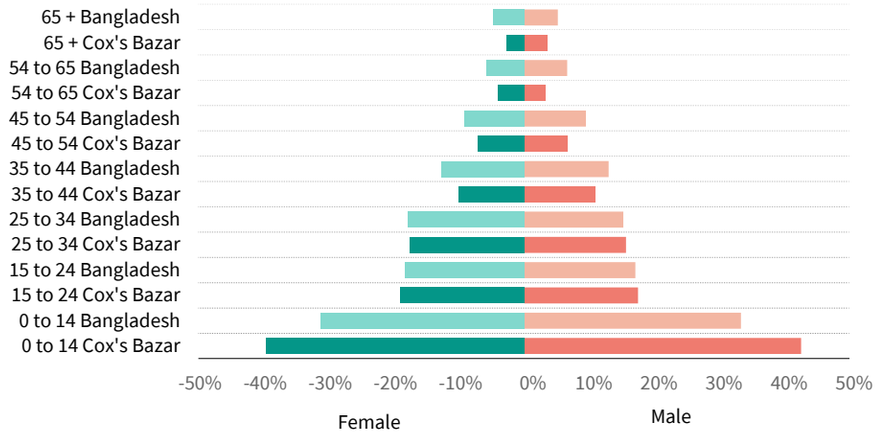


Map 2-4: Population density by upazila, after 2017 influx, including newly displaced Rohingya



Source: LGED, OpenStreetMap, HRSL, UNPD, ACAPS.
Notes: Scalar adjustment of 2011 census based on UN Population Division growth estimates

Figure 2-1: Demographic pyramids, Bangladesh versus Cox's Bazar, 2016



Source: World Bank staff calculations, HIES 2016.

Human capital and living conditions

Human capital is increasingly recognized as a critical input to inclusive growth (World Bank 2020a).[10] In contrast to geography, for example, human capital is an endowment that governments can substantially improve through well-understood policy choices and programs. The World Bank's Human Capital Index (HCI) measures "the productivity as a future worker of a child born today, compared with what it could be if he or she had full health and complete, high-quality education" (World Bank 2020a). Bangladesh's HCI performance lags somewhat behind the average for lower-middle-income countries and the average across the South Asia region. This is mainly due to the comparatively poor quality of education in Bangladesh and the continued prevalence of stunting. This section presents data on how Cox's Bazar is performing in the two key domains of human capital formation, education and health, and in the provision of basic goods and services that contribute to the development of human capital.

Education

Cox's Bazar has historically been among Bangladesh's poorest-performing districts in terms of education. According to the 2011 Population Census, only five Bangladeshi districts had a lower adult literacy rate than Cox's Bazar, and only Bandarban district was ranked lower within Chittagong division. Educational attainment among adults remains

[10] https://www.worldbank.org/en/publication/human-capital

low, with half of all Cox's Bazar adults never having attended school, and only a third of adults in poor households able to read or write (USAID 2018). According to HIES 2016, only 53 percent of individuals older than 18 in the district are literate, below the national average of 59 percent and among the lowest rates in the country. Forty-seven percent of the adult population has never attended school, compared to the national average of 42 percent and the Chittagong division average of 39 percent. Only 34 percent of the district's adult population has achieved primary education or beyond, compared to 39 percent on average in Bangladesh overall and 43 percent in Chittagong division (HIES 2016).

Cox's Bazar lags not only on quantitative measures of educational attainment, but also on measures suggestive of educational quality, such as student-teacher ratios. According to preliminary data from the National Primary School Census 2019 and BANBEIS 2018, the student-teacher ratio for Cox's Bazar is among the highest in the division and in the country, at 42 and 68 students per teacher in primary school and secondary school, respectively. The National Student Assessment 2017 (BBS 2018b), reflecting standardized test results in mathematics and Bangla for children in grades 3 and 5 nationwide, places Cox's Bazar among the three lowest-performing districts in the country.[11]

Within Cox's Bazar, the upazilas of Teknaf and Ukhia were already lagging in educational attainment prior to the influx of displaced Rohingya. A comparison of adult educational attainment across areas which were more exposed to the Rohingya influx and those that were further away within Cox's Bazar (CBPS 2019) suggests that the high-exposure areas (mainly Teknaf and Ukhia) have a higher share of adults who have never attended school (Figure 2-2).[12] High-exposure areas also have lower educational attainment among adults for post-primary school levels. Within the district, adult men are more likely to have some education than adult women, or in other words, 52 percent of men never attended school relative to 55 percent of women. The overall pattern of higher adult male educational attainment at the district level appears to be driven by low-exposure areas (Figure 2-3), which have larger shares of male adults with education beyond primary (50 percent in low-exposure versus 41 percent in high-exposure areas). On the other hand, the large share of females with secondary incomplete in low-exposure areas contributed to narrowing the gender education gap at the district level.

Low human capital among hosts living near camps raises the risk of competition with Rohingya for low-skill jobs. The findings just summarized on adult educational attainment within Cox's Bazar reflect conditions before the recent influx of displaced Rohingya.

[11] Specifically, the results flag Cox's Bazar as the second-worst performer in Bangla Language and among the 10 worst in mathematics at grade 3. For grade 5, Cox's Bazar had the third-lowest mean among all Bangladeshi districts for both Bangla language and mathematics.

[12] To distinguish between host communities that are more or less affected by the arrival of Rohingya, the survey's sampling strategy uses a threshold of three hours' walking time from a campsite to define two strata for hosts: (i) host communities with potentially high exposure to the displaced Rohingya, and (ii) host communities with potentially low exposure.

The results suggest that Bangladeshi households living in Teknaf and Ukhia, closer to the Rohingya camps, were already accumulating human capital at lower rates than households living further away in the district. In this context, the influx of a Rohingya population with even lower average rates of human-capital endowment risks intensifying competition for low-skill jobs in high-exposure areas. Compared to hosts, adult Rohingya have far lower educational attainment – with 90 percent of adults never having attended school or completing less than primary education. In addition, gender gaps become large at secondary and post-secondary levels, for the few Rohingya who did go to school.

Figure 2-2: Educational attainment, adults (18+), 2019 (low-exposure areas, high-exposure areas, and Rohingya camps)[13]

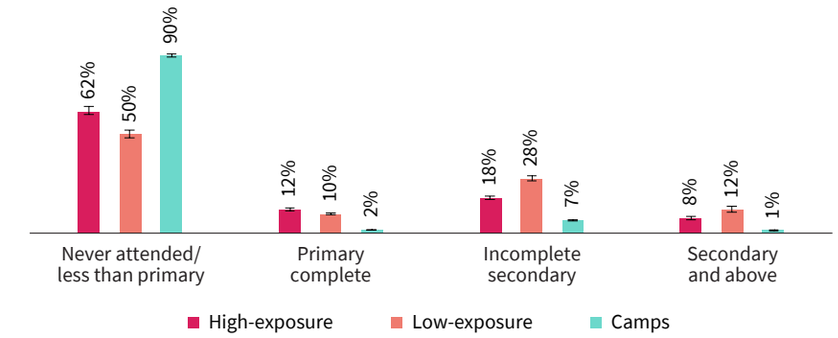
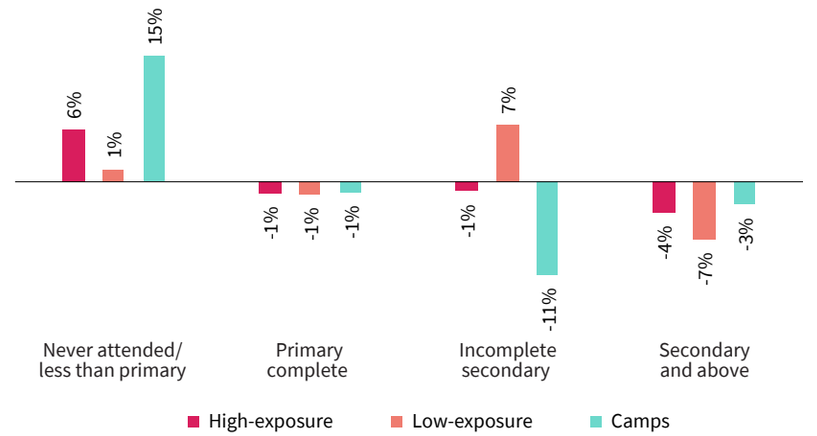


Figure 2-3: Female-male gaps in educational attainment, adults (18+), 2019 (low-exposure areas, high-exposure areas, and Rohingya camps)



Source: World Bank staff calculations, CBPS 2019.

[13] Religious education is included with the "Never Attended/Less than Primary" category. 1.8 percent of the host population and 4.6 percent of the camp population report this type of education.

While district level public education spending per student generally tends to increase with poverty rates across Bangladesh, Cox's Bazar is an exception to this pattern, with low per-student expenditure relative to districts with similar poverty rates. Analysis of public expenditure data on education finds a positive correlation between poverty and per-student spending (Genoni et al. 2019). However, government expenditure per student in primary and secondary levels in Cox's Bazar is significantly lower than in other districts with similar poverty rates (Bhatta et al. 2019). This relationship might be partially explained by the relatively higher number of students and schools in the area. Indeed, HIES data suggest that Cox's Bazar is among the top 10 districts in terms of students enrolled in primary education in the country, but it still has fewer primary students than other districts in the division such as Brahmanbaria, Noakhali, Comilla, and Chittagong.

Educational spending appears to yield lower outcomes in Cox's Bazar, relative to other districts that spend similarly per student. Genoni et al. (2019) use data from BOOST 2014 and HIES 2016 to assess the relationship between public expenditure and educational outcomes.[14] While there is a positive correlation between spending and net attendance rates overall, this is only statistically significant at the secondary level. Cox's Bazar has a relatively lower attendance rate when compared with other districts with similar expenditure per student at both primary and secondary levels. The district has the lowest percentage of children of primary school age enrolling in first grade (USAID 2018). Cox's Bazar is among the districts with the lowest survival rate (about 65 percent), highest dropout rate (about 35 percent), and lowest efficiency ratio, relative to districts with similar expenditures per student at the primary level (Genoni et al. 2019).[15]

Poor educational outcomes may be related to the type and size of educational institutions in Cox's Bazar. Data show a high prevalence of small, NGO-run educational institutions, as well as high student-teacher ratios in formal schools in Ukhia and Teknaf in 2011, well before the Rohingya influx. This suggests that there was already a heavier reliance on non-formal sources of education outside the public sector in these areas, which may signal pre-existing stresses on the education sector (which are beyond the scope of this report to explain). Teknaf and Ukhia had 327 and 140 NGO-run schools respectively in 2011, which accounted for at least half of all educational institutions in the two upazilas. In contrast, Kutubdia had 34 (roughly 20 percent of all schools), while Cox's Bazar

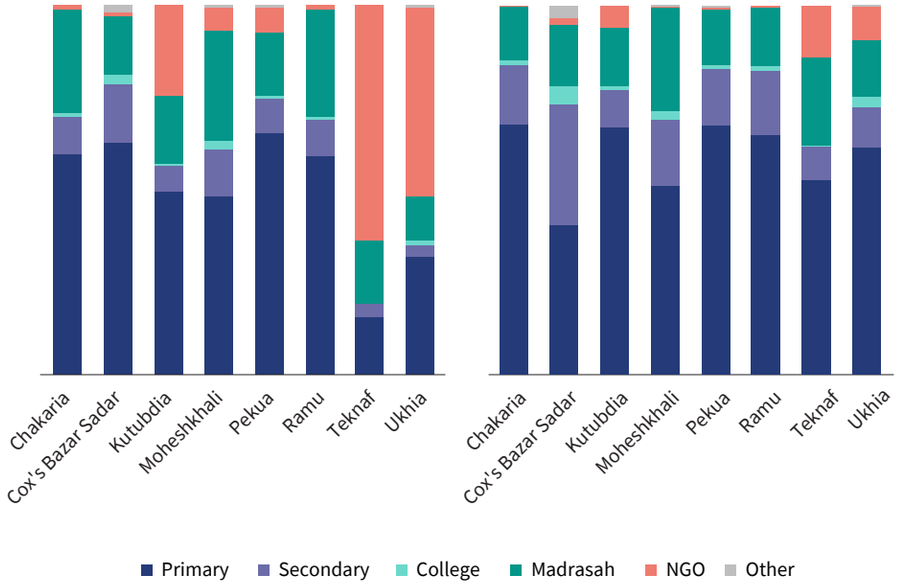
[14] See https://www.worldbank.org/en/programs/boost-portal.

[15] The survival rate is the percentage of a cohort of pupils (or students) enrolled in the first grade of a given level or cycle of education in a given schools year expected to reach successive grades, regardless of repetition. This rate is calculated following the UNESCO reconstruction cohort model. The coefficient of efficiency is an indicator of the internal efficiency of an educational system. It summarizes the consequences of repetition and dropout on the efficiency of the educational process in producing graduates. It is defined as the ideal (optimal) number of pupil years required (i.e., in the absence of repetition and dropout) to produce a number of graduates from a given school cohort, expressed as a percentage of the actual number of pupil years spent to produce the same number of graduates. The coefficient of efficiency therefore ranges from a low of 0 to a high of 1.

Sadar and other upazilas had far fewer, accounting for no more than 5 percent of all educational institutions there (Figure 2-4). Despite the proliferation of NGO-run schools in some parts of the district, such schools account for a disproportionately small share of students (Figure 2-5), as NGO schools are generally small, enrolling 45 students each on average. In Teknaf and Ukhia, NGO schools were even smaller, reporting an average of 39 and 35 students each (Table 2-1).[16] In general, student-teacher ratios in Cox's Bazar district were already high in 2011, averaging 70 students per teacher in primary school (Table 2-2). These ratios were particularly high in some upazilas, including Teknaf (132), Chakaria (81), and Maheshkhali (87).

Figure 2-4: Share of school types, by upazila, Cox's Bazar, 2011

Figure 2-5: Share of students by type of institution and upazila, Cox's Bazar, 2011



Source: BBS (2013).

[16] There is substantial within-district variation, with Cox's Bazar Sadar NGO schools enrolling an average of 762 students, suggesting they may be substantively different and not comparable. While it is beyond the scope of this report, understanding the proliferation and role of NGO schools in the district is an area for further research.

Table 2-1: Average number of students per school for different school types, Cox's Bazar upazilas

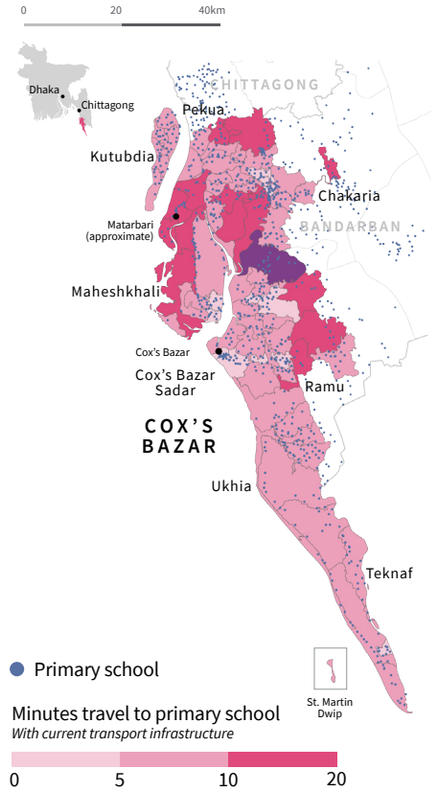
	Primary	Secondary	College	Madrasah	NGO	Other	Average, upazila
Chakaria	385	559	248	177	100		338
Cox's Bazar Sadar	307	987	1,012	497	762	783	477
Kutubdia	349	387	424	221	61		257
Moheshkhali	473	631	375	422	30	80	447
Pekua	359	583	425	303	30	134	347
Ramu	378	617	756	181	182		344
Teknaf	583	476	274	246	39		175
Ukhia	375	583	682	242	35	60	192
Total	388	668	574	269	45	524	297

Table 2-2: Average student-teacher ratios, different school types, Cox's Bazar upazilas

	Primary	Secondary	College	Madrasah	NGO	Other	Average, upazila
Chakaria	81	47	21	35	17		60
Cox's Bazar Sadar	57	67	38	47	254	30	56
Kutubdia	57	46	25	21	15		38
Moheshkhali	87	71	18	37	10	5	56
Pekua	69	40	20	31	30	22	51
Ramu	70	61	24	21	46		49
Teknaf	132	55	11	40	39		65
Ukhia	70	40	30	35	35	6	51
Total	75	56	27	34	34	26	55

Source: BBS (2013).

Map 2-5: Travel times to primary schools[17]



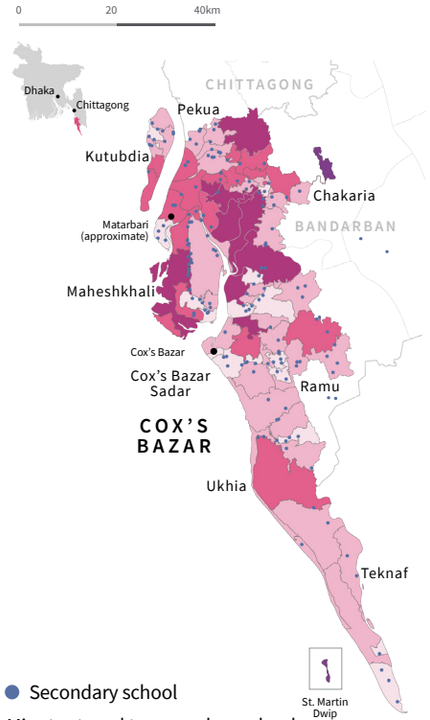
Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Physical accessibility to schools does not appear to be a major determinant of poor educational outcomes in Ukhia and Teknaf. Teknaf's and Ukhia's reduced levels of educational attainment come in spite of good average levels of accessibility to primary and secondary schools, shown in Map 2-5 and Map 2-6. However, climate-related disruptions and natural disasters in the area create accessibility problems for both students and teachers. Physical access to schools is often constrained due to the low quality of roads and traffic congestion (USAID 2018). This suggests that the qualitative differences in schooling described above and/or the lack of economic opportunity described in Chapter 3 are the main negative influences on human capital formation in these upazilas.

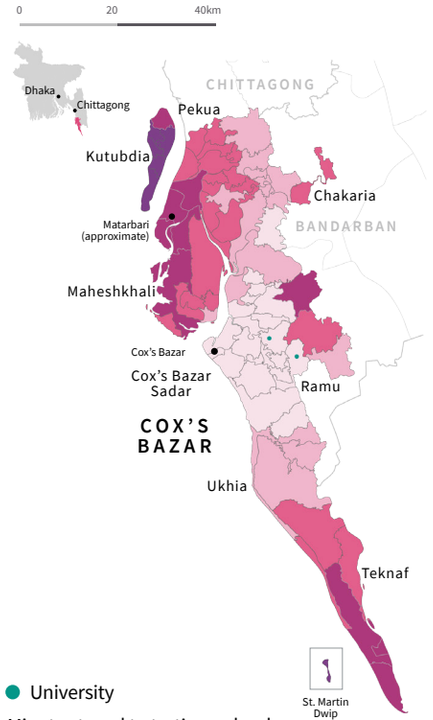
Geographic and infrastructural disparities within Cox's Bazar affect access to education in some unions. More than 80 percent of the population of Cox's Bazar lives within 15 minutes of a primary school, while more than 60 percent lives in similar proximity to secondary and tertiary educational institutions. However, access to education is constrained in Cox's Bazar's northern and western unions by inadequate school facilities and underdeveloped roads. Within-union variation is high and primarily linked to proximity to the main north-south road, along which households and schools cluster. Far fewer schools serve the significant populations set among the surrounding paddy fields; large populations with access to few nearby primary schools and secondary schools can be found in remote areas of Chiringa, Kuntakhali, and Saharbil unions in Chakaria; Kalarmaechhara and Hoanak unions in Maheshkhali; Ali Akbar Deil in southern Kutubdia; Harbang and Barno Bilchari in Chakria; and St. Martin Dwip in Teknaf (Map 2-5 and Map 2-6). Poor road infrastructure across all outlying areas constrains access to the district's centrally located universities, particularly for remote Kutubdia, Maheshkhali, and Teknaf (Map 2-7).

[17] Travel times have been estimated using speed by type of road specified in Table A1-1, Annex 1.

Map 2-6: Travel times to secondary schools



Map 2-7: Travel times to tertiary education



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

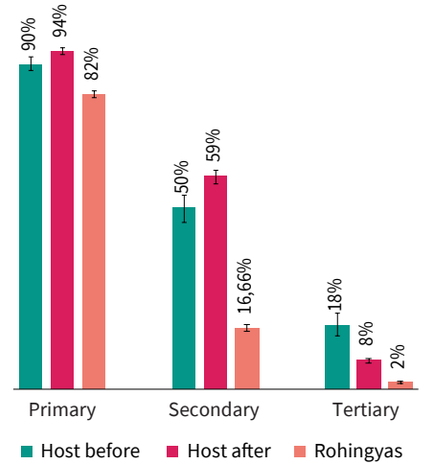
Secondary net attendance rates among host children have increased slightly since the Rohingya influx, while tertiary attendance has fallen. These findings are based on comparisons between HIES 2016 and the CBPS 2019 (Figure 2-6, standard errors are also shown in the figures below).[18]

[18] Two earlier reports based on focus group discussions and key informant interviews preceded the 2019 CBPS. They found that school attendance had decreased and dropout rates had increased among hosts, and that this was related to increased work opportunities related to the Rohingya influx (UNDP 2018 and USAID 2018). While the findings of the present report are qualitatively similar, this report relies on data from the 2019 CBPS baseline which is representative of Rohingya and host communities, and is more recent.

Educational opportunities for displaced Rohingya children have improved since 2017 but remain insufficient. Older children and youth are especially disadvantaged. At the onset of the 2017 influx, recently displaced Rohingya children living in camps had access only to non-formal education in learning centers operated by NGOs. By 2019, Pascaud and Panlilio (2019) reported significant improvements in education programming in Cox's Bazar. For instance, attendance at learning centers had increased substantially. This was partly due to the construction of a larger number of local centers, alleviating previous concerns related to mobility and safety. Similarly, learning centers had improved their staffing to include more trained and dedicated teachers. Despite such gains, substantial challenges persist. In 2020, the GoB authorized the use of the Myanmar curriculum for Rohingya children in camps, but its rollout has been severely hampered by COVID-19. Thus, the de facto curriculum in learning centers consists of only English, Burmese, math, and life skills classes.[19] Without adequately structured curricula or grade progression, this model is not meeting the needs of young adolescents and youth, who are almost entirely left out of the system.

School attendance rates among Rohingya children remain well below those among hosts at all levels of education. Due to discriminatory practices in Myanmar, nearly half the Rohingya children who arrived in Bangladesh had had no previous opportunity to engage in formal schooling (Guglielmi et al. 2020). Displaced individuals who arrived in Bangladesh before 2017 and lived in host communities accessed education in local private and government schools. But, in the absence of valid Bangladeshi documents (a prerequisite), they were unable to secure certification for their education, excluding them from future opportunities.

Figure 2-6: School attendance rates before and after the 2017 Rohingya influx, host children and Rohingyas



Source: Authors' calculations using HIES 2016/17.

Female-male attendance gaps have narrowed among children from the host community in primary and secondary schools, compared to before the influx. Prior to the 2017 influx, in both primary and secondary education, host girls were more likely to attend school than host boys. The female-male attendance gaps in primary and secondary schooling reached 9 and 12 percent, respectively, although boys completed both educational levels at marginally higher rates than girls. Since the influx, relatively more boys in the Cox's Bazar host community are attending primary and secondary school (Figure 2-7). This is reflected in the increase in overall attendance rates

[19] https://www.unicef.org/bangladesh/en/stories/expanding-education-rohingya-refugee-children-bangladesh

at both levels, particularly secondary. In contrast, in tertiary school, where boys were 19 percent more likely to attend than girls in 2016, this gap has fallen to 3 percent, stemming from a decline in male tertiary school attendance since the influx. This is reflected, in turn, in lower overall net attendance rates in tertiary school, as measured by the CBPS baseline in 2019. In addition, the observed increase in secondary net attendance rates among hosts is driven by low-exposure areas, meaning upazilas other than Teknaf and Ukhia (Figure 2-8). These patterns need further investigation. Within the Rohingya community, gender gaps in school attendance are pronounced, particularly at the primary and secondary levels.

Figure 2-7: Female-male school attendance ratio gaps, before and after 2017 Rohingya influx, host community and Rohingya

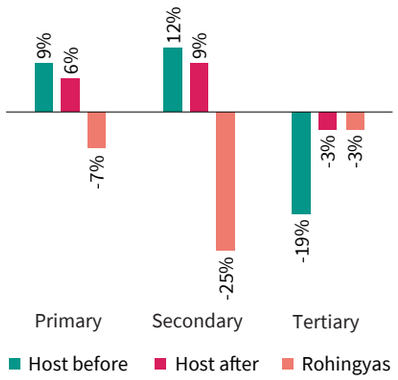
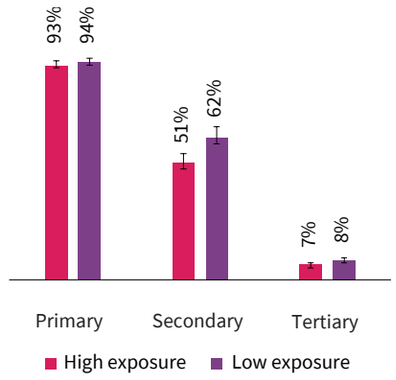


Figure 2-8: Net school attendance rate after influx, hosts in high- and low-exposure areas



Source: World Bank staff calculations, CBPS 2019 and HIES 2016.

Health

At the national level, Bangladesh has made impressive gains on critical health indicators that are especially important for long-term human capital accumulation, including child nutrition. However, progress in Cox's Bazar has been slower. Undernutrition is associated with nearly half of all child deaths worldwide, while many children who survive early undernutrition suffer lifelong losses of cognitive capacity (Black et al. 2013). Data show that Cox's Bazar is lagging behind in reducing child stunting and the prevalence of underweight children, compared to Chittagong division and the national average (Table 2-3). Bangladesh and Chittagong almost halved the share of underweight children and the incidence of wasting and substantially reduced stunting between 2007 and 2019. Available data for Cox's Bazar suggest improvements in stunting and child underweight between 2012 and 2019, but prevalence remains higher than the national average, while progress on wasting has been stagnant.

Access to healthcare facilities varies across the district, with facilities clustered near some Rohingya camps providing services for both displaced populations and hosts. Cox's Bazar currently has 43 healthcare facilities. At least 95 percent of the district population lives within 45 minutes of a healthcare facility (Figure 2-9), and the mean gap in travel times between low-skilled agricultural and high-skilled service workers (a proxy for better-off host households) is only seven minutes. As Map 2-8 and Figure 2-10 show, mean travel times to health services are lower for people in the southern parts of Cox's Bazar than in the north. In Ukhia, a cluster of healthcare facilities around the camps serves hosts and displaced Rohingya. This cluster helps to provide better access for host communities in Teknaf and Ukhia. However, host communities may avoid such health services because of anti-Rohingya stigma (IOM and ACAP 2020), so effective healthcare access may be lower.

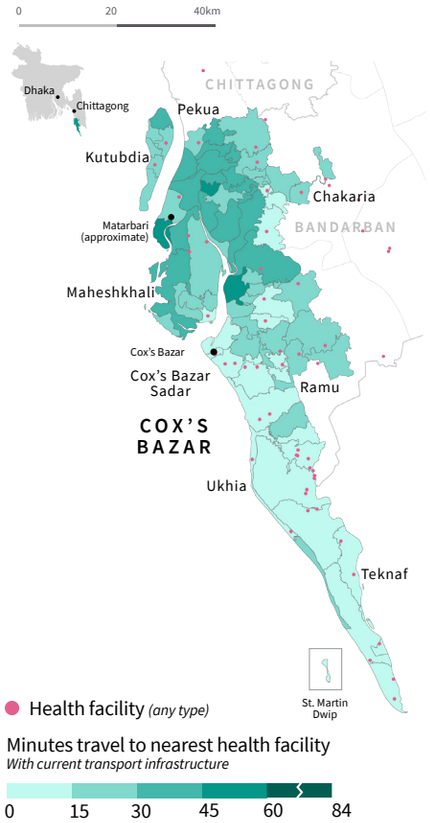
Table 2-3: Malnutrition indicators for Bangladesh, Chittagong division, and Cox's Bazar district, 2007-2019

	Area	2007*	2011*	2012/13**	2014*	2017/18*	2019**
Stunting	National	43%	41%	42%	36%	31%	28%
	Chittagong	46%	41%	43%	38%	33%	27%
	Cox's Bazar			50%			35%
Underweight	National	41%	36%	32%	33%	22%	23%
	Chittagong	42%	37%	32%	36%	21%	23%
	Cox's Bazar			41%			29%
Wasting	National	17%	16%	10%	14%	8%	10%
	Chittagong	18%	16%	9%	16%	8%	10%
	Cox's Bazar			10%			10%

* Estimates obtained from BDHS 2007, 2011, 2014, and 2018/18 rounds final reports.
** Staff estimates using MICS rounds 2012/13 and 2019.
Notes: Although BDHS 2017/2018 and MICS 2019 rounds were undertaken after the Rohingya influx in August 2017, these surveys do not include recently displaced Rohingya in their sample frames.
All indicators are for children under five years old, following WHO (Child Growth Standards. Technical Report, Geneva: WHO, 2006. http://www.who.int/childgrowth/standards/Technical_report.pdf?ua=1).
Underweight is defined as children whose weight-for-age is more than two standard deviations below the median.
Stunting is defined as children whose height-for-age is more than two standard deviations below the median.
Wasting is defined as children whose weight-for-height is more than two standard deviations below the median.

Congested living conditions, high population density, and limited sanitation within camps imply that the recently displaced Rohingya population remains highly vulnerable to the spread of infectious diseases. A third of Rohingya households share a toilet with more than 25 people, and two-thirds report sharing water facilities with more than 25 people (compared to 1 and 7 percent respectively among host households, CBPS 2019).

Map 2-8: Estimated travel times to health center facilities, Cox's Bazar district



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Infectious disease outbreaks have emerged sporadically in and around some Rohingya camps but have so far been adequately controlled. During 2017 and 2018, Bangladeshi health authorities detected outbreaks of several communicable diseases, including a diphtheria outbreak among displaced Rohingya and the nearby host community in Cox's Bazar. These outbreaks induced substantial morbidity but relatively few deaths. Prompt action from the Directorate General of Health Services (DGHS) has so far limited the impacts of infectious outbreaks (Health Bulletin BBS 2018). However, evidence on the efficacy of these campaigns is mixed; while the number of measles and diphtheria cases detected in the camps had decreased through 2018, infections had not ceased entirely. Studying the population across Kutupalong Camp, Nayapara Camp, and makeshift settlements,[20] Summers et al. (2018) find high incidence rates of diphtheria despite vaccination efforts. With the exception of unregistered Rohingya in Kutupalong Camp, coverage with at least one dose of oral cholera vaccine was high. An investigation into risk factors for acute respiratory infections (ARI) among children under 10 years in Rohingya camps found that about 21.6 percent of the 259 children studied showed acute ARI symptoms (Oishi and Alam 2020). Immunity gaps persist despite several vaccination campaigns. This may reflect historically low vaccination coverage rates among Rohingya, compounded by high birth rates that rapidly replenish the susceptible population.

[20] Three cross-sectional population-representative household surveys were conducted in 2018. These took place in Kutupalong (October 22–28), makeshift settlements (October 29–November 20), and Nayapara (November 20–27). Sampling frames included all households in each area, regardless of whether they were registered with UNHCR. In Kutupalong and Nayapara, households were selected using simple random sampling. Because of the large population residing in the makeshift settlements, households in these sites were selected using multistage cluster sampling; the Inter Sector Coordination Group provided block populations.

Figure 2-9: Travel times to health care facilities, by population share

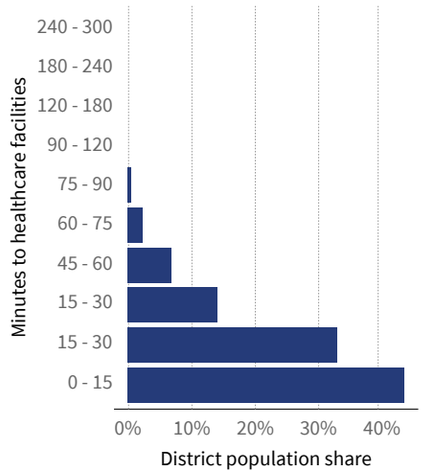
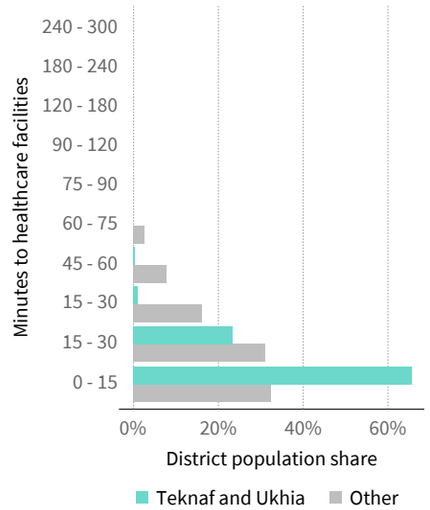


Figure 2-10: Travel time to health care facilities, Teknaf and Ukhia versus other upazilas



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

In the context of the COVID-19 pandemic, the Rohingya population and their hosts in Cox's Bazar remain at high risk. An outbreak in the camps would not only overwhelm existing health systems but also transmit rapidly due to the high population density, inadequate water and soap supplies to maintain hygiene, limited ability to isolate infected individuals, and large household sizes (Truelove et al. 2020). A follow-up phone survey of a quarter of CBPS households carried out between April 11 and April 17, 2020, showed that most respondents understand how COVID-19 is transmitted, yet three-fourths of households in camps and half in host communities attend communal prayers, despite the risk of disease spread (Lopez-Pena et al. 2020).

Humanitarian agencies and the Government of Bangladesh have joined forces to fight COVID-19 in Cox's Bazar. Early in the pandemic, this included support for two Severe Acute Respiratory Infection Isolation and Treatment Centres (SARI ITC) and four quarantine centers. New ICU beds were added in Cox's Bazar's main district hospital, while WHO coordinated with the GoB to expand testing capacity in the Field Laboratory at Cox's Bazar Medical College.[21] Humanitarian agencies worked with the government to inform host

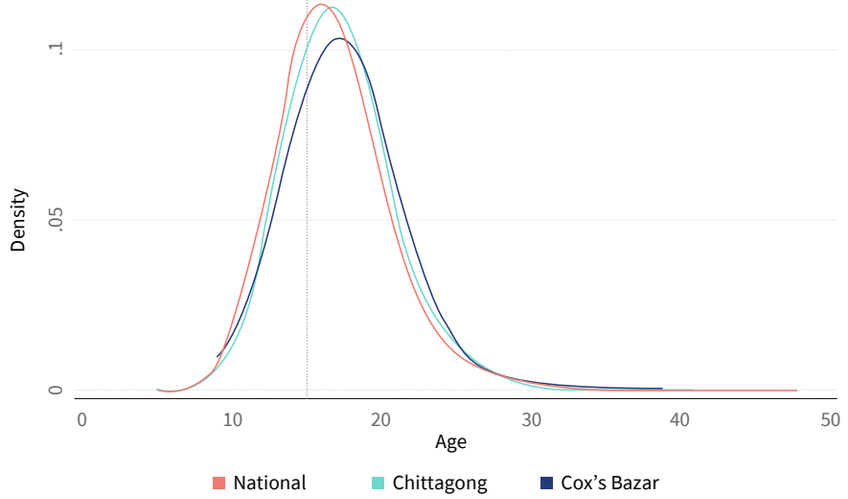
[21] UNHCR Bangladesh. "COVID 19 Preparation/Response- 31 May 2020 "(#4).

and Rohingya communities about COVID-19 prevention through neighborhood-based approaches and mass-media outreach. At least 5,641 hand-washing stations were installed in public places within camps.[22]

Reproductive health, gender-based violence, mental health, and trauma

Early marriage and childbearing can severely impact the reproductive health and mental well-being of adolescent girls (Gordon, Jay, and Lee-Koo 2018). Across Bangladesh, the median age at first marriage of women aged 20-49 was 16.3 years in 2017-18. In other words, half of Bangladeshi women currently aged 20-49 were married before the age of 16. Fifty-nine percent of women aged 20-24 marry before the legal age of marriage, 18 years (Ministry of Health and Sports 2017). The median age at first marriage in Cox's Bazar district and Chittagong division is only 17 (UNICEF 2019) (Figure 2-11). In Chittagong division, more than a quarter of girls aged 15–19 years are already married, and adolescent girls in Chittagong are more likely to marry a significantly older man than girls of their cohort in the rest of the country (BBS and UNICEF 2015).

Figure 2-11: Women's age at first marriage: Bangladesh, Chittagong division, and Cox's Bazar, 2019



Source: World Bank staff calculations using Bangladesh MICS 2019. Note: Vertical dashed line at 15.
Notes: Although MICS 2019 was undertaken after the Rohingya influx in August 2017, these surveys do not include recently displaced Rohingya in their sample frames.

[22] Inter Sector Coordination Group (ISCG). "COVID-19: Preparedness and response for the Rohingya refugee camps and host communities in Cox's Bazar District Weekly Update #12." ISCG, Cox's Bazar, 31 May 2020.

While systematic data on the prevalence of child marriage among the Rohingya is lacking, some studies have found that early marriage is likely to be more prevalent than among the host community (Ainul et al. 2018). While the 2019 CBPS did not ask directly about age at first marriage, a significantly larger share (35 percent) of married Rohingya women in the sample are younger than 25, compared to married women in the host community sample, of whom 24 percent were under 25.[23] A 2016 UNHCR report estimates that more than half of the Rohingya girls who have fled Myanmar since 2012 were married before they were 18. Conservative religious and social norms about the use of contraception and early marriage contribute to a lack of information about sexual and reproductive health, relatively high rates of fertility within camps, and maternal morbidity and mortality (Hasan-ul-Bari and Ahmed 2018).

Available evidence points to a severe burden of mental health conditions among displaced Rohingya, including children and youth. Qualitative studies, in-depth interviews, and focus group discussions have identified numerous factors adversely affecting the mental health of the displaced Rohingya. Contributing factors include the chronic stresses of poor living conditions, reliance on assistance, domestic violence, lack of physical safety, and the emotional scars of displacement. Corna et al. (2019) document mistrust, depression, PTSD symptoms, and sleeping problems among the markers of distress. Many Rohingya women and girls survived sexual violence in Myanmar before fleeing to Bangladesh, resulting in persistent physical and mental trauma. Some months after arriving in Bangladesh, almost half of Rohingya children reported experiencing indicators of distress and sleeplessness (IOM 2018). While concerted efforts to address mental health and trauma have been a part of the humanitarian effort, the 2020 Joint Response Plan for the Rohingya Crisis (UNHCR 2020) notes the urgent need for scaled-up psychosocial support for children under the age of 18.

More recent data collected as part of the CBPS effort confirm the prevalence of trauma and experiences of violence, particularly among the displaced Rohingya. As part of the CBPS, GAGE (Gender and Adolescence: Global Evidence) implemented mixed-methods data collection focusing on adolescents and their caregivers, with quantitative survey data complemented by qualitative research in three camps and two host community areas. Fourteen percent of adolescents in the sample reported experiencing psychological distress, with older adolescents twice as likely and adolescent boys more likely than girls to experience distress (Guglielmi et al. 2020). Analysis of the trauma and mental health and the crime and conflict modules of the CBPS reveals that 1 out of 2 Rohingya reported having been close to death, and 44 percent reported having experienced torture or combat situations. While only 6 percent of Rohingya reported having personally experienced rape or sexual abuse, the large majority had either witnessed it or heard about others' experience.

[23] Data from the 2015-16 Myanmar DHS indicate that the median age at first marriage for women aged 20-29 was 22.1 years, with lower ages at first marriage and first birth for women in Rakhine state. The median age for women's marriage in Rakhine State in 2016 was 20.7 years (Ministry of Health and Sports 2017; Ripoll 2017).

This difference between reporting about others' experience versus one's own is not uncommon, given the sensitivity of this issue, as well as the social norms and stigma, particularly for women, associated with such a traumatic experience.[24]

Hosts have a lower incidence of traumatic events. However, hosts in areas closer to camps are more likely to have witnessed or heard about events related to imprisonment, combat, murder of strangers, or torture. This may refer to the experience of the Rohingya or their own. Among hosts, the most common symptoms of psychological stress and distress include feelings of powerlessness and lack of a future. Worryingly, 1 in 2 Bangladeshi women and girls live in neighborhoods where harassment and physical and gender-based violence are issues.[25]

Food security and living conditions

Consumption patterns for hosts indicate broad access to basic foods, with no large differences between low- and high-exposure areas. Overall, consumption patterns for hosts and displaced Rohingya indicate broad access to a range of basic food groups, and higher than minimum required levels of caloric intake per capita per day.[26] On average, host households living in high- and low-exposure areas consumed 10 of 12 basic food groups in the week preceding the interview, with the majority of the items being purchased. The average caloric intake per person per day was 2,240 calories. Seventy-eight percent of the caloric intake for hosts came from market purchases, with the remainder coming from self-production or transfers/gifts. High- and low-exposure hosts report similar patterns of consumption, with the former reporting marginally better access to food groups and per capita caloric intake. This pattern of more urbanized areas reporting lower food consumption relative to more rural regions is consistent with the consumption patterns reported nationally in the HIES 2016 survey.

Measured food insecurity among the host population is relatively low, although many households report being dissatisfied with dietary diversity. Data from the 2019 CBPS can be used to measure food security, classified into three stages based on severity of deprivation: (i) Inadequacy and dissatisfaction: lack of dietary diversity; (ii) Moderate hunger: having to consume smaller or fewer meals than usual; (iii) Severe hunger: having no food at home, going to sleep hungry, or going days without food. More than 2 out of 3 hosts report either not being able to consume their preferred foods or having to consume a

[24] See Table A1-2 and Table A1-3.

[25] See Table A1-4.

[26] For planning purposes, the World Health Organization (WHO) and the U.S. Committee on International Nutrition recommend that an average of 2,100 kcal per person/per day be used as an initial reference figure. Since implementation of revised Memoranda of Understanding (MoUs) among UNHCR, WFP, and UNICEF (UNHCR/WFP, July 2002; WFP/UNICEF, February 1998), the three agencies have adopted 2,100 kcal as their initial planning figure for calculating energy requirements and designing food rations.

limited variety of foods due to lack of resources. However, reports of deprivation decrease as the scale progressively moves towards indicators for moderate to severe hunger. Only 6 percent of households report that members went at least an entire day and night without any food within the four-week recall period. Low-exposure households self-report higher rates of deprivation compared to high-exposure households across indicators for moderate to severe hunger but report lower rates of dissatisfaction in terms of their dietary diversity.

The economic fallout of the COVID-19 pandemic has adversely affected access to food among the host population. The first round of the CBPS high-frequency follow-up,[27] implemented during the first half of 2020, showed that urban, low-exposure areas were more adversely affected than the more rural, high-exposure areas. Indeed, 50 percent of host households in low-exposure areas reported they were not able to purchase basic needs in the seven days prior to the survey, as opposed to 34 percent in areas closer to the camps. These impacts on consumption are correlated with larger labor-market shocks faced by low-exposure households (see also section 3 of this report). The higher incidence of difficulty in basic food access among relatively more urbanized communities in Cox's Bazar has apparently been driven by (i) greater labor-market disruptions and losses in purchasing power; and (ii) limited scope for self-production of basic foods, coupled with high reliance on market purchase of food.

The Government of Bangladesh is providing assistance to host communities to mitigate the impact of COVID-19. Fifteen percent of surveyed hosts reported receiving some form of assistance after March 1, 2020. Three-fourths of this assistance was newly received, that is, not part of previously running programs. In line with CBPS baseline findings, more than 90 percent of this assistance came from the government. High-exposure hosts were marginally more likely to receive assistance from NGOs than low-exposure hosts. One source of NGO assistance is the World Food Programme (WFP), which started a district-wide support program for hosts who are vulnerable due to COVID-19. This support includes in-kind food transfers and cash transfers. Overall, 75 percent of the assistance received was through distribution of food and other basic needs, 22 percent through work or jobs programs where in-kind basic needs assistance was also provided, and 3 percent through cash transfers.

The welfare of the recently displaced Rohingya population remains primarily reliant on humanitarian assistance, and the latter has been largely successful in ensuring access to food and basic needs. Analysis of the food consumption module of the CBPS 2019 finds widespread and adequate access to food for Rohingya households living in camps, financed primarily through humanitarian assistance. Food consumption covers a wide range of food types, but consists primarily of cereals, vegetables, fish, spices, and sweets, with low intake of dairy products, meat, and eggs. On average, 85 percent of the Rohingya households in camps consumed 8 or more food groups in a week, out of the 12 food groups considered. The lowest range of food groups consumed was 5 or 6 groups, and this was reported by

[27] The CBPS high-frequency follow-ups Round 1 was conducted between April and May 2020.

only 3 percent of households. Eighty-four percent of the calories consumed per capita by displaced Rohingya were obtained from humanitarian aid. This was especially reflected in the consumption of calories from oils and fats, legumes, and cereals (96 percent, 96 percent, and 95 percent derived from aid, respectively).

On average, households in camps consumed 2,352 calories per capita per day. About 60 percent of the displaced Rohingya households consumed more than the standard 2,100 calories per capita provided within a WFP food basket.[28] The composition of the calories consumed is also similar to surrounding hosts, with 90 percent of calories coming from the following sources: cereals (65 percent), oils and fats (12 percent), eggs (8 percent), and legumes, nuts, and seeds (4 percent). Similar to host populations, the share of daily calories coming from fish, meat, and vegetables, along with other remaining food groups, is low, at 1-2 percent on average. Despite the low caloric share, households report consuming seven different types of vegetables on average in the past week, indicating access to a wide range of produce.

While food support provides the bulk of Rohingya families' essential nutrition, households also report purchasing food. Almost all Rohingya households (99 percent) report purchasing at least some food items during the past week, although such purchases represent only about 12 percent of total calories for the average household. The resources for these purchases could, in principle, come from stipends from cash for work programs, from bartering or selling items received as humanitarian aid, or from other resources.[29] Nevertheless, there is a clear distinction in the kinds of foods that are largely obtained from humanitarian assistance as opposed to those that are purchased: cereals, oils, legumes, sweets, and eggs largely come from aid, whereas the remaining food types are largely reported as being purchased.

Providing food assistance via electronic vouchers shows promise to further improve nutrition among the Rohingya. While at the beginning of the influx most food aid was based on an in-kind system, in the months prior to the COVID-19 pandemic, 95 percent of food aid was transferred to e-vouchers. Filipski et al. (2020) study the effect of receiving electronic vouchers versus food rations on the nutritional status of Rohingya children. The study finds that e-vouchers led to positive growth outcomes among children between the ages of 6 and 24 months, and that one of the main reasons behind better nutritional outcomes among e-voucher recipients was the flexibility that vouchers allowed households in purchasing items beyond those provided by humanitarian organizations. While nearly two-thirds of the displaced Rohingya people had access to e-vouchers at the time of the study, the rest were obliged to sell or barter their entitlements in the

[28] For 75 percent of households consuming above the 2,100 calories per capita threshold, the range of calories per capita was between 2,100 and 3,000.

[29] Forthcoming briefs will explore how food purchases are funded (e.g., by selling aid, through cash-for-work, or from other sources).

open market to fill nutritional gaps and meet other needs (WFP 2019a). However, in the current COVID-constrained operating environment, while WFP has continued the delivery of food assistance, temporary adjustments have been necessary. Rohingya receiving e-voucher assistance now receive a fixed basket of products to reduce crowding in food distribution centers.[30] At the same time, WFP in coordination with the GoB has started a one-off scheme for host communities. This scheme will benefit 105,000 households and consist of in-kind and cash transfers.[31]

Access to shelter, sanitation, water, and electricity affects welfare and human capital accumulation among Cox's Bazar displaced Rohingya and hosts. **Limited access to water and sanitation reflects low living standards for both hosts and displaced Rohingya**. While no open defecation is reported in the CBPS, almost half of host households are using unimproved sanitation, with 40 percent having access to basic (improved and not shared) sanitation facilities, and 10 percent to limited sanitation facilities.[32] According to World Bank (2019c), only 2 percent of Rohingya have access to basic sanitation (improved and not shared), and 23 percent use unimproved sanitation facilities. There is a high reliance on shared facilities in Rohingya camps. Only 4 percent of camp households have access to private latrines, and around one-third of households are sharing these facilities with more than 25 households.

For both host and Rohingya populations, access to water through improved sources is widespread, but that access is shared to a large degree. Differences emerge between host households living in high- and low-spillover areas. Households living closer to Rohingya camps report almost 6 percentage points lower access to private sources of drinking water than households living farther away. In addition, host households living close to camps are more likely than households farther away to share their water source with many other families (12 percent versus 4 percent sharing access with more than 25 other households). Reliance on shared sources of drinking water is far more prevalent in camps: 3 out of 4 displaced households share their drinking water source with more than 25 households.

[30] WFP. "WFP in Cox's Bazar - Perception Analysis - COVID-19 Response." Brief, April 2020. https://www.wfp.org/publications/wfp-coxs-bazar-perception-analysis-covid-19-response

[31] WFP. "COVID-19 - Support to the Host Community - Cox's Bazar." Brief, November 2020. https://www.wfp.org/publications/wfp-bangladesh-covid-19-support-host-community-coxs-bazar

[32] Definitions for sanitation indicators follow standards set by the WHO-UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) 2017 update (UNICEF 2017). Improved sanitation refers only to the type of facility used – in the survey, "sanitary" and "pacca" latrines are classified as improved facilities. Basic sanitation services are defined as use of improved sanitation facilities which are not shared with other households. Limited sanitation services are defined as use of improved sanitation facilities which are shared with other households. The survey does not collect the data required to classify facilities as safely managed.

Access to electricity is widespread for hosts in Cox's Bazar, although the availability of power varies substantially. **Most Rohingya households do not have access to electricity**. On average, 87 percent of host households have access to electricity. While low-spillover areas receive around 12 hours of electricity per day on average, high-spillover areas receive only 6. Among Rohingya households, only 40 percent have access to electricity, relying completely on solar-powered sources.

According to CBPS 2019, 8 out of 10 host community households were living in owned dwellings, but the poor quality of construction materials reflects the area's low living standards and poses risks given high exposure to climate-related disasters. Host houses have, on average 2.5 rooms in both high- and low-exposure areas. However, differences in housing quality between low- and high-spillover areas are pronounced. While 24 percent of host dwellings in high-exposure areas have walls of brick/cement, in low-exposure areas this share rises to 37 percent. The share of households with brick/cement roofs in low-spillover areas (13 percent) is almost double that in high-spillover areas (7 percent) (World Bank 2019b). The Rohingya in Cox's Bazar are also generally living in low-quality dwellings. Around 95 percent of Rohingya housing is built of bamboo, straw, polythene, or canvas materials. Rohingya dwellings are not only of lower quality than local houses but are also smaller. On average, Rohingya shelters have fewer than two rooms. In contrast to many displaced populations elsewhere, however, recently displaced Rohingya in Cox's Bazar have largely remained in the camps where they were initially settled. Ninety-eight percent of the displaced Rohingya have not moved their residence outside the camps since they arrived (Genoni et al forthcoming).

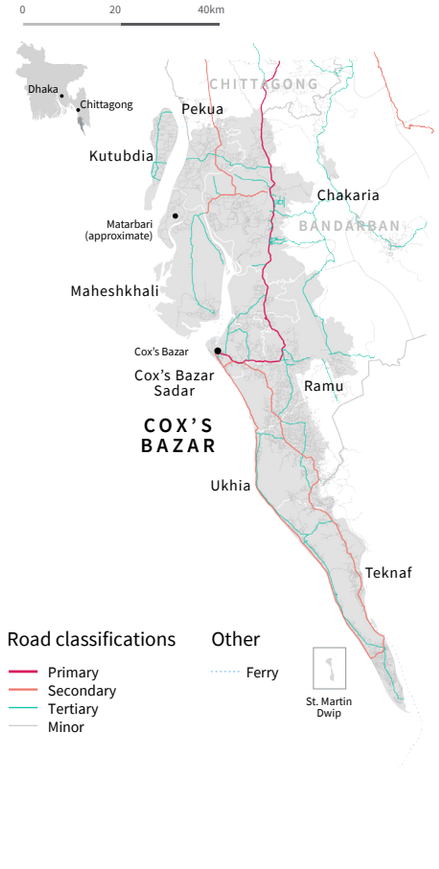
Geography

Cox's Bazar district is situated in the Chittagong Division of southeastern Bangladesh. It lies south of Chittagong district and west of Bandarban district. Cox's Bazar is bounded by the Bay of Bengal on the south and west, Myanmar and the Naf river on the east. Comprising 2,491.9 square kilometers, Cox's Bazar represents about 1.7 per cent of the total land area of Bangladesh, making it one of the country's smallest districts. The land area of Cox's Bazar district is part hilly and part coastal plain and islands, as the district straddles two agroecological zones, the Northern and Eastern Hills and the Chittagong Coastal Plain. The district is also characterized by one of the longest unbroken natural beaches in the world and is a major domestic tourism destination.

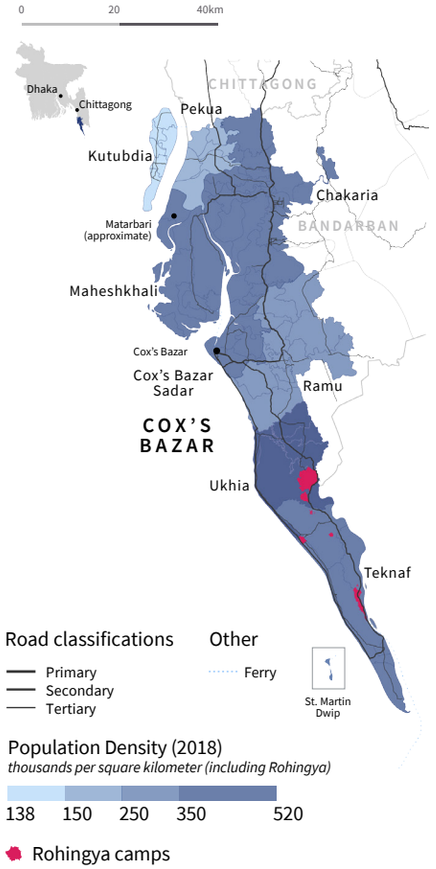
Cox's Bazar's geography constrains transportation, accessibility, and development possibilities. From the north, a single two-lane primary road connects the district to Chittagong, the regional economic hub, and onwards to Dhaka. East-west connections are weak throughout the district, such that the eastern unions of Rama upazila, the populous western upazila of Maheshkhali, western areas of Charkaria upazila, the island upazila of

Kutubdia, and the proposed Martarbari port location are poorly connected to the Chittagong road. Martarbari and Maheshkhali are connected to Cox's Bazar Sadar across the bay only by small, slow private launches unsuited for major commercial activities. South of the city, traffic is split along two small roads on either side of steep hills hugging the coastline. The coastal road, which passes through fewer villages, is primarily used for transporting aid to the Rohingya camps (Map 2-9). However, as these roads were built for traffic prior to the influx, they are now both heavily congested and rapidly deteriorating under the weight of trucks ferrying goods to the camps. The geography effectively prevents the development of additional routes, such that improvements will have to come from upgrades to existing routes (Map 2-10). The Asian Development Bank is currently overseeing upgrades to the coastal road to improve the delivery of aid to the camps.

Map 2-9: Cox's Bazar road transport network



Map 2-10: Cox's Bazar population, camps, and road transport network

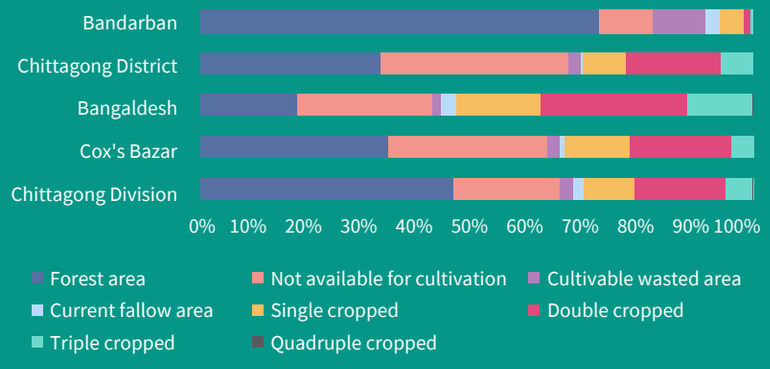


Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

The recent Rohingya influx has been concentrated in areas with relatively scant land available for cultivation and other economic uses (Box 3-Figure B3-1). More than 60 per cent of the land area in Cox's Bazar district is either forest or unavailable for cultivation, compared to 40 per cent nationally (BBS 2017b). Compared with the district's biggest upazila, Chakaria, which also has the largest share of cultivable land, Teknaf and Ukhia, the two upazilas with the highest concentration of recently displaced Rohingya, have a relatively smaller land area and a greater share of reserved forest (Teknaf 41 per cent, Ukhia 59 per cent) (BBS 2013). Thus, the recent influx has not only increased population density but also the need for fuelwood and shelter. This has compromised livelihoods through deforestation and reduced access to land (Tallis et al. 2019).

Box 3: **Land availability and environmental risks in Cox's Bazar**

Figure B3-1: **Uses of land, districts in Chittagong division and nationally**

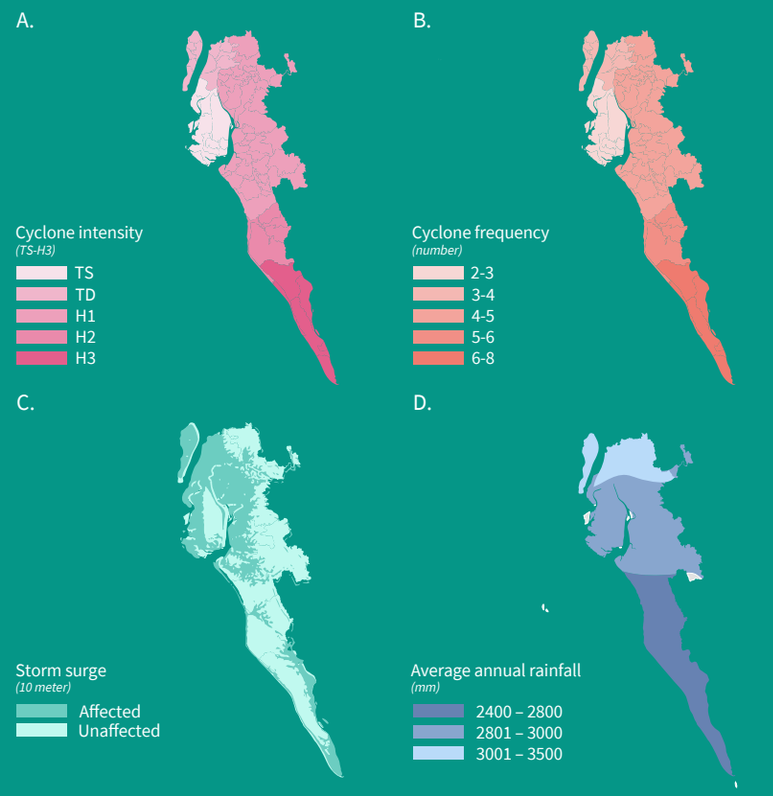


Source: BBS (2018).

The Rohingya displaced population has settled in an area with extremely high environmental risks. Bangladesh is among the seven countries in the world with the highest long-term climate risk indices (Germanwatch 2020). Flat and low-lying floodplains make the country vulnerable to water-related natural risks, such as floods and storm surge, particularly in coastal areas. Southern districts with long coastlines on the Bay of Bengal, including Cox's Bazar, are on

the path of monsoon rain[33] and tropical cyclones.[34] Every year the government of Bangladesh, together with international organizations, provides extra shelter and performs earthworks to help displaced and host populations prepare for monsoon season.[35] The region is also susceptible to earthquake, wildfire, extreme heat, and tsunamis.[36]

Figure B3-2: **Risk of cyclones and storms and average annual rainfall in Cox's Bazar**



Source: Alam, Sammonds, and Ahmed (2019).

[33] Monsoon periods start in late May and gradually diminish between October and November.

[34] For instance, previous to the largest influx, in May 2017, around 70 percent of shelters in camps were damaged by Cyclone Mora (ISCG 2017).

[35] In 2018, around 150,000 Rohingya were estimated to live in areas that were at high risk of floods and landslides (UNHCR 2018).

[36] See http://thinkhazard.org for a hazard profile of Cox's Bazar

The incoming Rohingya population has exacerbated pre-existing environmental risks in Cox's Bazar. According to the Ministry of Forests and UNDP (2018), the most important and visible impacts of the influx are forest degradation, habitat loss, fragmentation of territory for wildlife, soil erosion, ground water degradation, and water scarcity, all of which increase climate vulnerability in the region (Tallis et al. 2019) (Figure B3-3). Indeed, since the influx, 2,283 hectares of forest have been deforested, reducing forest coverage in the areas around Kutapalong camps by 18 percent (Hassan et al. 2018). Strategies and resources are needed to manage the increasing stress on the natural environment, as well as the consequences for the wellbeing of host and displaced populations. The Government of Bangladesh is working with international organizations and NGOs to promote reforestation[37] around the camps, helping to mitigate these risks.

Figure B3-3: Deforestation in Kutupalong camps, May 2017 (top) versus May 2020 (bottom)

A.

B.

Source: Google Earth (2020).

[37] See http://www.fao.org/bangladesh/news/detail-events/en/c/1200069/

Connective infrastructure and accessibility

Especially where geography poses challenges, competitive modern economies invest in infrastructure to reinforce connectivity and accessibility. Connective infrastructure (roads, rail, waterways, and ferries, as well as digital infrastructure[38]) and accessibility (proxied in this report as travel times, which are determined by topography and the presence and quality of connective infrastructure) lower transport costs, increase market access, decrease interregional price gaps, and enhance economic growth. They also improve supply chain efficiency and increase population access to social services such as health and education (Donaldson 2018; World Bank 2019c). More generally, expanding the coverage of and access to transport and digital infrastructure has the potential to expand access to markets, enhance capacity to manage risks, and boost productivity and income generation capacity.

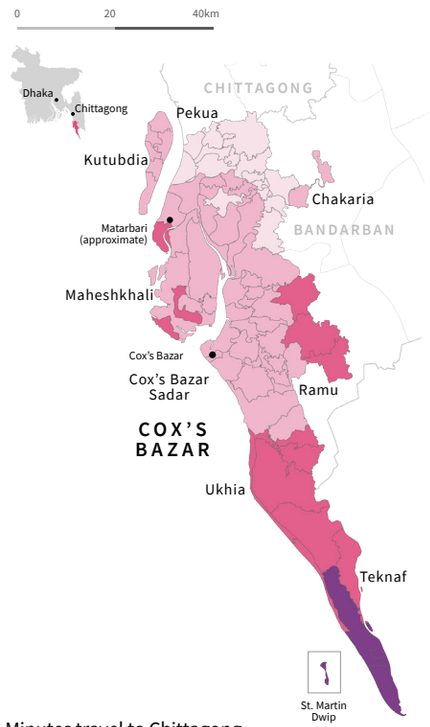
Better connectivity and accessibility in Cox's Bazar are key for regional economic growth and can accelerate national growth. Rising wage demands from workers, tougher global price competition, and inefficient logistics have raised pressure on local producer costs in Bangladesh. This poses a growing challenge for the country's economic model, which has relied on a competitive advantage in wages (Farole and Cho 2017; Herrera Dappe et al. 2020). Bangladesh needs to invest in its transport infrastructure, which has not kept pace with its growth – the country ranks 100th out of 141 countries in the World Economic Forum's Global Competitiveness Index in transport, and even further behind in the ranking for road connectivity. Beyond the lack of adequate transport infrastructure, operation and maintenance of existing assets have been inadequate, even more so considering the repeated exposure to flooding and natural hazards. Developing a more inclusive growth model beyond the Dhaka and Chittagong corridor will require better transport and logistics systems to connect people to jobs and allow businesses to invest in areas of high return. Integration with the global economy will be facilitated by the development of a multi-modal and interconnected transport network that effectively and efficiently links Bangladesh's seaports with more of the country's interior (IFC 2020). In this context, improving connectivity infrastructure and access is crucial for future growth, and progress in Cox's Bazar can have national impact.

To date, high population density, poor road quality, and lack of alternatives to road transport have kept Cox's Bazar relatively isolated from Bangladesh's main economic centers. Map 2-11 shows estimated travel times from different areas of Cox's Bazar to Bangladesh's main economic gateway, Chittagong city. Connectivity varies within the

[38] Households and firms in Cox's Bazar are also disadvantaged by poor access to digital infrastructure. As discussed in chapter 4, access and quality issues, compounded with the relatively high cost of internet connections, are a nationwide constraint, but are particularly salient to businesses in Cox's Bazar, for which technology is the second most important constraint, after access to credit.

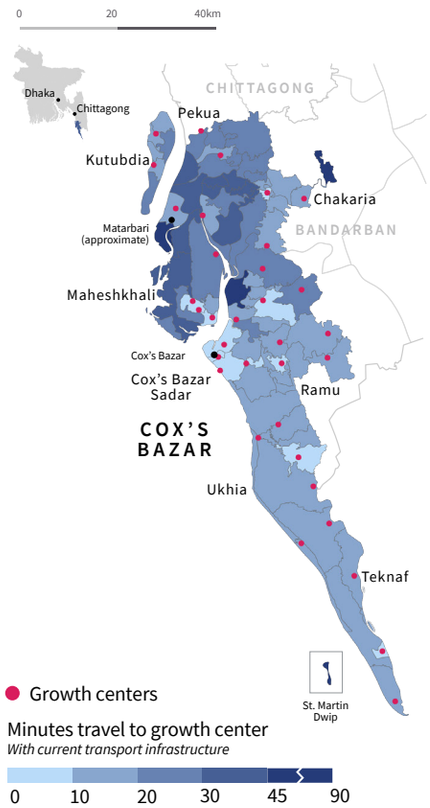
district and is affected by factors other than geographic distance. For example, the highway connecting Dhaka with Bangladesh's southeastern districts varies in quality along its length.[39] This increases travel times and reduces connectivity in areas of lower road quality (Map 2-12).

Map 2-11: Estimated travel times to Chittagong city



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Map 2-12: Accessibility to growth centers in Cox's Bazar



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

[39] See Table A1-1 in the Annex for road and ferry speeds used for modeling, adapted from Blankenspoor and Yoshida (2010).

The market accessibility index in Table 2-4 reflects this inequality of connectivity within the district and underscores the relative isolation of Cox's Bazar.[40] This index measures each upazila's cumulative access to every major market (defined as cities of 50,000+ population) in Bangladesh, given current transportation infrastructure. However, the lack of connectivity primarily seems to affect access to national rather than local markets (Table 2-4). As Map 2-12 shows, with the exception of Maheshkhali, which seems to have major connectivity problems, access to growth centers or key multi-modal markets[41] within each upazila is relatively good. Moreover, using the distribution of education as a proxy for inequality, we observe that not only growth centers, but all markets, are equally accessible for individuals of different levels of education (Figure 2-12 and Figure 2-13).

Table 2-4: Market accessibility index - Ranking of Cox's Bazar upazilas, 2010

	Ranking in Cox's Bazar	Ranking in Chittagong	Ranking in Bangladesh
Kutubdia	7	92	481
Maheshkhali	6	91	470
Teknaf	5	90	461
Ramu	4	86	441
Ukhia	3	85	430
Cox's Bazar Sadar	2	75	393
Chakaria	1	73	383

Note: Ranking in Chittagong division ranges from 1 to 94, with 94 being the lowest rank. Ranking in Bangladesh ranges from 1 to 493, with 493 as lowest. Source: Blankespoor and Yoshida (2010).

The influx of Rohingya has increased congestion and underlined the urgent need for better road infrastructure. During the first wave of displacement, Rohingya used roads, bridges, and dams as shelter, causing damage to transport infrastructure (UNDP and UN Women 2017). Subsequently, the growing international relief workforce and the large-scale delivery of humanitarian supplies have further stressed the district's congested road transport infrastructure. The Roads and Highways Department estimates that road traffic in affected areas has more than doubled, damaging the main road between Cox's Bazar and Teknaf in particular (UNDP 2018).

[40] See Blankespoor and Yoshida (2010) for more details. This index was calculated with the negative exponential potential model for 202 cities with population from the 2001 census, with populations ranging from approximately 15,000 to 6,500,000 (Dhaka).

[41] The more important markets in Bangladesh are characterized as having permanent multimodal structures including shops, banks, and storage facilities, among others, as well as managing a large volume of trade. Since the early 1990s, the Planning Commission of Bangladesh has identified these important markets as Growth Centers. These centers are intended to be the focal points of rural development (GoB 2005).

Along with the Rohingya influx, climate risk affects connectivity in Cox's Bazar. Transport infrastructure is destroyed every year because of exposure to monsoon cyclones and floods. Twenty-five percent of the total length of roads and 1.5 km of bridges and culverts need to be rehabilitated to be accessible to traffic throughout the year (GFDRR 2018). To guarantee continued delivery of vital humanitarian assistance to the Rohingya camps, every year[42] international organizations and the Government of Bangladesh perform risk-reduction activities including re-paving of main roads, improvement of drainage systems, and earthwork construction.

Figure 2-12: Average travel time to markets of any size by level of education and upazilas

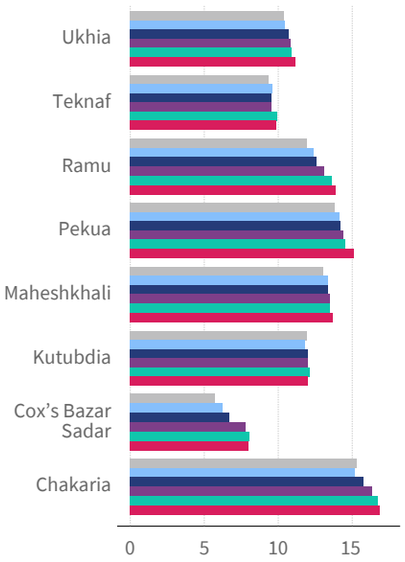
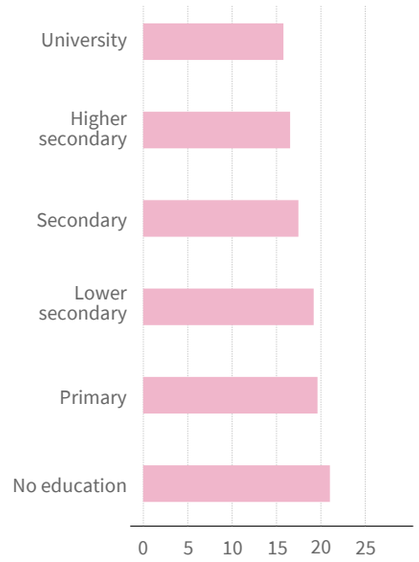


Figure 2-13: Average travel time to growth centers by level of education



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

[42] In 2020, disaster risk reduction efforts were suspended due to the COVID-19 lockdown. https://www.unhcr.org/news/briefing/2020/4/5e9ea77e4/covid-19-unhcr-warns-severe-implications-annual-monsoon-response-bangladesh.html

The lack of multimodal transport nodes, the dominance of road transport, and the lack of capacity to handle high traffic volumes constrain both economic development and humanitarian action in Cox's Bazar. On the one hand, the district faces rising transport costs and reduced competitiveness, with greater effects on relatively isolated areas (Herrera Dappe et al. 2020). On the other hand, the pressure on local transport infrastructure has weakened Cox's Bazar's logistic capacity, complicating effective humanitarian assistance (UNHCR 2019).

Investment in transport infrastructure in Cox's Bazar needs to increase. The factors just discussed have boosted the demand for investments in infrastructure in Cox's Bazar. Such investment would also contribute to Bangladesh's goal of increasing economic density in secondary cities, a priority for local development and national economic growth.

Thanks to its natural comparative advantages, Cox's Bazar can host infrastructure projects of national and international importance. Bangladesh's privileged geographic location between South and Southeast Asia creates a unique opportunity to benefit from the international movement of goods, services, and investment flows (Plummer, Morgan, and Wignaraja 2016). Ambitious infrastructure projects have been planned in anticipation of the incoming demand from local international trade, as well as increasing demand related to the regional connectivity agenda (JICA 2016). Cox's Bazar is positioned to play a key role in these advances.

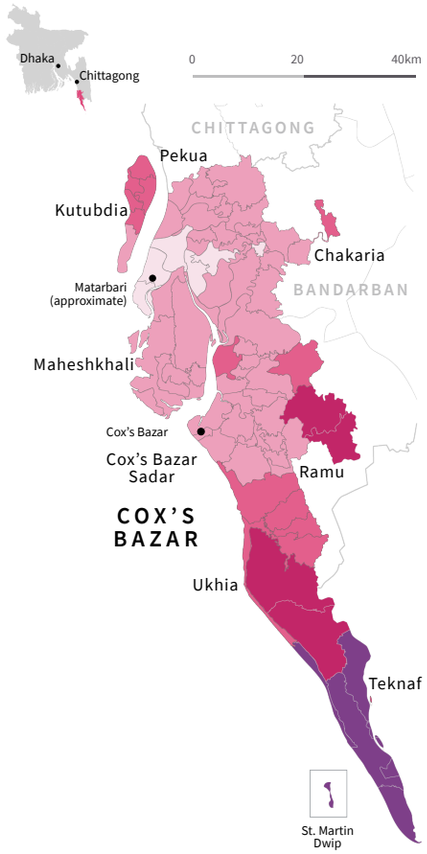
The proposed construction of Bangladesh's first deep seaport at Matarbari holds promise.[43] Increased international trade and the concentration of 98 percent of cargo in Chittagong port has exceeded the port's capacity.[44] This directly impacts Bangladesh's economic growth prospects. Accordingly, the country's Seventh Five-Year Plan 2016-2020 has included the construction of port terminals financed by JICA. Along with the ship terminals, the project includes the upgrading and construction of new local roads to improve connectivity to the port area (Map 2-13).[45]

[43] Originally, the plans for the energy hub at Maheshkhali Upazil called for development of up to 6 gigawatts (GW) of coal power plant capacity (in addition to some 3 GW of liquid natural gas-based generation), with the associated climate/environmental and financing challenges. The Government of Bangladesh has recently announced that it will review the plan for coal power additions as part of a forthcoming Power/Energy Sector Master Plan, starting in early 2021. As such, some of the previously planned coal-based generation in Matarbari may be postponed or cancelled. A project to invest in a Bay Terminal development at Chittagong port is also planned. This will help to reduce congestion not only in Chittagong port but also in Matarbari port in the future.

[44] https://www.joc.com/port-news/asian-ports/port-chittagong

[45] The project also includes the development of special economic zones, logistic parks, and power plants. See JICA (2018).

Map 2-13. Accessibility to proposed Matarbari port and energy complex



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Cox's Bazar is a key link in other regional connectivity projects fostering international and domestic trade and growth. Under international agreements in which Bangladesh participates, the country is part of five regional connectivity corridors.[46] In 2009, Bangladesh and the UN Economic and Social Commission for Asia and the Pacific (ESCAP) signed an agreement on connecting the Asian Highway, which includes a key road going along the AH41 axis Chittagong-Cox's Bazar-Teknaf (Plummer et al. 2016). The Asian Highway is especially relevant for Cox's Bazar because it connects the district with other regional corridors terminating in Chittagong and because it is the most important arterial road for the Matarbari Development Project. Additional ongoing and proposed road projects also hold promise for regional development. The cross-border road network improvement project includes the reconstruction of four bridges between Chittagong and Cox's Bazar and is linked to the development of Matarbari port. Projects still at the proposal stage include the upgrading from two to four lanes of the National Highway from Chittagong to Teknaf[47] and the construction of an alternative route (the N1) connecting regional highways to improve connectivity[48] (JICA 2018b). In addition to these projects, and considering the increased congestion since the large-scale arrival of Rohingyas in 2017, the Government of Bangladesh has initiated a project to upgrade the road segment connecting Teknaf with Cox's Bazar.

[46] Asian Highway, SAARC highway corridor, SASEC road corridor, BIMSTEC road corridor, BBIN MVA corridor, Chittagong Port access from the North East, and India and BCIM economic corridor (JICA 2016).
[47] "Due to the expected large-scale social environmental impact, financial source for the construction works of the project has not been confirmed yet" (JICA 2018b, page 3.17).
[48] "This new road construction project has been proposed by the Cox's Bazar Road Division of RHD. This road will be a 20 km long Regional Highway connecting R170 to Z1132 as a secondary road of N1" (JICA 2018b, page 3.17).

This plan will be financed by the Asian Development Bank, will employ workers from the camps, and will include improvements to both roads and water supply while also increasing environmental resilience, strengthening disaster risk management, and improving energy infrastructure (RHD 2019).[49]

Better rail connections may help relieve pressure on the district's road system. Prospects of increasing cargo traffic, the development of Cox's Bazar as a tourist destination, and the influx of Rohingya have all contributed to rising stresses on roads. Considering this, the Government of Bangladesh has started a project to connect Cox's Bazar to the national and sub-regional railway network (ADB 2016). The project, co-financed by the Asian Development Bank, aims to extend the railway corridor from Chittagong to Cox's Bazar. The project is part of the Asia Railway network and is expected to improve the district's access to regional markets and trade. The plan also foresees extending rail lines to the Myanmar border and the Matarbari Port area.[50]

Many of these capital-intensive and export-oriented investments are critically important for Bangladesh's economic growth, most directly through linkages with Chittagong and Dhaka. Indeed, the above-mentioned projects will likely lead to an increasing demand for services in Maheshkhali and neighboring upazilas in Cox's Bazar district (through higher demand for real estate, urban services, transport and communication services, and others). However, considering the capital intensity of the investments and the low skills and human capital endowment of the district, the direct beneficiaries of these investments are likely to be larger export-oriented business located in Chittagong and Dhaka. Targeted policy actions are needed to ensure that the people of Cox's Bazar also benefit fully from these strategic investments.

[49] For more information on the projects see JICA (2016), RHD (2019), and RHD (2018).
[50] The project is part of the Railway Master Plan formulated by the GoB, ADB, JICA, and WB. It is expected to be completed by 2025. See https://www.adb.org/projects/46452-002/main#project-pds

CHAPTER 3.

Economic outcomes: Jobs, livelihoods, and incomes

The previous chapter reviewed foundational endowments that affect prospects for inclusive growth in Cox's Bazar. This chapter discusses Cox's Bazar's economy and how well it has been working to translate those endowments into inclusive development and welfare outcomes. The chapter starts by examining the structure of the district 's economy, focusing especially on the sectoral composition of economic activity and the characteristics of firms. The second part of the chapter explores the livelihoods that the local economy enables for the people of Cox's Bazar. Throughout the chapter, economic structures, trends, and outcomes in Cox's Bazar are compared with those in Chittagong division and Bangladesh as a whole, providing a sense of what Cox's Bazar could achieve.

Structure of the Cox's Bazar economy: Economic activity and firm composition

The contribution of Cox's Bazar district to the national economy must be measured using proxy indicators. These suggest that Cox's Bazar's economic contribution is not directly commensurate to its population, a common pattern among districts in Bangladesh. Official data on sub-national estimates of economic growth and output are not available in Bangladesh, requiring the use of imperfect proxy indicators. Such indicators provide indirect evidence that Cox's Bazar, which accounts for 1.6 percent of Bangladesh's population, may not be contributing commensurately to the country's economic activity. In agriculture, for example, Cox's Bazar district represented less than 1 percent of total Bangladeshi crop production in 2017 and around 7 percent of production in Chittagong division. Net cropped area in Cox's Bazar district is 1 percent of total net cropped area in Bangladesh and 8 percent of net cropped area in the division.[51] Within the agricultural sector, fish pro-

[51] The analysis in this section relies mainly on the 2011 Population Census, the 2013 Economic Census, and the 2019 CBPS, as these are the only sources of statistical data that allow for inferences at the

duction and livestock in Cox's Bazar each account for 1 percent of national production and 5 percent of division production. The Economic Census of 2013 found that industry and service-sector enterprises in Cox's Bazar represented 1 and 6 percent of such firms in the country and division, respectively.

Cox's Bazar's economic performance is generally on par with districts of similar population, but with some unusual traits. Many Bangladeshi districts perform at similar levels on the indicators that proxy subnational economic contribution (Figure 3-1). The long coastline of Cox's Bazar should be a comparative advantage for sea-caught fish, and indeed, the district contributes 20 percent of national production. But when considering total national fish production, the district's contribution is relatively low, with the exception of shrimp, where it represents a tenth of national production (Figure 3-2). Indeed, pond-based fish production gives districts such as Comilla (on the Dhaka-Chittagong highway, in Chittagong division), Mymensingh district (in the division of the same name, home to the fourth-largest city in Bangladesh), and Jessore (near Khulna) the edge in production. Similarly, despite its reliance on agriculture as a source of employment, net cropped area in Cox's Bazar is close to the average predicted by its population size (Figure 3-3), and crop production is below the average predicted by cropped area (Figure 3-4). That being said, Cox's Bazar does display some distinct characteristics in terms of its economic structure, apparent in its above-average contribution in sectors including shrimp production, salt extraction, and some specific cash crops, further discussed below.

Figure 3-1: Economic performance among Bangladeshi districts (1): share of national non-agricultural firms in relation to population

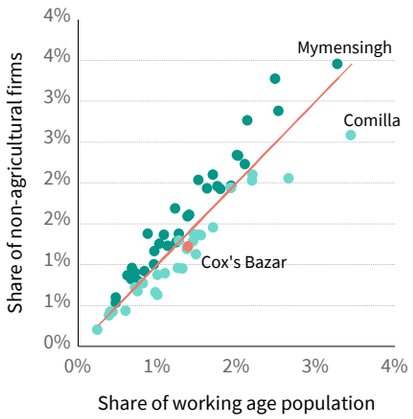
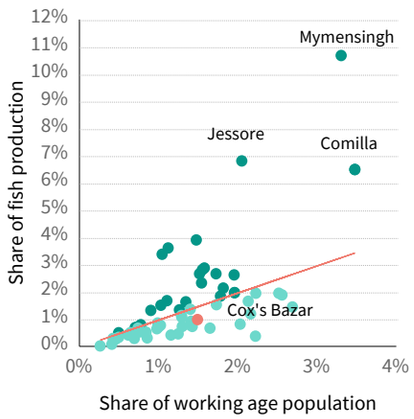


Figure 3-2: Economic performance among Bangladeshi districts (2): share of national fish production in relation to population



sub-district level.

Figure 3-3: Economic performance among Bangladeshi districts (3): share of total net cropped area in relation to population

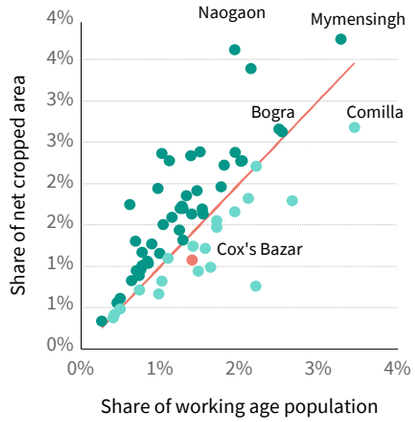
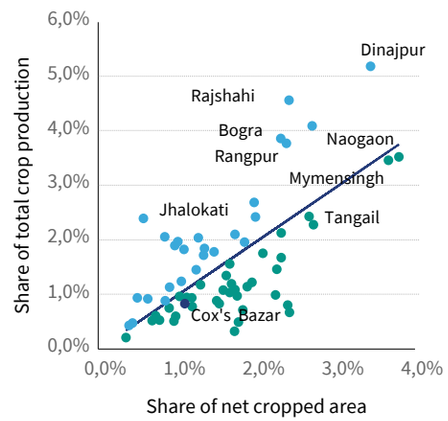


Figure 3-4: Economic performance among Bangladeshi districts (4): share of total crop production in relation to net cropped area



Source: World Bank staff estimates, based on Agricultural Yearbook 2017, Economic Census 2013, Population Census 2011.

Agriculture and fisheries

Agriculture was a key sector in Cox's Bazar before the Rohingya influx and remains an economic mainstay. On the 2011 Population Census, 50 percent of households in Cox's Bazar reported agriculture as their main sector of employment, followed by 43 percent in services and 7 percent in industry. Beyond the structure of employment, a third of households at that time relied on agricultural labor as their main source of income, with another 10 percent deriving income mainly from fishing activities.[52] These shares are 11 and 4 percentage points higher than the division average, and 7 and 2 percentage points higher than the national mean.[53] In addition, 76 percent of rural Cox's Bazar households are involved in activities related to livestock and poultry (BBS 2018a). This highlights the relative importance of the agricultural sector in terms of employment and incomes in Cox's Bazar, prior to the Rohingya influx. More recently, preliminary reports from the 2019 agricultural census

[52] The agricultural census defines "Agriculture labor households" as those whose major source of income during the preceding year was obtained by working as agriculture labor. Agriculture labor connotes receiving wages either in cash, kind, or both for performing agricultural work on land operated by other holders (BBS 2010).

[53] The differences between division and national average are lower when Dhaka and Chittagong are not considered. In this case, the differences between Cox's Bazar and the division and national mean are 8 and 2 percentage points, respectively.

estimate that 41 percent of the district's households are farming households, cultivating at least 0.05 acres of land.[54] Agriculture persists as the mainstay of the Cox's Bazar economy.

Cox's Bazar accounts for a significant share of Chittagong division's production of cash crops such as tea, tobacco, betel nut, and betel leaf, suggesting potential for specialization and diversification. Fruits, vegetables, and the crop group formed by tea, tobacco, betel nut, and betel leaf represent 12, 7, and 9 percent of Cox's Bazar's total farming production, respectively. Among these crops, the district is one of the major contributors to division production of tea, tobacco, betel nut, and betel leaf, accounting for a quarter of Chittagong's production and cultivated area for these outputs.

While high and medium-elevation land in the district's northern hills provides an opportunity to increase agricultural diversification, farming in Cox's Bazar remains dominated by rice cultivation. Comparing agricultural diversification among Chittagong districts in similar agroecological zones shows greater diversification in the northern hills and coastal plains than in low-lying lands such as estuarine and river flood plains (Figure 3-5).[55] While the share of fruits and vegetables is only 25 percent in the division's low-lying districts, these crops represent almost 40 percent of total crop production in the higher-elevation districts.[56] However, examining the crop structure of districts in the northern hills and coastal plains, Cox's Bazar is still producing a lower share of high value-added crops than its neighbors.[57]

The farming sector in Cox's Bazar is dominated by rice, which represents 69 percent of total district farm production (Figure 3-6). This compares to 49 percent nationally (BBS 2018c). Even where agroecological characteristics create a relatively unfavorable environment for growing rice, lower yields and returns in other crops, along with the need to ensure food supply, appear to create a bias towards rice production (Gautam and Faruqee 2016). As noted in the Bangladesh Rural Income Diagnostic (Genoni et al. 2021), the high concentration of rice as the crop of choice stems from the lower risks associated with its cultivation. The policy environment for rice cultivation – including input subsidies, price management, and targeted research and development – is very favorable, reflecting longstanding political concern to promote food security. For alternative crops that are perishable (unlike rice), commercialization poses additional challenges.

[54] The agricultural census defines farm households as those cultivating at least 0.05 acres. Non-farm households are those who have no cultivated or operated land or who are cultivating less than 0.04 acres.
[55] An agroecological zone is an area characterized by having homogeneous agricultural and ecological characteristics. Bangladesh has delineated 30 agroecological zones based on four elements: physiography, soil properties, land levels in relation to flooding, and agro-climate. See Figure A 1 in Annex 1.
[56] Districts in Estuarine and River flood plains are Chandpur, Comilla, Feni, Brahmanbaria, Lakshmpur, and Noakhali.
[57] See Figures A1-2 and A1-3 in Annex 1 for a district-wise diversification pattern within each agroecological zone in Chittagong division.

Contrary to other districts in the northern hills and coastal plains, agricultural activities in Cox's Bazar are based on small production units.[58] As discussed above (see Box 3), while dependent on agricultural activities, Cox's Bazar district has relatively little cultivable land. Indeed, 90 percent of farms in the district measure less than 1 hectare (Table 3-1), compared to roughly 80 percent of farms on average for this agricultural zone (BBS 2010). Considering that Teknaf and Ukhia are home to 34 percent of the district's forest land, and that 35 percent of the district's land is not available for cultivation (BBS 2018c), the southern upazilas appear to have a larger share of medium and large farms than other areas of the district. This could be an indicator of lower urbanization in those areas. The 2011 Population Census showed that, compared to an average of 76 percent rural popualtion in the other upazilas in Cox's Bazar, 92 and 94 percent of the population lived in rural areas in Teknaf and Ukhia, respectively.[59]

Land markets in Cox's Bazar reflect the nationwide upward trend in the share of cultivated land under tenancy.[60] Following the national trend, the share of tenant households has increased from 12 to 20 percent in the district between 2008 and 2019. Various studies have documented an increase in the share of tenancy in rural Bangladesh.[61] However, despite the rising trend, evidence shows that a better-functioning rental market in the country would allow households that are more efficient at cultivating to rent land, not only improving their living standards, but also increasing aggregate productivity (Genoni et al. 2021).

Limited adoption of new technology constrains diversification and productivity in higher-value crops. Reforms since 1980 have included the distribution of small irrigation equipment and the elimination of import restrictions on agricultural equipment. Such measures have facilitated the rapid adoption of mechanized irrigation across the country. Irrigation has not only improved productivity but enabled farmers to introduce multi-cropping systems and to plant during dry seasons (Gautam and Faruqee 2016). However, while at national level 50 and 96 percent of the gross and net cropped areas are covered by irrigation systems, in Cox's Bazar, these shares are lower: 40 and 70 percent, respectively. At national level, 80 percent of irrigated land is covered by tube well systems, but in Cox's Bazar, tube well systems cover only 21 percent of irrigated land, while 69 percent is irrigated with power pumps, and 10 percent still relies on traditional irrigation methods (BBS 2018c).

[58] Farm size groups are defined as follows. Small: 0.05 to 2.49 acres/0.02 to 1.007 hectares. Medium: 2.5 to 7.49 acres / 1.01 to 3.03 hectares. Large: more than 7.5 acres/more than 3.03 hectares.
[59] See Figure A-4 in Annex 1.
[60] Tenancy is defined according to the criteria used for Bangladesh's Agricultural Census. Tenant holders are defined as those having no owned land but operating land belonging to others on a sharecropping basis or on other terms (BBS 2010).
[61] See Hossain and Bayes (2009); Hossain and Bayes (2018); Genoni et al (forthcoming).

Figure 3-5: Share of crops in total agricultural production, different agroecological zones, Chittagong division, 2018

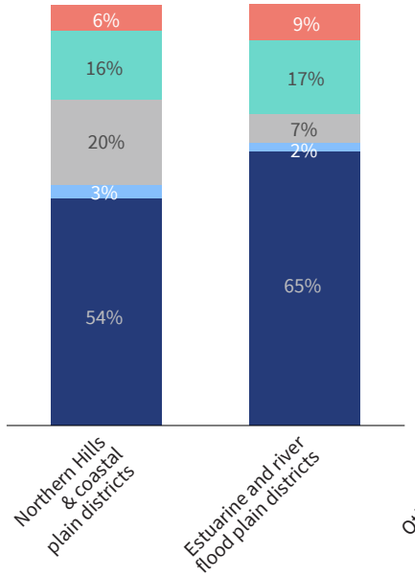
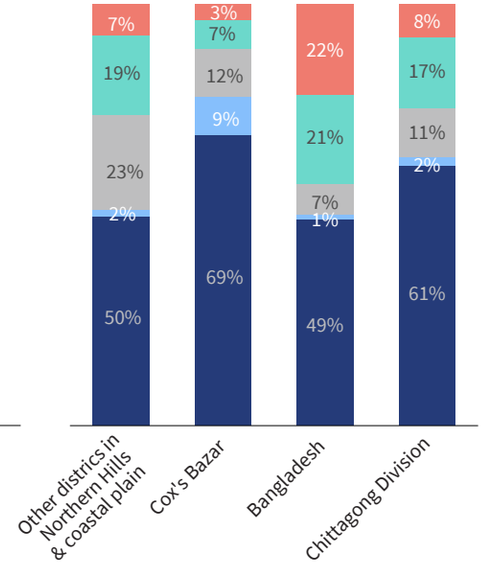


Figure 3-6: Share of crops in total agricultural production, Cox's Bazar and comparator areas, 2018



Rice Fruits Other crops (including jute) Tea,tobacco, betelnut & betel leaf Vegetables

Source: World Bank staff calculations (BBS 2018c).

Farm households appear to have good access to markets in Cox's Bazar, though levels remain below the national average. Sixty-four percent of farm households in Cox's Bazar are selling their products in a *haat bazar*, compared with 85 and 77 percent at the national and division level, respectively. More importantly, 73 percent of the markets where households sell their products are less than 4 km away, and 35 percent are less than 2 km away (BBS 2018a). Indeed, agricultural markets in Bangladesh appear to be functioning quite efficiently, with limited information asymmetries and low marketing margins (Gautam and Faruqee 2016). Despite the physical proximity of markets to producers, marketing margins arise due to the quality of transport infrastructure and logistics costs. While evidence on market integration is scarce for perishable value chains, for non-perishable value chains such as rice, market integration appears to be better, in part reflecting high levels of government intervention.

Table 3-1: Size of land holdings, Cox's Bazar and comparator areas, 2008

	Non-farm households	Total Farm households	Small*	Medium*	Large*
Noakhali	35%	65%	88%	10%	1%
Brahmanbaria	45%	55%	89%	10%	1%
Chandpur	41%	59%	96%	4%	0%
Comilla	39%	61%	94%	5%	0%
Feni	46%	54%	92%	8%	0%
Lankshmipur	35%	65%	93%	7%	1%
Khagrachhari**	23%	77%	64%	31%	5%
Rangamati**	26%	74%	49%	42%	9%
Bandarban**	29%	71%	54%	38%	8%
Chittagong**	72%	28%	91%	8%	1%
Cox's Bazar**	56%	44%	90%	9%	1%
Chakaria***	55%	45%	89%	10%	1%
Cox's Bazar Sadar***	71%	29%	92%	7%	1%
Kutubdia***	60%	40%	93%	7%	0%
Moheskhali***	53%	47%	92%	7%	1%
Pekua***	57%	43%	91%	8%	1%
Ramu**	45%	55%	85%	13%	1%
Teknaf***	63%	37%	84%	14%	2%
Ukhia***	34%	66%	92%	7%	1%
Northern hills and coastal plains	62%	38%	81%	17%	3%
Chittagong division	48%	52%	89%	10%	1%
Bangladesh	47%	53%	84%	14%	2%

Note: *Shares over the total of farm households. **Districts included in northern hills and coastal plains. ***Cox's Bazar upazilas.
Source: World Bank staff calculations, Agricultural Census 2008.

The district's fishing (particularly shrimp) sector presents an opportunity to enhance exports and household income diversification. Fisheries and livestock sectors are important because they act as stabilizers, create employment, improve food security, and contribute to poverty reduction (Gautam and Faruqee 2016). Moreover, fisheries are Bangladesh's

main agricultural export, making the sector important from the perspective of export diversification.[62] While the district's overall fish production constitutes less than 1 percent of national fish production, it represents a fifth of national sea-caught fish, and Cox's Bazar seems to have a comparative advantage in shrimp and prawn farming. Shrimp and prawn farming accounts for 76 percent of fisheries production in the district, 90 percent in the division, and 10 percent of total national production (BBS 2018c). Pond production in Cox's Bazar seems to be more developed, given the larger share of highly intensive ponds compared to other districts in the division and relative to the division average. Despite these apparent advantages, significant obstacles to the sector's further development persist. These include the need to reform contracts and improve productivity, market access, traceability, and food safety systems (Toufique and Ahmed 2014). Moreover, fish production in ponds in Cox's Bazar tends to be extensive rather than intensive, compared with other districts in the division (Table 3-2), lowering average productivity.

Table 3-2: Intensiveness of fish production in ponds, Cox's Bazar and comparators, 2017

	Extensive	Semi-intensive	Intensive	Highly Intensive
Bandarban	25%	75%	0%	0%
B.Baria	1%	58%	38%	3%
Chandpur	1%	59%	41%	0%
Chittagong	18%	64%	18%	0%
Comilla	2%	42%	48%	9%
Feni	3%	70%	26%	2%
Khagrachari	10%	76%	14%	0%
Lakshmipur	1%	74%	25%	0%
Noakhali	3%	93%	4%	0%
Rangamati	5%	92%	3%	0%
Cox's Bazar	33%	48%	9%	10%
Chittagong Div.	5%	61%	31%	3%
Bangladesh	3%	46%	31%	20%

Note: Extensive <1.5 Metric tonne (MT)/Ha; Semi intensive 1.5-4 MT/Ha; Intensive 4-10mt/ha; Highly intensive +10 MT/Ha.
Source: World Bank staff calculations, Yearbook of Agricultural Activities 2017.

[62] See Atlas of Economic Complexity https://atlas.cid.harvard.edu/

Services and industry

Data gaps limit our understanding of the non-agricultural economy in Cox's Bazar, particularly in terms of recent changes in the nature and composition of the firm economy. Much of our understanding of the non-agricultural economy at the sub-national level is reliant on the 2013 Economic Census. While no longer current, these data identify some structural characteristics of Cox's Bazar, which are distinct from the national economy, and help understand how these differences may have shaped more recently measured changes in employment patterns in the district.

The share of firms involved in key non-agricultural sectors in Cox's Bazar was consistent with the national pattern in 2013. However, the composition of employment differed between the district and the national level. Figure 3-7 shows these relationships. Nationally and in Cox's Bazar district, the majority of firms were engaged in wholesale and retail trade, but a relatively smaller share of Cox's Bazar's firms were engaged in transportation and storage (Figure 3-7a & Figure 3-7b). More substantial differences emerge in the composition of employment. Despite the large proportion of Bangladeshi firms dedicated to wholesale and retail trade, such firms accounted for only 34 percent of the country's total employment. In contrast, trade accounted for 51 percent of employment in Cox's Bazar, suggesting that this sector was more labor intensive here than nationally (even excluding Dhaka and Chittagong from the national average). The opposite pattern is evident in manufacturing. This sector accounted for 11 percent of firms but 29 percent of employment at the national level. In Cox's Bazar, the 14 percent of firms in manufacturing accounted for only 12 percent of jobs (Figure 3-7b & Figure 3-9). The composition of firms and employment in transport diverged in a similar way between district and national levels.

Figure 3-7a: Sectoral composition of non-agricultural firms and employment, Bangladesh, 2013

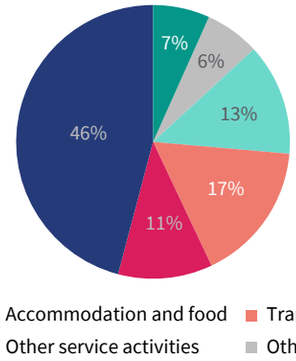
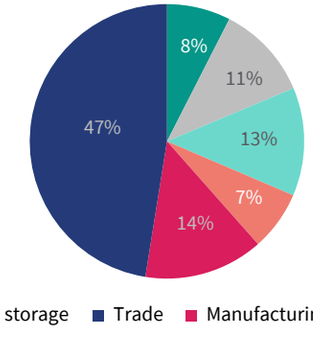
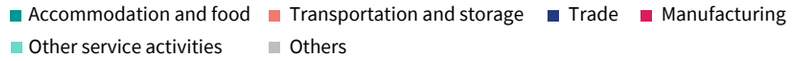


Figure 3-7b: Sectoral composition of non-agricultural firms, Cox's Bazar, 2013





Source: World Bank staff calculations, Economic Census 2013.
Note: "Others" includes industries such as mining, construction, utilities, education, health, public administration, financial, professional services, information and communication, and real estate. "Other service activities" in Cox's Bazar include tailoring and hairdressing.

Figure 3-8: Sectoral composition and employment, Bangladesh, 2013

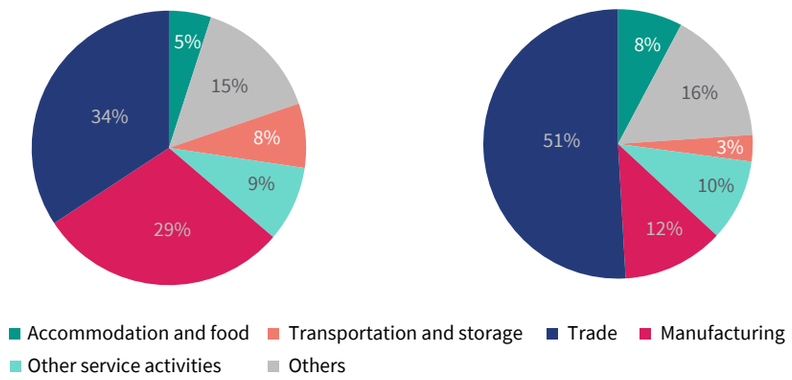


Figure 3-9: Sectoral composition employment, Cox's Bazar 2013

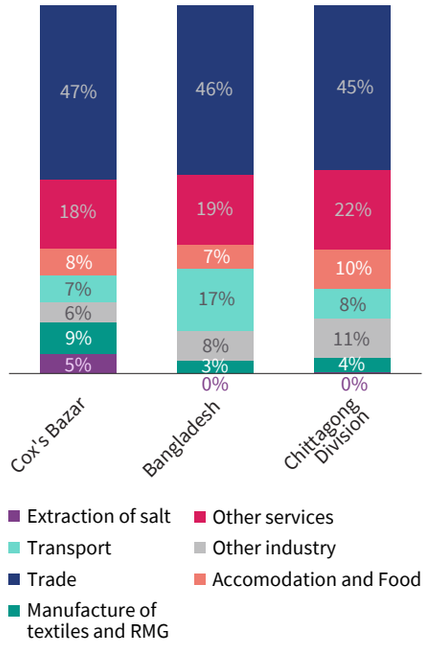
Source: World Bank staff calculations, Economic Census 2013.
Note: "Others" includes industries such as mining, construction, utilities, education, health, public administration, financial, professional services, information and communication, and real estate. "Other service activities" in Cox's Bazar include tailoring and hairdressing.

The RMG (ready-made garment) sector, the engine of Bangladesh's recent growth, was an important source of economic activity in Cox's Bazar, the district's contribution to the RMG sector at the national level was modest. RMG garment and textile firms represented a relatively larger share of firms in Cox's Bazar than at national and division level (9, 3, and 4 percent respectively), but the district's contribution to the national RMG industry was only 3 percent in 2013. On the other hand, while the share of firms in the salt extraction industry was negligible at national and division level, salt was the second most important industry in Cox's Bazar. Five percent of non-agricultural firms in Cox's Bazar are engaged in salt extraction, and these firms account for more than three-quarters of all salt extraction firms in the country (Figure 3-10 and Figure 3-11). Trade is the main component of the district's service sector, followed by other services and hospitality (food and accommodation), consistent with findings at divisional and national levels. However, the composition of the district's industrial sector departed from divisional and national patterns. Within industry, garment and textile firms represented 9 percent of all non-agricultural firms in Cox's Bazar and 64 percent of the district's manufacturing firms, but only 3 percent of non-agricultural firms in Chittagong and nationally. The vast majority of garment and textile firms in Cox's Bazar are single-person enterprises.

The distribution of non-agricultural firms by sector of activity was uneven across upazilas in Cox's Bazar and reveals a concentration of economic activity in northern areas of the district. Chakaria and Cox's Bazar Sadar together account for almost half of all non-agricultural enterprises in the district, followed by Teknaf and Ramu, which account

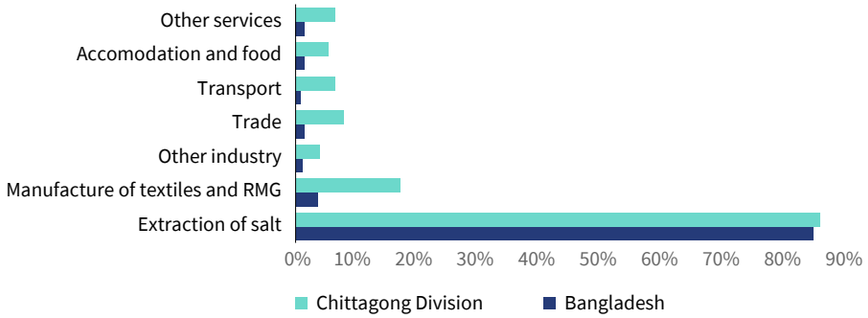
for another 30 percent (Figure 3-12). The composition of the private non-agricultural enterprise sector also varies by upazila, with some having a larger industrial presence (Figure 3-13). These include Chakaria, which is home to three-quarters of the district's RMG firms, and a quarter of firms engaged in salt extraction. In contrast, private non-agricultural enterprises in Teknaf and Ukhia are dominated by the services sector, with trade representing more than half of service-sector firms in both upazilas. Along with Chakaria, Teknaf has the highest ratio of firms to population in the district.[63] The main difference between Teknaf and the two largest upazila economies, Chakaria and Cox's Bazar Sadar, is in the composition of firms. In Teknaf, 90 percent of all firms are in services, mainly wholesale and retail trade. In Chakaria and Cox's Bazar Sadar, 66 and 84 percent of firms are in services, respectively. Teknaf's most important industry is salt extraction, accounting for 4 percent of all firms in this upazila, followed by RMG at 3.5 percent. In contrast, RMG and the textile industry account for a quarter of firms in Chakaria.

Figure 3-10: Share of non-agricultural firms by main activity -Cox's Bazar district, Chittagong division, and Bangladesh, 2013



Source: World Bank staff calculations, Economic Census 2013.

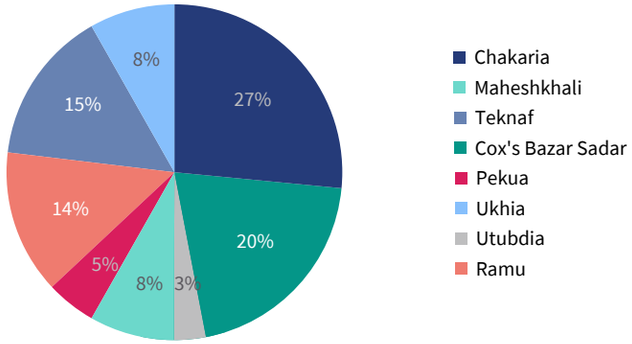
Figure 3-11: Cox's Bazar firms, as a share of division and national firms, diverse sectors, 2013



Source: World Bank staff calculations, Economic Census 2013.

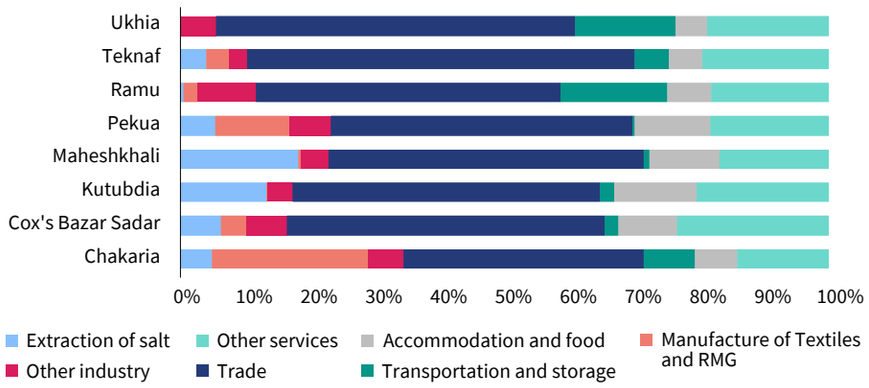
[63] See Table A1-5 in Annex 1.

Figure 3-12: Share of district firms by upazilas in Cox's Bazar, 2013



Source: World Bank staff calculations, Economic Census 2013.

Figure 3-13: Distribution of firms by sector within Cox's Bazar upazilas, 2013



Source: World Bank staff calculations, Economic Census 2013.

Firm size, informality, sectoral concentration, and spatial distribution

In terms of firm size, Cox's Bazar reflects broad national and divisional patterns, with very small, non-manufacturing enterprises accounting for the vast majority of all non-agricultural firms. Using official definitions of firm size by number of employees, 98 percent of all non-agricultural enterprises in Bangladesh fall under the smallest category, cottage enterprises, with less than 10 employees (in services, the proportion is 88 percent). The cottage enterprise category can be further disaggregated into 1-2 person enterprises, 3-4 person enterprises, and 5-9 person enterprises, treating all enterprises hiring a greater

number of workers as non-micro enterprises (Table 3-3).[64] Overall, Cox's Bazar mimics national and division patterns, with more than half of non-agricultural firms having less than 5 employees. While in services the firm-size distribution is similar, manufacturing firms in Cox's Bazar are characterized by a much larger share of 1-2 person enterprises, relative to the national and division-level average.[65]

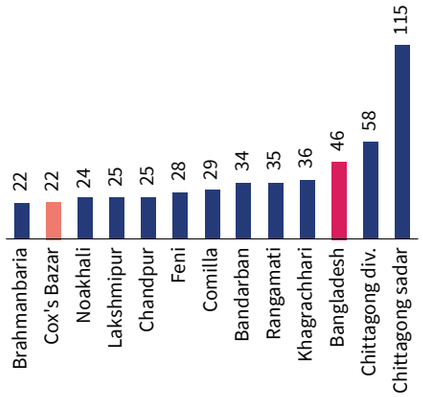
Non-micro firms are smaller in Cox's Bazar than nationally. Larger firms tend to be older in the district and the country as a whole. The average size of non-micro firms in Cox's Bazar is less than half the Bangladesh average of 46 (Figure 3-14). Firm size also varies across upazilas, with Ukhia having the smallest average, 16 employees, compared to 20 in Teknaf and 30 in Cox's Bazar Sadar (Figure 3-15). At both national and district levels, non-micro firms have been operating for almost twice as long as micro firms, on average. In Cox's Bazar, non-micro firms have been in operation for 18 years, on average, compared to half that for 1-4 person enterprises (Figure 3-16). Many authors have highlighted the importance of new and young firms in job dynamics (Haltiwanger et al. 2013, 2017).

A dynamic firm environment is associated with more job creation, given that well-established firms have a limited capacity to grow, and because the process of "creative destruction" allows the market to allocate production factors to more efficient enterprises (Farole and Cho 2017). Firm size plays an important role for a firm's survival or growth in the long run. For instance, using firm-level data from several developing countries, Goswami, Medvedev, and Olafsen (2019) show that high-growth firms are usually not small, but mid-sized firms. Likewise, the literature suggests that exit rates are higher among smaller firms (Jovanovic 1982), and that financial constraints are especially relevant for young, small firms. More worrying, even the old non-micro firms are not large. This suggests that the "up or out" dynamics observed for example in the United States (Haltiwanger, Jarmin, and Miranda 2010) are not playing out in Cox's Bazar, indicating a lack of pro-competitive forces.

[64] Bangladesh industry policy establishes the following criteria to classify firms by size: **Manufacturing: Cottage:** up to 9 workers or value of fixed assets excluding land and building less than Tk. half a million. **Microenterprises:** 10-24 workers or value of fixed assets excluding land and building between Tk 500.000 and 5.000.000. **Small:** 25-99 workers or value of fixed assets excluding laznd and building between Tk 5 million and 100 million. **Medium:** 100-250 workers or value of fixed assets excluding land and building in between Tk 100 million and 300 million. Large > 250 workers or of fixed assets excluding land and building in excess of Tk. 300 million. **Non-manufacturing sector:** Small: 10-25 workers or value of fixed assets excluding land and building between half a million and 10 million. **Medium:** 50-100 workers or value of fixed assets excluding land and building between 10 million and 150 million. Large >100 workers or value of fixed assets excluding land and building in excess of Tk. 150 million. In every case, if a firm falls in two categories, it will be classified according to the larger one (Bangladesh Industry Policy). For simplicity, in this diagnostic, we classify firms based solely on the number of workers. Given the preponderance of enterprises in the cottage category among both manufacturing and non-manufacturing firms, we further disaggregate these, while pooling together all firms with more than 10 employees into a non-micro category.

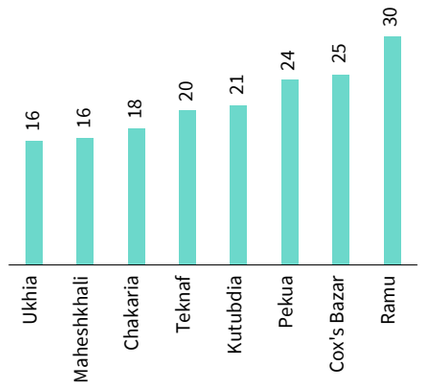
[65] See Table A1-6 in Annex 1 for detailed composition of firms by size in Cox's Bazar, Chittagong, and Bangladesh.

Figure 3-14: Average size of non-micro firms (by number of workers), Cox's Bazar and comparator areas, 2013



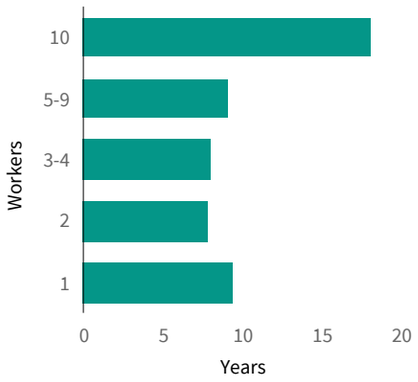
Source: World Bank staff calculations, Economic Census 2013.

Figure 3-15: Average size of non-micro firms (by number of employees), Cox's Bazar upazilas, 2013



Source: World Bank staff calculations, Economic Census 2013.

Figure 3-16: Average age of firms, by firm size, Cox's Bazar, 2013



In contrast to the national pattern, large RMG and textile firms are not a distinguishing characteristic of Cox's Bazar. Farole and Cho (2017) found that, at the national level, 4 out of 5 firms with more than 100 employees are manufacturers, and around 50 percent of them are in the RMG sector. Considering that the average size of firms with more than 10 employees in Cox's Bazar is far below 100 (on average, 22 employees work in large firms in the district), and that only 0.4 percent of the district's RMG firms have more than 10 employees, large RMG firms are very rare in Cox's Bazar.[66]

Most of Cox's Bazar's non-micro firms are engaged in education, financial intermediation, and public administration, while micro firms are in "non-tradable" services. Most of the largest firms in Cox's Bazar, employing 10 or more workers, operate in the education and other services sectors, which are mainly represented by firms related to financial intermediation, government administration, and health activities. These two categories alone account for 60 percent of the district's largest firms. The short-term accommodation

[66] See Table A1-7 in Annex 1.

industry is another important cluster of larger firms, representing 6 percent of non-micro enterprises. In contrast, among smaller firms, employing between 3 and 10 workers, more than 60 percent are engaged in trade.[67]

Table 3-3: Firm size (official versus IGD classification of enterprises)

Firm size (official classification)	% firms in			Firm size (classification used in this report)	% firms in		
	Bangladesh	Chittagong	Cox Bazar		Bangladesh	Chittagong	Cox Bazar
Manufacturing							
				1-2 workers	4.03%	6.64%	10.54%
Cottage: <10	10.40%	13.63%	13.91%	3-4 workers	4.92%	5.63%	2.48%
				5-9 workers	1.45%	1.36%	0.90%
Micro enterprises: 10-24	0.21%	0.13%	0.06%				
Small enterprises: 25-99	0.30%	0.16%	0.07%	Non-micro: >= 10	0.59%	0.36%	0.15%
Medium: 100-250	0.04%	0.03%	0.02%				
Large:>250	0.04%	0.04%	0.00%				
Services							
				1-2 workers	63.77%	53.74%	50.30%
Cottage <10	87.62%	84.57%	84.68%	3-4 workers	17.22%	23.63%	25.85%
				5-9 workers	6.63%	7.20%	8.53%
Small enterprises: 10-49	1.33%	1.38%	1.19%				
Medium: 50-100	0.04%	0.04%	0.06%	Non-micro: >= 10	1.39%	1.43%	1.26%
Large:>100	0.02%	0.02%	0.01%				

Source of official classification shares: Economic Census Final Report, BBS (2015), Table S4.
Source of report classification: Statistics produced by the team using micro data from census 2013.

[67] See Table A1-8 in Annex 1.

Within Cox's Bazar district, non-micro firms are mainly located in the upazilas of Cox's Bazar Sadar, Teknaf, and Chakaria. Most of these non-micro enterprises are in the service sector, with 70 percent engaged in "education" and "other services" activities. Among the categories included in "other services," "financial services activities, except insurance and pension funding" accounts on average for 12 percent of non-micro firms in the district. The second most important category under "other services" is "public administration and defense," which represents 11 percent of firms across upazilas, on average. "Other industries" is the third-largest group of firms characterized by the presence of non-micro enterprises. On average, 14 percent of firms hiring more than 10 employees are in this sector. Within this category, "manufacture of furniture" and "manufacture of non-metallic mineral products (mainly bricks)" represent on average 6 and 4 percent of non-micro enterprises, respectively.[68]

Relative lack of dynamism among Cox's Bazar firms may also be related to characteristics such as family ownership and a lower share of private limited firms. Bloom and Reenen (2010) find that most family-owned firms are poorly managed, and hence show low levels of firm performance. In Bangladesh, 90 percent of microenterprises, as well as small and medium firms, are owned by individual families (Figure 3-17 and Figure 3-18). Only among large firms is there a higher share of government, private, and public limited companies, as well as other types of entities. The picture in Cox's Bazar differs from national and division patterns, however. While in Chittagong and nationwide, 1 out of 5 large firms are single-family owned, this number rises in Cox's Bazar to 1 out of 3 firms. Only 9 percent of firms are private limited in Cox's Bazar, roughly half the national rate. In addition, government has a higher presence in large firms in Cox's Bazar, compared to Chittagong and the country as a whole (Figure 3-18). As Farole and Cho (2017) point out, lack of dynamism in microenterprises is related to the role of enterprises as a livelihood strategy for households, given lack of other job opportunities.

Informality is a prominent feature in Bangladesh and Cox's Bazar, which is likely to have deep economic implications. First, high informality implies widespread tax evasion, hindering government's ability to provide public goods. Second, informality may distort firms' decisions along important margins, such as the size of their work force. Third, it allows less productive (informal) firms to compete with more productive (formal) firms, leading to misallocation of resources and potentially large total factor productivity (TFP) losses (e.g., Hsieh and Klenow 2009).[69] Figure 3-19 suggests that more than 90 percent of firms in Bangladesh have neither a tax identification number nor a VAT

[68] See Table A1-9, Table A1-10, Table A1-11, Table A1-12, and Table A1-13 in Annex 1 for a detailed distribution of non-agricultural firms by sector and upazila.

[69] In contrast, informality can sometimes be beneficial to growth, as it provides de facto flexibility for firms that would otherwise be constrained by burdensome regulations. Therefore, understanding what proportion of firms belong to the informal sector is crucial for gauging the aggregate impacts of policies on economic development.

registration. Moreover, the share is highest in Cox's Bazar, where it is close to 100 percent. CBPS data show that, on average, only about 12 to 13 percent of the entire work force in Cox's Bazar had a written contract in 2019 (Figure 3-20).

Figure 3-17: Ownership type, by firm size, Cox's Bazar, 2013

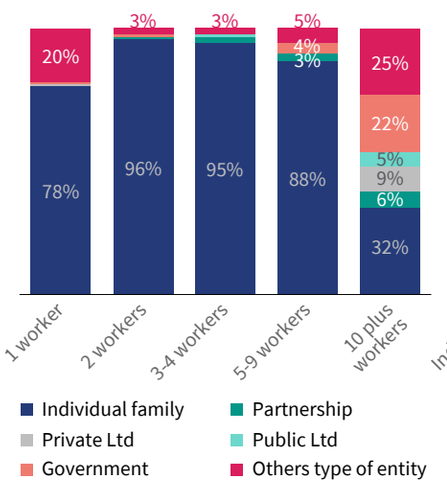
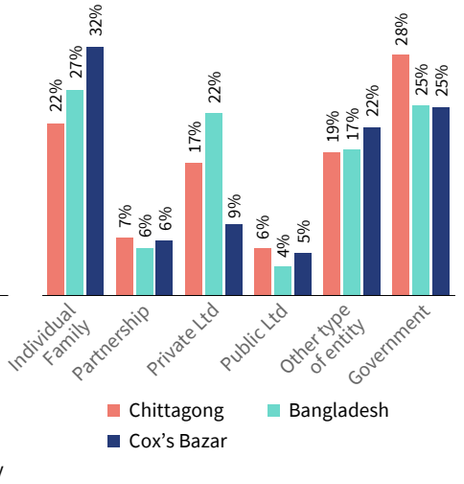
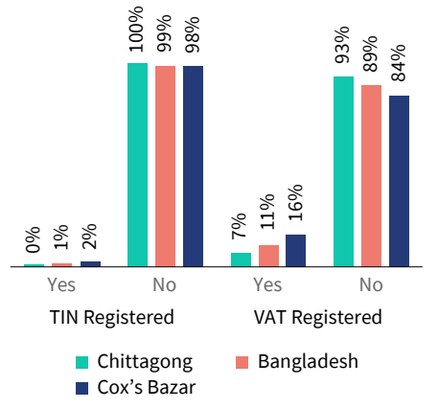


Figure 3-18: Ownership type, non-micro firms (>=10 workers), Cox's Bazar, Chittagong, and Bangladesh, 2013



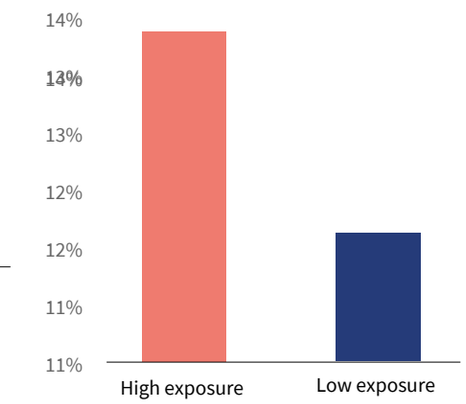
Source: World Bank staff calculations, Economic Census 2013.
Note: Following the Economic Census classification, "other type of entity" includes autonomous, foreign, joint venture, cooperative, NPI, and Non-Resident Bangladeshi enterprises, and others

Figure 3-19: The normality of informality in Bangladesh, 2013



Source: World Bank staff calculations, Economic Census 2013.

Figure 3-20: Share of workers with written contracts, Cox's Bazar, 2019



Source: World Bank staff calculations, CBPS 2019.

Work and livelihoods in Cox's Bazar

Employment patterns and dynamics

The benefits of Bangladesh's economic growth in terms of employment have been unevenly distributed across the country. For example, Chittagong division's female labor force participation increased from 29 percent in 2005 to 32 percent in 2016, but women's engagement in the labor force in Barisal and Sylhet declined during the same period (Labor Force Survey [LFS], various years). Within Chittagong division, evidence from the CBPS points to district-level disparities in key employment variables.[70] Table 3-4 shows that labor force participation in Cox's Bazar was below national and division averages, and female participation in the labor force was half that of Chittagong division overall (World Bank 2019a).

Table 3-4: Labor force participation, Cox's Bazar, Chittagong division, and Bangladesh

	LFS 2016-2017		CBPS 2019
	Bangladesh	**Chittagong**	**Cox's Bazar**
Male	83%	80%	71%
Female	35%	32%	19%
Total	58%	54%	42%

Structural change accompanying economic growth in Bangladesh has not only decreased the share of agriculture in GDP but also reshaped employment patterns, with a progressive shift of jobs toward non-agricultural sectors. Using different data sources, recent studies including the latest Poverty Assessment (Hill and Genoni 2019), Bangladesh Jobs Diagnostic (Farole and Cho 2017), and Rural Income Diagnostic (Genoni et al. 2021) have confirmed that Bangladeshi individuals and households are shifting away from agriculture. However, this process is progressive, and the sector still employs a substantial share of workers.

[70] Note that Labor Force Survey data does not allow for district-level comparisons. HIES tends to strongly underestimate female labor force participation relative to other sources, perhaps because the labor module is filled out by proxy.

Recent data on the composition of employment in Cox's Bazar confirms its greater reliance on services, particularly in low-exposure areas.[71] Using data from the 2016-17 Labor Force Surveys and the 2019 CBPS, Table 3-5 shows that both high- and low-exposure areas in Cox's Bazar rely more heavily on education and health services for employment, compared to the national and division average. Similarly, construction jobs also account for a higher share of employment. High-exposure areas (primarily Teknaf and Ukhia) are characterized by a higher share of employment in agriculture, whereas services and industry are more important in low-exposure areas (Figure 3-21).

The employment structure within Cox's Bazar continues to be differentiated by gender and across space. In 2019, a quarter of working men were employed in agriculture, a fifth in industry, and more than half worked in service-related activities (Figure 3-21). For women, agriculture is the primary source of livelihoods, engaging half of all working women, with a third employed in services. When breaking down non-agricultural sectors, gender differences are more striking. Within industry, while a larger share of women are involved in manufacturing and utilities, men are mostly performing construction activities (Figure 3-22). Across service activities, women have a larger participation than men in "other services, education and health." On the other hand, the male labor force is more diversified, with men's share of employment being larger than women's in trade and accommodation, transport, and other activities including non-classified waged and salaried workers.

Table 3-5: Sectoral composition of employment: Bangladesh, Chittagong, and low- and high-exposure areas of Cox's Bazar

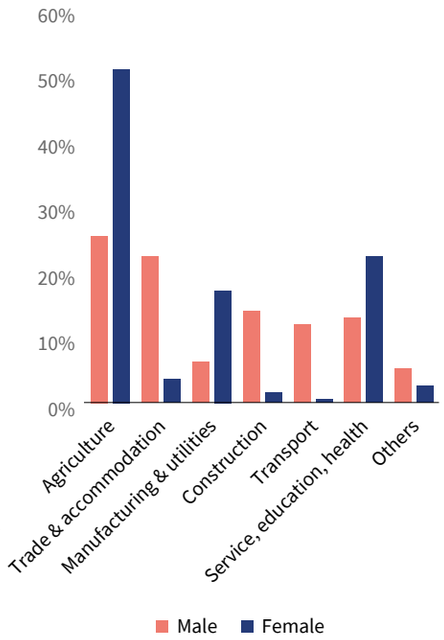
	Bangladesh	Chittagong	Low-exposure	High-exposure
Agriculture	41%	39%	30%	41%
Trade and accommodation	16%	19%	19%	15%
Industry	15%	13%	10%	7%
Construction	6%	7%	11%	10%
Transport	9%	9%	8%	11%
Services, education, health	14%	13%	22%	17%
Total	100%	100%	100%	100%

Source: World Bank staff calculation, LFS 2016-2017, CBPS 2019.

[71] Lack of pre-influx data at district level, together with large standard errors regarding employment patterns in HIES 2016, prevent reliable pre-post influx comparisons. The high prevalence of informality and home-based work in Cox's Bazar and across Bangladesh must also be considered. These factors suggest that labor force analysis based on the Economic Census could prompt misleading conclusions about trends. This report uses the Economic Census to demonstrate firm structural characteristics that are less likely to have changed significantly over the past decade. However, the report bases its descriptions of employment patterns on CBPS 2019 to the greatest extent possible. For a more detailed discussion of employment patterns using Economic Census 2013 and Population Census 2011, see Annex 4.

Figure 3-21: Share of men and women working in different sectors, Cox's Bazar, 2019

Figure 3-22: Share of individuals working, by activity and gender, Cox's Bazar, 2019



Source: World Bank staff calculations, CBPS 2019.

Employment differences between high- and low-exposure areas are more pronounced for women than men. Looking at the composition of employment among males in high- and low-exposure areas (using the 2019 CBPS), it is evident that individuals in Teknaf and Ukhia (high-exposure) have a larger share in low-skill activities such as agriculture and transport than is the case in other areas of Cox's Bazar (Figure 3-23). On the other hand, a larger share of males in low-exposure areas are working in construction and other manufacturing, as well as in trade and accommodation and other service activities. Among females, the differences between high- and low-exposure areas are more prominent. As previously mentioned, women's employment is less diversified than men's, and this low level of diversification is even more pronounced in high-exposure areas (Figure 3-24). Indeed, the agriculture sector represents more than 60 percent of total female employment in Teknaf and Ukhia. Other services—including personal services, NGO work, education, and health—emerge as the second-largest employer of women in high-exposure areas, followed by manufacturing and utilities. Women in low-exposure areas are less concentrated in agriculture and are more likely to be employed in services than in agriculture.

Figure 3-23: Sectors of employment, high-exposure versus low-exposure males, Cox's Bazar, 2019

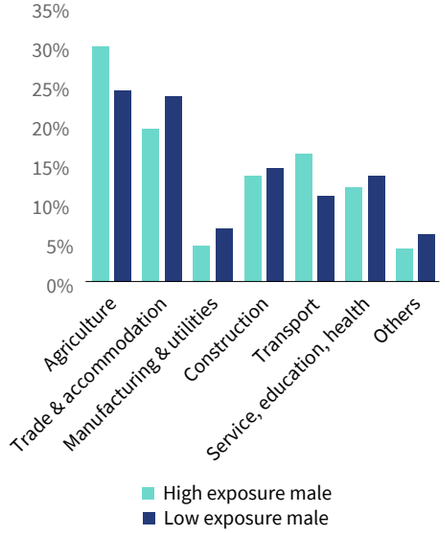
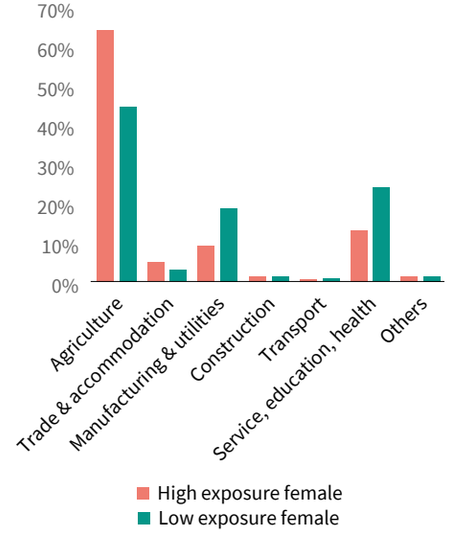


Figure 3-24: Sectors of employment, high-exposure versus low-exposure females, Cox's Bazar, 2019



Source: World Bank staff calculations, CBPS 2019.

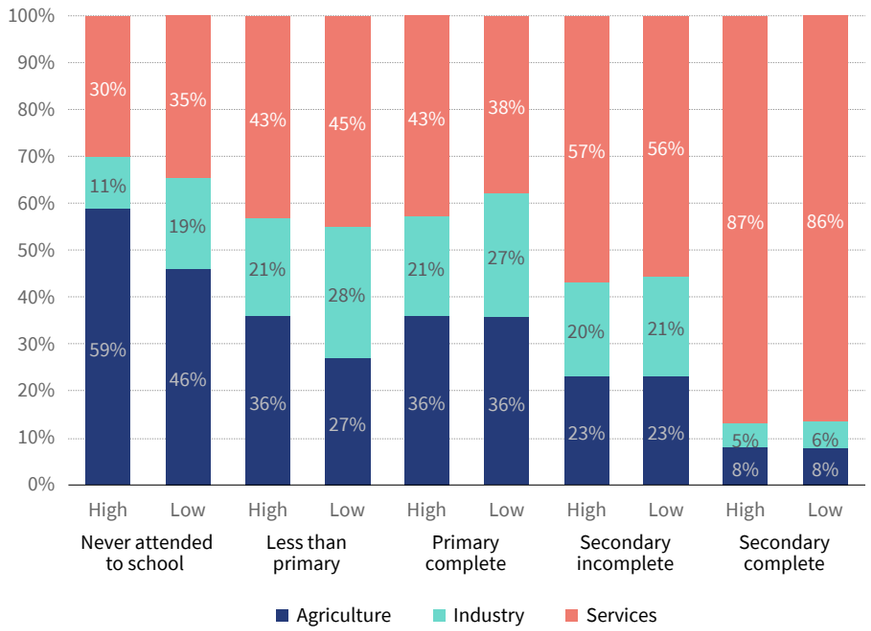
Women and men also work for different types of employers, with NGOs providing an important source of jobs for women in high-exposure areas. Women's and men's jobs are typically linked to different types of employers. The kinds of firms likely to hire women also change, depending on whether women live in low- or high-exposure areas. This is less the case for men. Men in all areas of Cox's Bazar are mainly employed by small enterprises and private institutions (58 and 20 percent, respectively, in high-exposure areas and 51 and 22 percent in low-exposure areas). In contrast, women working in high-exposure areas are mainly employed in NGOs, small enterprises, and other households (35, 36, and 17 percent respectively), while women living in more urbanized, low-exposure areas are more likely to work for government (20 percent of women in the labor force in low-exposure areas compared to 8 percent in high-exposure areas) and less likely to work for NGOs (which employ only 9 percent of the female labor force in low-exposure areas).

Most well-educated workers in low-exposure areas are employed by government or private companies, while in high-exposure areas, NGOs employ two-thirds of all workers with at least secondary education. In both high- and low-exposure areas, the share of individuals hired by small enterprises decreases as worker education increases. Indeed, while in high-exposure areas, 2 out of 3 individuals with primary education or

less are hired by small enterprises, this share decreases to less than half for those with incomplete secondary education and to 6 percent for high school graduates. NGOs were the main employer for those with more than secondary education in high-exposure areas (66 percent of this group). Among individuals with at least secondary education in low-exposure areas, government and private companies were the main employers, accounting for one-third of such workers each. Among similarly well-educated workers in areas close to Rohingya camps, two-thirds are employed by NGOs (Table 3-6). While pre- and post-influx comparisons are not possible, it is likely that NGOs working in or close to the Rohingya camps have provided new work opportunities for better-educated host workers and women living in surrounding areas.

Recent data confirm that agriculture is an important source of employment among the less educated, while most people with more than secondary education are employed in services. Half of all employed workers with no education in high-exposure areas work in agriculture, compared to 38 percent in low-exposure areas (Figure 3-25). As education increases, reliance on agriculture decreases, with some shifting to industry and services. Among those with incomplete secondary education, more than half work in services, and for the better educated, service jobs are the predominant source of employment (Figure 3-25).

Figure 3-25: Probability of employment by sector and level of education, high-exposure versus low-exposure areas, 2019



Source: World Bank staff calculations, CBPS 2019.

Given the structure of the local economy, which relies on informal, small-scale, low-productivity jobs in services and agriculture, it is not surprising that there are limited returns to education until tertiary level.[72] While individuals with secondary education or less appear to earn more, on average, than individuals with no education, only tertiary education yields a statistically significant and positive impact in determining higher hourly wages. Furthermore, these returns to higher education are larger in areas closer to camps than in areas farther from the Rohingya camps. Among the self-employed, earnings are significantly higher for those engaged in services, and once this is taken into account, there are no distinguishably different returns to higher education (Table 3-7).

Table 3-6: How workers sort into different kinds of employers, low-exposure and high-exposure areas, Cox's Bazar, 2019

		Government	Private office/ institution/ company/ mill/*factory	NGO	Households	Small enterprises
High exposure	Male	7%	20%	11%	4%	58%
	Female	8%	5%	35%	17%	36%
Low exposure	Male	7%	22%	2%	17%	51%
	Female	20%	13%	9%	32%	26%
High exposure	Never attended school	4%	10%	8%	11%	66%
	Less than primary	5%	20%	2%	9%	64%
	Complete primary	7%	20%	5%	3%	65%
	Incomplete secondary	8%	19%	25%	4%	43%
	Secondary and above	21%	7%	66%	1%	6%
Low exposure	Never attended school	3%	11%	0%	34%	52%
	Less than primary	6%	16%	0%	20%	59%
	Complete primary	9%	19%	0%	19%	53%
	Incomplete secondary	8%	28%	11%	9%	43%
	Secondary and above	33%	34%	5%	13%	15%

Source: World Bank staff calculations, based on CBPS 2019.

[72] Results based on regressions of log hourly wages (for wage workers) and log monthly earnings (for the self-employed) on education, sector of work, gender, and age cohort.

Table 3-7: Average number of months and weekly hours allocated to primary and secondary jobs, waged and non-waged workers, Cox's Bazar, 2019

	Non-waged			Waged			
	Month		Weekly hours	Month		Weekly hours	
	Primary	Secondary	Primary	Primary	Secondary	Primary	Secondary
High-exposure male	10	8	45	9	6	45	29
High-exposure female	10	10	20	9	6	36	33
Low-exposure male	10	7	47	9	6	44	40
Low-exposure female	10	9	17	9	8	37	17

Source: World Bank staff calculations, based on CBPS 2019.
Note: Number of observations for secondary jobs are as follows: high-exposure 328; low-exposure 161. Among high-exposure workers: males waged 90; males non-waged 132; females waged 10; females non-waged 96.

Reliance on secondary jobs for livelihoods varies within Cox's Bazar and by worker education. CBPS data show that, while 1 out 4 individuals in high-exposure areas engage in a secondary activity to complement their main earning activity, only 15 percent of people in low-exposure areas do so (Figure 3-26). In both areas, most of these secondary activities involve running own businesses or self-employed activities (Figure 3-27). Most individuals are engaged in agricultural work (73 and 63 percent for high- and low-exposure, respectively) or construction activities (11 and 16 percent for high- and low-exposure, respectively). This could indicate that some of these jobs are seasonal in nature. When engaged in secondary activities, women are less diversified than men (89 and 85 percent are engaged in agriculture in high- and low-exposure areas, respectively) (Figure 3-28). On the other hand, while agriculture still dominates secondary jobs for males, the probability of working in either construction or service jobs is greater than for women. Individuals allocate a similar number of hours per week to work in secondary and primary activities, but secondary jobs are more likely than primary jobs to be based on a daily arrangement and, among wage jobs, to occupy workers for fewer months compared to their primary jobs (Figure 3-27 and Figure 3-29).

Figure 3-26: Share of individuals with secondary jobs, Cox's Bazar, 2019

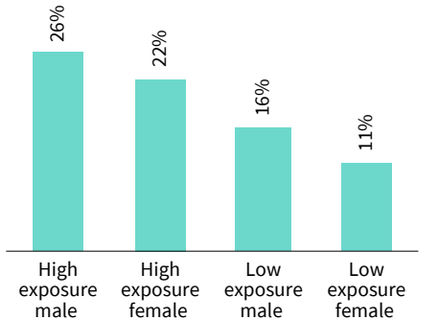
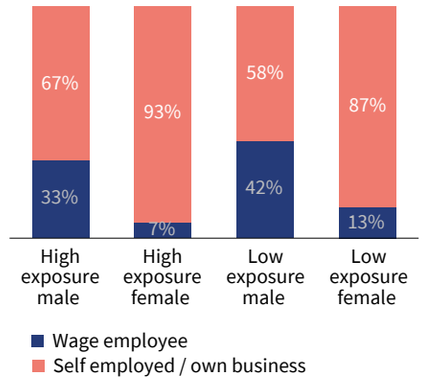


Figure 3-27: Types of contracts used for secondary jobs, Cox's Bazar, 2019



Source: World Bank staff calculations, based on CBPS 2019.

Figure 3-28: Share of sectors for individuals with secondary jobs, by gender and high vs low-exposure Cox's Bazar, 2019

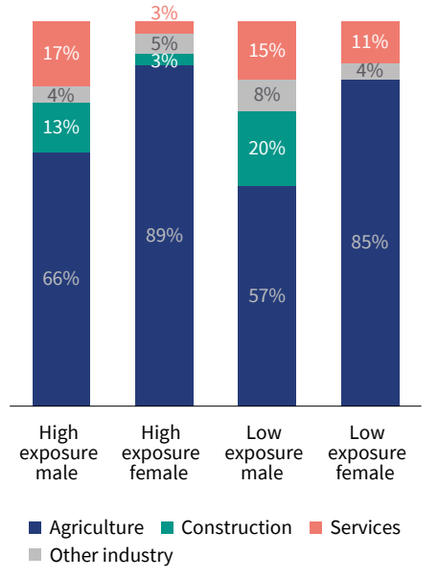
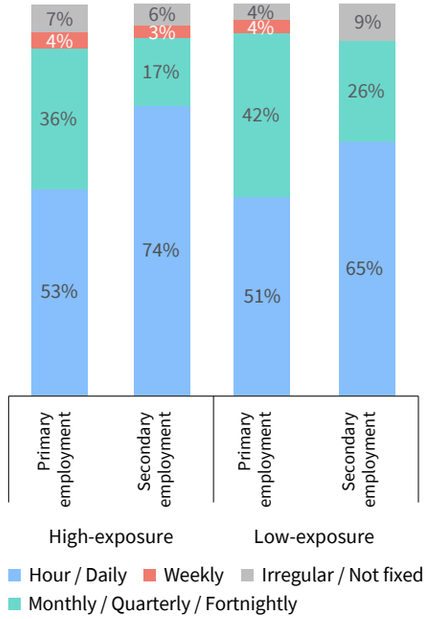


Figure 3-29: Contract types for primary and secondary jobs, high-exposure and low-exposure areas,



Source: World Bank staff calculation using CBPS 2019.

Income sources and livelihoods

While the latest official poverty figures predate the 2017 Rohingya influx, available data suggest that the pre-existing welfare gap persists between Teknaf and Ukhia and the other upazilas in Cox's Bazar. Using data from the 2019 CBPS, per capita incomes in high-exposure areas (primarily Teknaf and Ukhia) are 22 percent lower than in low-exposure areas (Table 3-8).[73] High-exposure areas are also more reliant on incomes from cultivation, whereas low-exposure areas report a larger share of households receiving remittance incomes.

Table 3-8: Income sources and average incomes, low-exposure versus high-exposure areas within Cox's Bazar, 2019

Household income sources	High-exposure	Low-exposure
Wages	53%	53%
Income from cultivation	12%	7%
Income from livestock/fishing/forestry	5%	4%
Income from non-agriculture business earnings	14%	14%
Remittances	11%	15%
Asset earnings	1%	2%
Pensions	0%	0%
Cash assistance from government	1%	1%
Other	2%	2%
Average per capita income	3,553	4,566
Average income	16,972	21,370

Source: World Bank staff calculation using CBPS 2019.
Note: Average income in Takas. All indicators calculated using only households reporting income. Percentages indicate share of households reporting income above zero.

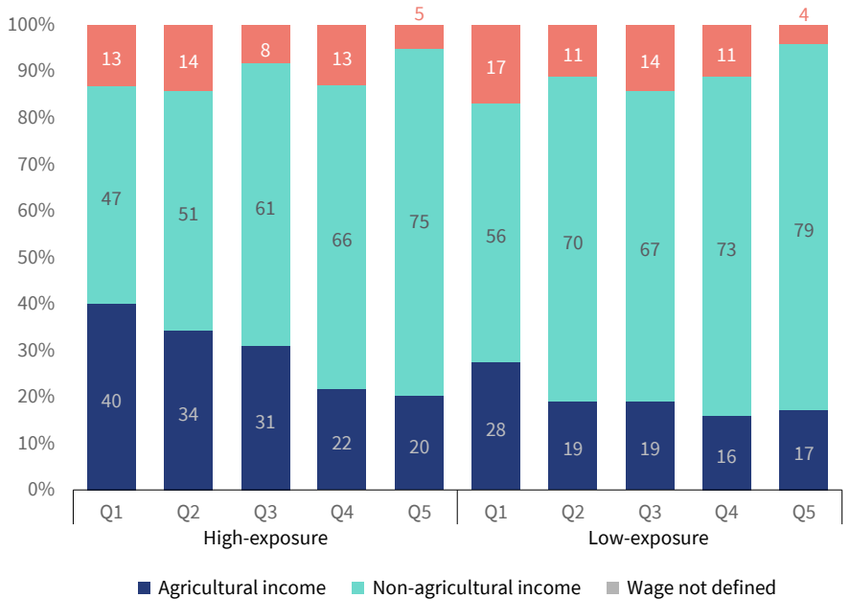
[73] Ninety-four percent of households in the high-exposure strata of the CBPS live either in Teknaf or Ukhia, with the remaining split between Naikhongchhori and Ramu. Within low-exposure areas, only 3 percent of the sample is from Teknaf and Ukhia, with the largest shares coming from Chakaria (38 percent) and Cox's Bazar Sadar (31 percent). As previously noted, Maheshkhali and Kutubdia are not included in the CBPS sample.

Agricultural incomes represent a significant share of total incomes among poorer households, with households in high-exposure areas more likely to be exclusively engaged in agriculture.[74] As Figure 3-30 shows, agricultural-sector income represents a higher share of total income among less well-off households, particularly in high-exposure areas.[75] Seventeen percent of households in high-exposure areas report earning only agriculture-related income, compared to 12 percent in low-exposure areas. Other studies have also shown that the main livelihoods for vulnerable households in Teknaf were fishing and forestry,[76] which is consistent with the larger share of agricultural incomes for the bottom 20 percent of the population in high-exposure areas. Differences in the composition of agricultural income between high- and low-exposure areas come largely from wages (Figure 3-31). High-exposure areas report a larger share of workers engaged in wage labor in the agricultural sector, and income from cultivation represents a larger share of income in high-exposure settings. Moreover, average wages are lower in agriculture, when compared with services and industry (CBPS 2019), confirming the pattern of lower welfare in high-exposure areas. Finally, the shares of income from livestock, fisheries, and forestry are higher in the first and the last quintile (Figure 3-31).

While rice is the main crop in both high- and low-exposure areas, and rice-producing households report larger cultivated areas, poorer households are less likely to be cultivating rice. Forty percent and 71 percent of households report cropping rice in high- and low-exposure areas, respectively. The three main crops for hosts after rice are chili, potato, and betel. Half of rice producers in low-exposure areas crop only rice, compared with 20 percent of households in high-exposure areas. This is reflected in the average number of crops cultivated per household: 2 in low-exposure areas versus 1.6 in high-exposure areas. However, households in the bottom 40 percent of the income distribution are less likely to be cultivating rice in high- and low-exposure areas.

[74] Income data was collected at the household level. To distribute total household wages into agriculture and non-agriculture categories, the adult module data was used. If members of a household reported all wages to be earned in one sector, the total household wage was classified accordingly. If members reported different sectors for wages, the total household wage was distributed proportionally using the individual wages reported. If members reported sectors but not wages, and the household reported income from wages, wage income was distributed in equal proportions. (For example, if one adult reported working in agriculture, and another reported working in the non-agriculture sector, then 50 percent of the total wage income was assigned to each sector.) If respondents to the adult module did not provide any information on employment sectors, then wages were classified as not defined. Classification was carried out using International Standard Industrial Classification (ISIC) sectors, complemented by the self-reported agriculture and non-agriculture sectors for the missing cases.
[75] Agricultural income includes agricultural wages, income from cultivation, and income from livestock. Non-agricultural income includes non-agricultural wages, income from non-agricultural business, remittances, asset earnings, pensions, cash assistance, and others.
[76] For example, see Tani and Rahman (2018).

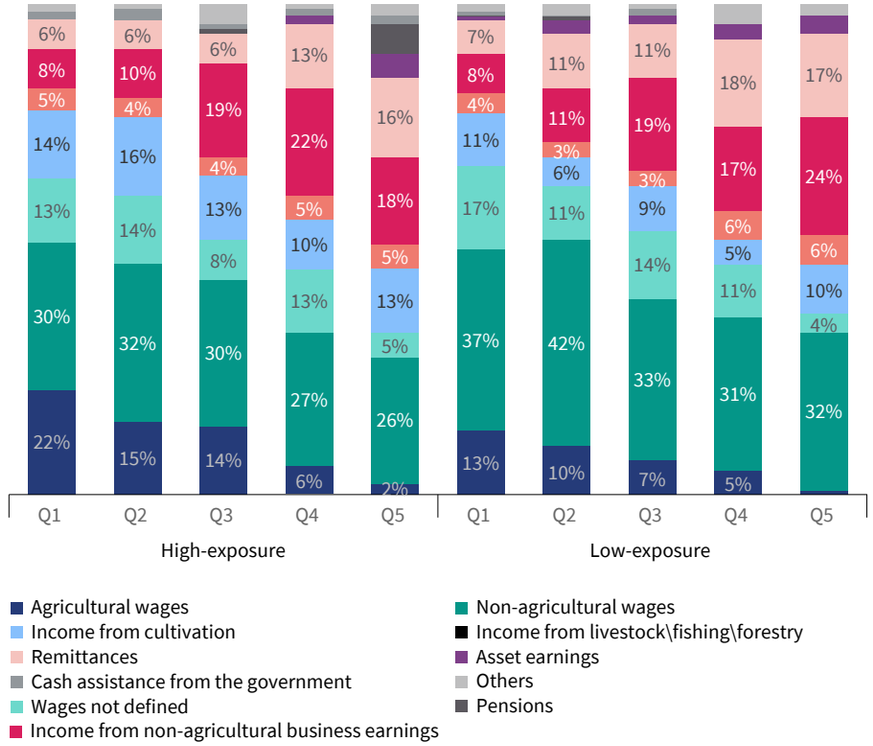
Figure 3-30: Average composition of monthly income (last 30 days) from agricultural and non-agricultural sources, by per capita income quintile, low-exposure and high-exposure areas, 2019



Source: World Bank staff calculation using CBPS 2019.
Note: Quintiles generated using per capita income. Agricultural income includes agricultural wages, income from cultivation, and income from livestock. Non-agricultural income includes non-agricultural wages, income from non-agricultural business, remittances, asset earnings, pensions, cash assistance, and others. "Wage not defined" includes wages that could not be distributed between the other two categories due to lack of information. See footnote 59 for additional details on wage classification.

In both high- and low-exposure areas, households in the bottom two per-capita income quintiles (bottom 40 percent of incomes) rely heavily on wages (Figure 3-31). Wages represent a higher share of total income and are more important for households in low-exposure areas, and at least 40 percent of households in the bottom two quintiles report wages as their only sources of income. In both areas, as incomes rise, households rely less on wages from agricultural and non-agricultural work, and more on earnings from non-agricultural enterprises. Remittances are generally a more important income source for households in the top income quintiles, particularly in low-exposure areas of the district. Incomes among the top quintile are also more likely to come from multiple sources, with at least 60 percent of households in this quintile in low- and high-exposure areas relying on two or more sources.

Figure 3-31: Average composition of monthly income, by per capita income quintile, low-exposure and high-exposure areas, 2019



Source: World Bank staff calculation using CBPS 2019. See footnote 74 for details on wage classification.

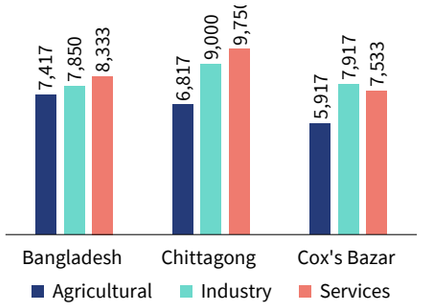
Finally, cash and in-kind assistance is generally a small source of income. Such assistance is comprised primarily of health and education support and is largely provided by the Government of Bangladesh. Households in high-exposure areas are more likely to report assistance, although assistance is not received regularly in any area. The top five assistance items reported by hosts are education (37 percent), health (33 percent), blankets/bedding/mosquito nets (26 percent), rice (22 percent), and cash (8 percent). Households in high-exposure areas report receiving 63 percent of their assistance from the GoB, 9 percent from WFP, and the remainder from various NGOs. Households in low-exposure areas report 87 percent of assistance coming from the GoB.

Firm performance and earnings of the self-employed

Using revenue or sales as an indicator for firm performance, service and agricultural enterprises in Cox's Bazar perform below national levels. Based on HIES 2016 household data, the median agricultural firm in Cox's Bazar earns[77] around 6,000 Bangladeshi Taka per month, which is less than what a median agricultural firm earns in Chittagong (around 7,000) and Bangladesh as a whole (7,500) (Figure 3-32). In the case of services, firms in Cox's Bazar district earn 20 percent less than firms in Chittagong division can expect to earn. On the other hand, a manufacturing firm in Cox's Bazar is likely to achieve earnings similar to the national median but 12 percent less than the division median.

Within Cox's Bazar, wage work generates higher monthly income relative to self-employment in both low- and high-exposure areas, and for men and women. Using 2019 CBPS data, monthly earnings can be compared between the self-employed and wage workers, across high- and low-exposure areas and by gender (Figure 3-33).[78] Two main conclusions emerge. First, self-employed women earn far less than self-employed men in high- and low-exposure areas. Second, wage work is a dominant choice for women and men in terms of earned income. Incomes are higher in low-exposure areas relative to high-exposure areas, for wage work and self-employment, except for female wage workers, which may reflect the prevalence of NGO jobs near Rohingya camps.

Figure 3-32: Median net monthly revenue of firms: Cox's Bazar, Chittagong, and Bangladesh, 2016



Source: World Bank staff calculations from establishments data in HIES 2016.
Note: Revenues trimmed at 1 percent of the distribution for each geographic area.

Figure 3-33: Mean monthly labor income in Cox's Bazar: wage employment versus business profits (average), 2019

Source: World Bank staff calculations, CBPS 2019.
Note: Results do not change qualitatively when median values are used instead of means.

[77] Net of expenses.

[78] The reported incomes are the averages of individual labor income reported in the adult module of the CBPS questionnaire.

Analysis of incomes in secondary jobs suggests that entry into business and entrepreneurial activities may be driven by the opportunity of better marginal earnings for wage workers in high-exposure areas. Secondary employment is common in the rural areas of developing countries, particularly as the returns from a single job are low. Table 3-9 shows that weekly earnings are larger for primary jobs and that wage workers earn more than the self-employed. It also confirms systematically higher earnings for men compared with women, and that women engaged in wage work earn more in high-exposure areas in both primary and secondary jobs. The returns (hourly wages) to secondary wage work differ based on proximity to camps. While secondary jobs are paid more per hour than primary jobs in high-exposure areas, the contrary is true in low-exposure areas.

Table 3-9: Weekly and hourly wages in primary and secondary jobs, Cox's Bazar, 2019 (averages, in Takas)

	Waged				Self employed	
	Weekly		Hourly		Weekly	
	Primary job	**Secondary job**	**Primary job**	**Secondary job**	**Primary job**	**Secondary job**
High exposure	2,531	1,596	79	135	1,531	907
Low exposure	3,360	2,150	144	73	1,953	1,047
High exposure male	2,627	1,659	82	**139**	2,358	1,274
High exposure female	**2,125**	**1,320**	69	**84**	370	298
Low exposure male	3,700	2,341	156	76	2,713	1,367
Low exposure female	**1,541**	**1,117**	78	31	448	220
High exposure agriculture	2,079	1,379	72	**120**	1,021	653
High exposure industry	2,186	1,231	81	**217**	1,142	933
High exposure services	2,909	1,883	82	**94**	2,387	1,425
Low exposure agriculture	2,032	1,191	114	72	1,311	905
Low exposure industry	2,277	2,608	119	56	884	787
Low exposure services	4,444	2,205	168	79	2,866	1,626

Source: World Bank staff calculations, based on CBPS 2019.

Sector-level differences in earning opportunities for the self-employed point to the potential of services. In both low- and high-exposure areas, service jobs yield the highest average monthly earnings, irrespective of type of employment (Figure 3-34). While wage work generally pays better than self-employment, among the self-employed, work in services pays substantially more than working in industry or agriculture. Among these sectors, therefore, services seem to offer an opportunity to improve earning capacity through self-employment and entrepreneurship. Despite the possibility of higher earnings in services, self-employment in agriculture remains important, more for subsistence than as an entrepreneurial activity, given its lower earnings (Figure 3-35).

Figure 3-34: Mean monthly earnings by area and sector, Cox's Bazar, 2019

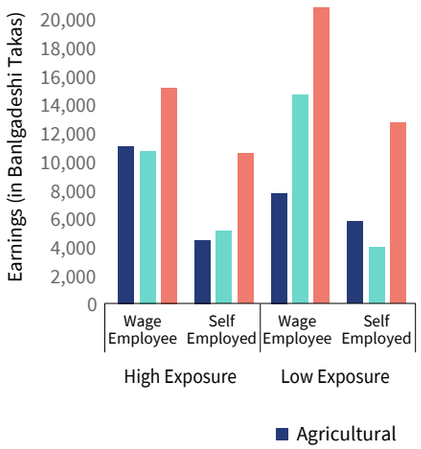
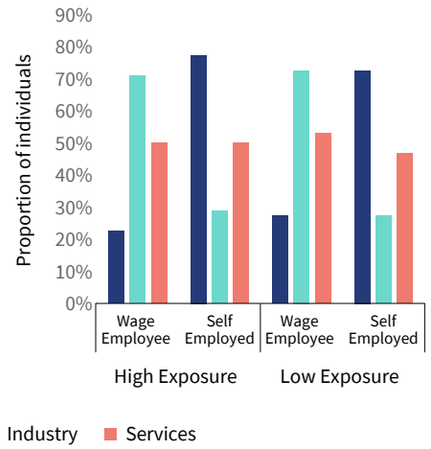


Figure 3-35: Main sectors of work, by area and employment type, Cox's Bazar, 2019



Source: World Bank staff calculations, CBPS 2019.

Wage workers are more likely to be employed in very small enterprises if they are working in the agricultural sector. Agricultural wage workers in high-exposure areas are more likely than those in low-exposure areas to be working in microenterprises. Wage workers are more likely to be employed in enterprises hiring less than five employees, particularly if they are engaged in agriculture (Figure 3-36). The pattern detected in the 2013 Economic Census and highlighted above—of employment in Cox's Bazar being dominated by small firms—is confirmed in the 2019 CBPS. In the latter, firms with less than five employees account for roughly 60 percent of employment in both low- and high-exposure areas (Figure 3-37). However, agricultural workers in high-exposure areas are more likely than those in low-exposure areas to be working in microenterprises. On the other hand, non-agricultural wage workers are more likely to be employed in non-micro enterprises in high-exposure compared to low-exposure areas.

Overall, the probability of working in small firms is similar for men and women across areas. Roughly 60 percent of women and men are likely to be employed in firms with less than five employees in both low- and high-exposure areas (Figure 3-36 and Figure 3-37). Some interesting differences arise when examining sectoral shares. Within agriculture, women in low-exposure areas are twice as likely as those in high-exposure areas to be working in non-microenterprise firms. In the industry sector, males in high-exposure areas are more likely to be working in larger firms than men in low-exposure areas. At the same time, women have a higher likelihood of working in larger firms than men, and these differences are even higher for low-exposure women. Indeed, the share of wage-earning female workers employed in microenterprises within the industry sector in low-exposure areas is half that in high-exposure areas (14 and 29 percent, respectively).

Figure 3-36: Share of wage employment by sector and self-reported firm size, high-exposure versus low-exposure areas, 2019

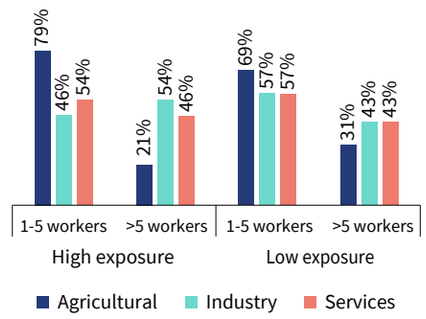


Figure 3-37: Most wage workers are employed in very small enterprises: self-reported firm size among wage workers, high-exposure and low-exposure areas, 2019

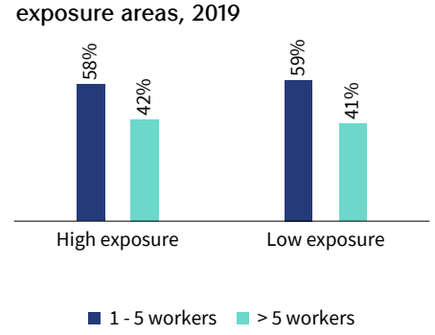


Figure 3-38: Share of wage employment by sector, gender, and self-reported firm size, high-exposure areas, 2019

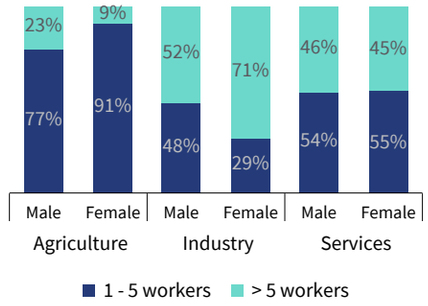
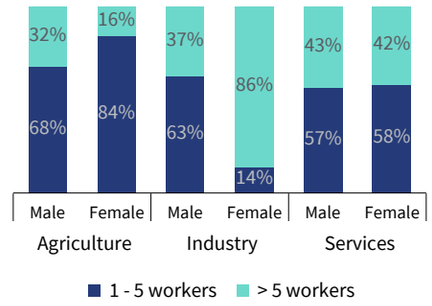


Figure 3-39: Share of wage employment by sector, gender, and self-reported firm size, low-exposure areas, 2019



Source: World Bank staff calculations, CBPS 2019.

Migration and remittances

Migration is an important facet of livelihoods in Bangladesh. Outward international migration from Cox's Bazar broadly reflects national patterns. International migrants represent 3.8 percent of the population of Cox's Bazar, similar to the national average of 3.4 percent (Population Census 2011). Cox's Bazar accounts for 1.7 percent of total Bangladeshi international migrants. Ninety-eight percent of international migrants from Cox's Bazar are male (compared to 96 percent of international migrants in Bangladesh as a whole), 87 percent are between the ages of 15 and 40 (versus 92 percent nationwide), and 94 percent migrate for work. 14.6 percent of households in Cox's Bazar report having an international migrant, higher than the national average of 12.2 percent and the Dhaka division average of 11.7 percent, but lower than the Chittagong division-level figure of 26.2 percent. While Bangladeshi households sending international migrants have on average 1.22 migrants, in Cox's Bazar, this number is higher, at 1.35. Most international migrants from Cox's Bazar have less than secondary education. Fourteen percent have no education, 30 percent have primary education, and 47 percent have less than secondary education. Compared to the national average of 70 percent, 80 percent of international migration from Cox's Bazar is to Gulf countries, with 50 percent going to Saudi Arabia and 25 percent to the United Arab Emirates.

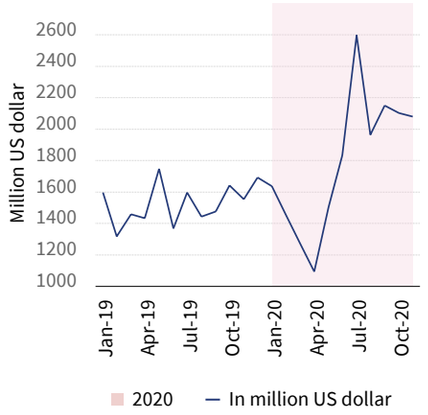
To date, Cox's Bazar has received little domestic migration. Internal or domestic migration is proxied by the share of the population in a district that reports being born elsewhere on the 2011 census. Only 1 percent of the Bangladeshi population in Cox's Bazar was not born in the district, which is lower than the national average. Within Bangladesh, 8 percent of the population was born in a district other than the one in which they were counted during the census. These estimates are much larger for populations living in Dhaka district (50.6 percent) and Chittagong district (11.5 percent), urban centers which attract domestic migrants. Indeed, Cox's Bazar is a net sender of domestic migrants based on this measure. In 2011, an estimated 60,000 Bangladeshis born in Cox's Bazar were living in other districts, whereas 22,000 Bangladeshis living in Cox's Bazar were born elsewhere. Eighty-seven percent of the population born in Cox's Bazar that moved to another zila moved within the Chittagong division, and 10 percent moved to Dhaka division.

International remittances represented 5.7 percent of Bangladesh's GDP in 2018 (WDI). In the context of COVID-19, the amount of remittances flowing into the country has fluctuated heavily since January 2020. Figure 3-38 traces this pattern. Analysis of the most recent household survey shows that 17 percent of households at the national level received some type of remittance in 2016 and suggests that remittances are more likely to go to well-off households (Hill and Genoni 2019).

In 2019, remittances represented on average 11 and 15 percent of total household income for households in high- and low-exposure areas within Cox's Bazar, respectively. In addition, households receiving remittances are more likely to be female-headed and have fewer members (Figure 3-41). Finally, more households received international remittances

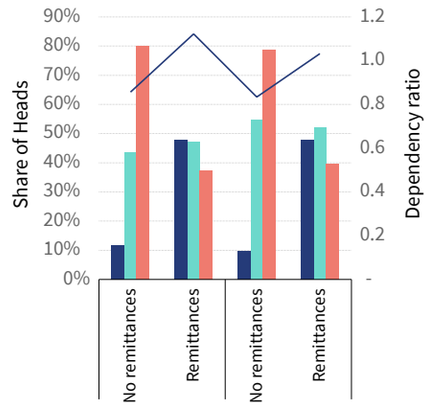
than domestic in Cox's Bazar, and remittances represent a higher share of total income for better-off households, since better-off households are more likely to report remittances, especially from international migrants (Figure 3-42).

Figure 3-40: Monthly international remittance flows to Bangladesh from wage workers abroad, 2019-2020 (millions of US dollars)



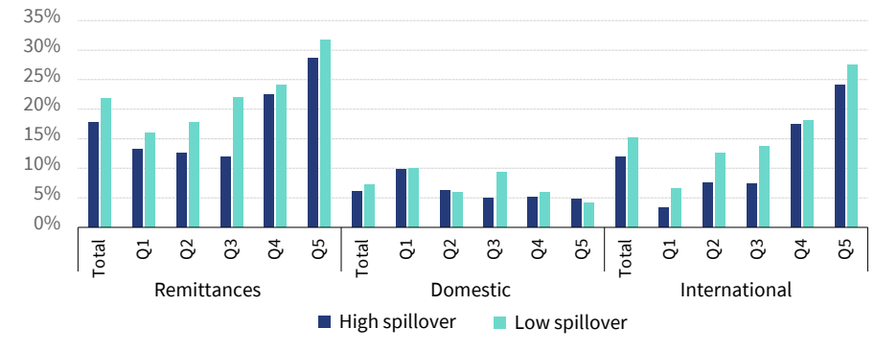
Source: Staff calculation using Bangladesh Central Bank data. January 2019 to November 2020.

Figure 3-41: Characteristics of households that receive or do not receive remittances, high- and low-exposure areas, Cox's Bazar, 2019



Source: Staff calculations using CBPS 2019. A household is considered to receive remittances if it declares strictly positive income from remittances.

Figure 3-42: Share of households receiving remittances, by income quintile, Cox's Bazar, 2019



Source: Staff calculations using CBPS 2019. A household is considered to receive remittances if it declares strictly positive income from remittances.

The COVID-19-related economic slowdown in Cox's Bazar

The spread of the novel coronavirus poses substantial health and economic threats to Bangladesh. COVID-19 poses grave health and welfare risks in South Asia, a region characterized by weak health systems, high population density, reliance on insecure, informal livelihoods, and limited safety net systems. These risks are further exacerbated in Bangladesh, one of the most densely populated countries in the world, particularly in its large urban concentrations, such as Dhaka and Chittagong, and in areas of heightened local density, such as Teknaf and Ukhia. The government of Bangladesh initiated country-wide lockdowns on March 26, 2020, and mobility restrictions were also imposed in 2021 following the second wave.

To monitor the evolving labor-market and economic impacts of pandemic-related lockdowns, phone monitoring surveys have been rolled out in Dhaka, Chittagong, and Cox's Bazar. The following paragraphs draw insights from the labor module of the first rapid phone follow-up of the Cox's Bazar Panel Survey. This follow-up survey was conducted in April and May 2020 (World Bank 2020c). It engaged a representative sub-sample of 3,005 households out of the 5,020 surveyed at baseline. It was designed to track key factors and trends in current labor force participation, employment, unemployment, and income, in comparison to baseline scenarios. The study aims to provide insights on the impact of the ongoing crisis on the current labor market among host and Rohingya populations in Cox's Bazar. The labor module considers three employment periods, assuming that the country started dealing with the impacts of the COVID-19 crisis from early March 2020. The labor module allows for the identification of changes in work status and incomes from January to March 2020, in early-mid March, and during the survey recall period (seven days prior to survey dates falling in late April to mid-May 2020).[79]

As a consequence of the lockdowns and social distancing measures, unemployment increased among Bangaldeshi households in Cox's Bazar district. This was reflected in an increase in the share of individuals actively seeking work, and was accompanied by declining employment, particularly for women in low-exposure areas, which are more urbanized and include Cox's Bazar Sadar upazila. This increase in unemployment (and labor force participation) largely reflected previously non-participating women and secondary household members entering the labor force, likely in search of additional sources of household income, particularly in more urbanized parts of the district.

Among those who reported themselves as still being employed, more than half had been temporarily absent from work, that is, employed but absent in the seven days prior to the survey. Specifically, 53 percent of high-exposure hosts and 67 percent of low-exposure hosts who reported being employed in the seven days prior to the survey were temporarily absent from work, that is, not actively working. Unsurprisingly, an overwhelming majority of temporarily inactive workers attributed the situation to COVID-19 work restrictions, with the highest prevalence of COVID-19 restrictions being reported in high-exposure hosts (97 percent), compared to 87 percent in low-exposure hosts. On the other end of the spectrum, 85 percent of those who reported not working since January were not employed during the baseline survey, either. That is, these are largely hosts who are not participants of the labor force. Taken together, these results indicate that temporary job losses were attributable to the COVID-19-related slowdown in economic activity.

Among those who reported being employed amid the lockdown, a higher proportion of women are seen to be actively working, meaning that the high rates of temporary absence from work are driven by men. This could be explained by the nature of the jobs that these two groups are typically engaged in, with many women performing more home-based work less likely to be affected by lockdowns, while men are likelier to be engaged in service-sector activities such as transportation and trade.

People temporarily absent from work were largely wage-based day laborers in agriculture and services. Among this population, temporary work suspensions may easily lead to permanent job losses. Sixty percent of non-wage workers, as opposed to 67 percent of wage workers, reported being temporarily absent from work in the seven days prior to the survey. The higher rates of absence for wage workers were driven by low-exposure hosts, among whom 70 percent of wage workers were unable to work, largely due to COVID-19-related restrictions. For high-exposure hosts, temporary absences among wage and non-wage workers were relatively more balanced. These trends could be explained by the sectoral employment shares in high- and low-exposure regions, the former being more reliant on agriculture than the latter. Low-exposure areas are more reliant on non-agricultural jobs in wholesale and retail trade, construction, and transportation industries, which were more severely affected by the crisis. Close to three-fourths (72 percent) of temporarily absent wage workers, across high- and low-exposure areas, reported being paid on a daily or weekly basis, implying broad engagement in informal sector jobs as day laborers who are likely not to be paid during their absences from work. Given that most jobs are informal, many of these temporary absences may well translate into permanent job losses.

The lockdown and its impacts have taken a differential toll on wage and non-wage workers. Among non-wage workers and enterprise owners, a somewhat smaller share reported being temporarily absent, but income losses since March 2020 were reported more widely in this group. Ninety-eight percent of these non-wage workers report running enterprises with five or fewer employees, which is a potential indicator of how the lockdown impacted micro-enterprises. New data from recently completed phone surveys will provide additional insights on how the economic shock associated with the pandemic has affected household-based micro enterprises and wage workers in the country.

[79] The findings from the follow-up are presented as a cross-sectional update on baseline adults. Panel comparisons on employment transitions for adults who have been part of both surveys also demonstrate consistent trends. For more recent results from COVID monitoring surveys, please refer to https://www.worldbank.org/en/country/bangladesh/brief/cox-s-bazar-panel-survey-briefs.

Work and livelihoods among the recently displaced Rohingya population

Given current restrictions on work, the Rohingya people in camps have low labor force participation and are more reliant on informal work. Only 1 in 3 displaced individuals were participating in the labor force (that is, were employed or actively seeking work in 2019 (Figure 3-43). The majority of the workforce was comprised of men. While 64 percent of working-age men participated in the labor force, labor force participation among women was only 8 percent. Among the few Rohingya who are employed, the majority work in informal jobs, as non-agricultural wage labor and informal workers for independent employers. Types of work differ by gender, with men employed in non-agricultural wage-labor jobs and women in self-run, small-scale homebased activities (World Bank 2019a). Most recently displaced Rohingya who work receive daily wages, at higher rates than Bangaldeshi workers. Most employed Rohingya reported working for NGOs, 83 percent of employed men and 61 percent of employed women.

Among the few Rohingya who are employed, sectors of activity are differentiated by gender. While 88 percent of employment in camps is in non-agricultural activities, Rohingya women are 3 times more likely than men to be involved in farm activities (Figure 3-44). Within non-agricultural activities, men are mainly working in construction, as earth workers (non-government), construction workers, masons, and other miscellaneous non-agricultural day laborers. On the other hand, women are most likely to be employed in home-based manufacturing and education, for example, as tailors or teachers in camps. Both genders report working in health and social volunteering work, with women taking a slightly higher share of these jobs than men. In addition, working Rohingya men are much more likely to be waged employees (79 percent) relative to women, who are more likely to be self-employed (60 percent). This disparity in wage and self-employment could be explained by the fact that Rohingya men and women are engaged in very different activities (World Bank 2019a).

The types of activities in which the displaced Rohingya are employed, together with their low human-capital endowment and work restrictions, limit the potential for competition with the host population in the labor market. Conditional on the overall low levels of education among the displaced Rohingya population, and their low rates of employment, a large share of less-educated, employed Rohingya work in construction, whereas more educated Rohingya are primarily employed in health and education services in camps (Table 3-10). The low engagement of displaced individuals in agriculture, compared with hosts, the reliance on camp-based labor-intensive public works, and the dependence on NGO-related employment for the few educated Rohingya all suggest low labor-market friction with the local host population.

Figure 3-43: Labor market indicators, Rohingya population in camps, 2019

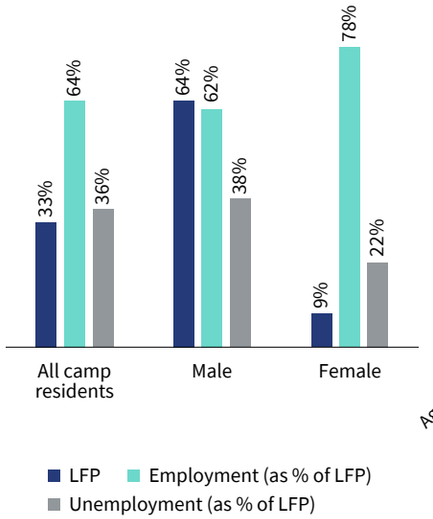
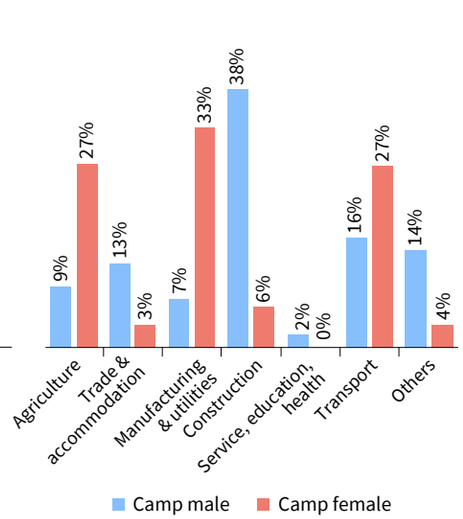


Figure 3-44: Share of employment by sector, Rohingya men and women in camps, 2019



Source: Staff calculations, 2019 CBPS. Note: LFP = labor force participation.

Table 3-10: Education and sector of employment, recently displaced Rohingya, 2019

	Never attended school	Less than primary	Complete primary	Incomplete secondary	Complete secondary
Agriculture	17%	10%	10%	1%	1%
Trade & Accommodation	10%	11%	15%	18%	0%
Manufacturing & Utilities	11%	14%	13%	8%	4%
Construction	**36%**	**36%**	**42%**	21%	2%
Transport	3%	1%	0%	2%	0%
Service, Education, Health	10%	12%	14%	**41%**	**93%**
Others	13%	17%	6%	9%	0%

Source: World Bank staff calculations, CBPS 2019.

Given restrictions on work, the prevalence of secondary employment among Rohingya in camps is low, at 15 percent. Similar to hosts, Rohingya men are more engaged in secondary activities than women (16 versus 9 percent, respectively). Among these secondary jobs, most men work for wages across all sectors, while women primarily report being self-employed in agriculture. As with primary employment, better-educated Rohingya individuals report secondary work in health and education services.

Despite the restrictions on movement and work, there is emerging evidence of some dynamism within the camp economy, and of growing business opportunities around the camps. Filipski et al. (2020) found that the Rohingya have access to a range of active businesses within camps. Hosts and the Rohingya both operate businesses within the camps. This suggests that settlement economies spring up not only through entrepreneurial drive, but also when locals identify business opportunities and fill the demand. Regardless of their location, the majority of the businesses were classified within the wholesale and retail trade category, but the type of enterprises run by hosts and Rohingya tend to differ. While trade and manufacturing businesses are mainly run by Rohingya, some activities inside camps, such as transportation businesses, are run predominantly by Bangladeshis. Despite opportunities for small businesses, Rohingya-run enterprises face greater constraints than their local counterparts: Rohingya-run businesses are smaller and less profitable, and Rohingya workers are paid lower wages than host workers. Moreover, lending plays an important role in sustaining these businesses.

Table 3-11: Income sources and average incomes, recently displaced Rohingya in Cox's Bazar, 2019

Household income sources	Share of Rohingya HH
Wages	53%
Income from cultivation	3%
Income from livestock/fishing/forestry	1%
Income from non-ag business earnings	6%
Remittances	10%
Asset earnings	0%
Pensions	0%
Cash assistance from government	4%
Other	22%
Average per capita income	910
Average income	4,254

Source: World Bank staff calculation using CBPS 2019.
Note: Average income in Takas. All indicators calculated using only households reporting income. HH = households.

Reliance on humanitarian aid and limited opportunities for employment have shaped the earned-income structure of displaced populations. While 53% of income sources come from wages, 22 percent of their income stems from other sources, including assistance programs (Table 3-11). Remittances represent 10 percent of total household income for Rohingya households, on average. Within labor income, male wage workers enjoy higher weekly earnings than their female compatriots. Similar to hosts, while weekly earnings are higher in primary jobs, secondary employment pays more on an hourly basis, suggesting the presence of temporary or seasonal opportunities to earn additional income.

Rohingya depend heavily on aid for their livelihoods. One hundred percent of Rohingya households report receiving some kind of aid in the last year (99.92 percent in the last month). Under food aid, 100 percent of Rohingya report receiving rice, followed by oil (99 percent) and pulses (98 percent). Ninety-eight percent of Rohingya households also report accessing health assistance. Various actors distribute aid, with WFP the most widely cited. Part of this aid is not directly used by beneficiaries; at least 21 percent of households report bartering some portion of the assistance received in the previous month. Most such items are exchanged for cash, and these transactions occur with other Rohingya and host communities alike. A rapid classification of other income sources[80] reported in Table 3-11 reveals that, for Rohingya households reporting other sources of income, 87 percent are related to or include some type of transaction with food aid.

The transition to WFP's SCOPE value-voucher modality, which allows for more dietary diversity (20 items, of which 12 are fixed and 8 flexible) was underway during the CBPS baseline survey period. By March 2020, shortly before government COVID-19 lockdowns were initiated, 72 percent of the Rohingya population had transitioned to value-voucher modality. In addition, WFP, in collaboration with Relief International, had piloted a farmer's market in select camps. The aim was to provide greater access to a variety of foods, while allowing small host-community farmers to sell their produce directly in camps as an extension of the aid delivery system. Public-health measures related to COVID-19 disrupted this experiment, however. From March 26 onwards, accessory operations such as farmers' markets were halted, and camps shifted to an essential-operation-only modality, with all camp residents now reverting to receiving commodity vouchers: a fixed food basket with consideration to broad food preferences and nutritional value.

The shift in modality for food support led to deteriorating perceptions about food assistance during the pandemic. Ninety-six percent of camp households reported getting food assistance from WFP in March 2020, but more than half of respondents reported receiving "less food" than usual. This perception of less food than before may have been

[80] In CBPS 2019, when a household reported other sources of income, a brief explanation of the source could be provided. Forty-eight percent of Rohingya households reporting income indicated receiving income from other sources. A rapid classification of cited sources revealed that 87 percent involved activities related to food-aid bartering or selling.

driven by the shift of delivery modality. A fixed basket of food may seem more restrictive, despite containing the same total monetary and caloric value of food entitlement received in the value-voucher modality, which provides more flexibility in basket composition. Despite restrictions in the modality of food assistance delivery, there is evidence of strengthened provision of WASH services to mitigate the potential spread of the coronavirus. Hygiene and sanitation assistance mechanisms have clearly been enhanced in camps in response to the crisis, with 13 percent of households reporting receiving more services than usual.

Post-baseline evidence from April-May 2020 suggests that employment among displaced Rohingya had declined significantly in that period, accompanied by a sharp rise in unemployment. Results from the rapid phone follow-up to the 2019 CBPS baseline suggest that employment dropped from 64 percent in 2019 to 23 percent in April-May 2020, while unemployment increased sharply, from 36 percent to 77 percent. Labor force participation increased in camps, mainly due to the rise in unemployment and fall in employment. The rising trend in unemployment was mainly driven by men, who are highly dependent on wage labor.

However, these recently identified changes in the labor market cannot be entirely attributed to COVID-19. More than half of the male camp population of working age reported not having worked since January 2020, suggesting that the trend was driven by pre-COVID-19 factors. Among such factors is a September 2019 (post-baseline) government directive banning cash-for-work programs in camps (World Bank 2020c). The restricted operational modality adopted by the camps in response to COVID-19 has also reduced the work generated inside the camps, which had previously been the main source of earned income for Rohingyas. Since March 25, 2020, all non-critical camp operations have been suspended or reprogrammed, including the complementary food voucher scheme, farmers' markets, self-reliance support, livelihood support, and shelter/non-food items activities – many of which had provided earning opportunities for the Rohingya population in camps.

CHAPTER 4.

Accelerating inclusive growth: Constraints and opportunities

This chapter uses the results from previous sections to analyze barriers to inclusive growth in Cox's Bazar and locate leverage points for progress. Currently, several features of markets and institutions in Cox's Bazar hold local people back from reaching their productive potential, make it harder for businesses to grow, slowing down the development of the district economy overall. This chapter diagnoses key obstacles to equitable growth and shows that opportunities exist to tackle them. It analyzes local comparative economic advantages of Cox's Bazar sub-districts and across economic sectors such as fishing and aquaculture, tourism, and manufacturing. It looks at how strategic improvements in connectivity, infrastructure, governance, and service delivery may accelerate inclusive growth and provides evidence that policy can leverage the ongoing humanitarian response in Cox's Bazar to unlock fresh economic opportunities for Rohingya people and host communities.

Targeting constraints to inclusive growth

The chapter begins by highlighting select factors identified in the preceding analysis that constitute key barriers to inclusive development in Cox's Bazar. The discussion foregrounds factors based on three considerations: (1) their substantial negative impact on fundamental conditions for inclusive growth is documented; (2) they are potentially actionable through well-understood, evidence-based policy options; (3) important steps to address them can be achieved in a short timeframe (1-3 years), laying foundations for longer-term gains. The chapter discusses barriers under three headings: constraints to human capital accumulation, specifically education human capital; constraints to local people's productive inclusion in labor markets, with special focus on women; and constraints to private-sector activity and entrepreneurship.

Constraints to human capital accumulation[81]

With a large share of illiterate adults and a weak education system, Cox's Bazar remains poor in human capital. This is an important reason the local economy continues to heavily rely on low-productivity agriculture and services. Improving its human capital is crucial, as the district moves to leverage its promising geographic and economic endowments for tourism, hospitality, aquaculture, and other fields that can power inclusive growth. It is vital to tackle economic constraints that make it difficult for low-income families to finance education expenses. Doing so will expand educational opportunities—and future work options—for both females and males.

Financial pressures and social norms are the major constraints that keep Bangladeshi children in Cox's Bazar from attending school. Once children begin their education, these are also the main reasons they drop out. Gendered social norms strongly constrain girls' educational opportunities. Only 5 percent of children aged 6 to 18 in Cox's Bazar have never attended school. However, about 1 in 5 school-aged children in high-exposure areas and 15 percent in low-exposure areas drop out.[82] Among current school-aged children, the cost of education is the main constraint for boys and girls across areas. About 50 percent of children who drop out do so because their families are unable to bear the costs of schooling. Meanwhile, 1 out of 3 women who never went to school report that they were constrained by social restrictions, family pressures, or because of marriage (Table 4-1).[83]

Table 4-1: Reasons for never attending school, high-exposure and low-exposure areas, Cox's Bazar, 2019

	High-exposure		Low-exposure	
	Male	Female	Male	Female
Lack of money/food/need to work/help with family chores	73%	48%	76%	48%
Disability/illness	2%	2%	0%	1%
Family/social restrictions/marriage	3%	33%	4%	34%
No schools close to home	6%	7%	4%	6%
Age (too old/too young)	8%	5%	8%	8%
No need/no interest to study	5%	2%	5%	2%
Other	2%	3%	3%	1%

Source: World Bank staff calculations using CBPS 2019.

[81] Given data limitations, this sub-section focuses only on constraints to education.
[82] Similarly, 40 percent of adults (over 18) in high-exposure areas and 32 percent in low-exposure areas never attended school, while 55 percent in high-exposure areas and 61 percent in low-exposure areas started school but dropped out.
[83] These gendered patterns are even more pronounced among older cohorts (aged 18+) who attended school but subsequently dropped out.

Adolescents aged 16-18 are at the highest risk of dropping out of school in Cox's Bazar. Two-thirds of all students who abandon their education drop out of school between the ages of 16 and 18, with most other dropouts observed in the 12-15 age group. This pattern holds across low- and high-exposure areas and for boys and girls.[84]

Girls' reasons for dropping out of school vary across areas and by age. Social restrictions and marriage are powerful drivers. While family and social restrictions play a larger role in high-exposure areas relative to low-exposure areas (24 versus 15 percent respectively), marriage is more important in explaining female drop out in areas further away from camps (10 versus 24 percent in high- and low-exposure areas). These constraints influence education decisions at different ages. While marriage can become a constraint for some girls as early as 15, this barrier is most relevant for 18-year-old girls (>70 percent of girls reporting this constraint are 18 years old). On the other hand, social norms start to discourage girls from pursuing their studies at early ages[85] and remain important thereafter (Table 4-2).[86]

Table 4-2: Reasons for dropping out of school, by age and gender, high-exposure versus low-exposure areas, 2019

	6-18 years			
	High-exposure		Low-exposure	
	Male	Female	Male	Female
No money/too expensive	49%	48%	45%	43%
Family/social restrictions	2%	24%	2%	15%
For marriage	0%	10%	0%	24%
Do not want to study more/completed studies	31%	8%	27%	9%
Must work/family chores	12%	3%	17%	6%
Other	6%	7%	9%	3%

[84] The only exception is among girls living closer to camps, among whom 40 percent of dropouts occur between the ages of 12 and 15.
[85] The youngest girls in high- and low-exposure areas reporting this constraint were 11 and 12 years old, respectively.
[86] These results are consistent with USAID (2018). In interviews with key informants and focus group discussions with members of the community, USAID researchers found that livelihoods/earnings and household budget were the main constraint for students who dropped out. The study also found that some students who abandoned school were attracted by comparatively high salaries in camp-related occupations. In the case of girls, the study mentions that early marriage might be related to the spouse's ability to achieve financial independence and solvency.

	Older than 18			
	High-exposure		Low-exposure	
	Male	Female	Male	Female
Family/social restrictions	3%	28%	4%	21%
No money/too expensive	46%	27%	40%	24%
For marriage	1%	23%	2%	37%
Do not want to study more/completed studies	29%	11%	29%	11%
Must work/family chores	14%	6%	21%	4%
Others	7%	6%	5%	3%

Source: World Bank staff calculations using CBPS 2019.
Note: The number of observations were as follows. For high-exposure areas: Ages 6-18: males 246; females 272. Older than 18: males 898; females 793. For low-exposure areas: Ages 6-18: males 202; females:142. Older than 18: males 950; females 944.

The current employment status of school dropouts is consistent with the main reasons reported for leaving education. While only 10 percent of girls who drop out of school are employed, about 7 out of 10 boys who drop out are currently working. This suggests that the returns to education net of the out-of-pocket costs for these children must be lower than the alternative wages and earnings, or that the need to help support their families in the immediate-term overwhelmed the potential future benefit of continuing their education.

Economic constraints matter differentially in explaining school dropouts across the income distribution and among age cohorts. More than half of children who dropped out between ages 6 and 18 in the bottom 40 percent of the income distribution in areas close to camps reported that their families were unable to cover education costs (63 percent among girls and 57 percent among boys). This share is higher than among children from more affluent households. In low-exposure areas, the situation is similar, but the intensity of this constraint is slightly lower among girls. When comparing current school-aged children with cohorts of adults (older than 18), it appears that financial considerations are more important in explaining school dropouts among younger cohorts than they were for older cohorts.[87]

While education costs clearly emerge as the main barrier for human capital accumulation, most students who dropped out were enrolled in government-run educational institutions. This underscores the importance of costs other than school fees as barriers to educational opportunity. Across the income distribution, boys were more likely to be enrolled in government-run schools than girls, which may indicate a revealed preference among households that private schools are more appropriate for girls' education. Private-school attendance systematically increases in higher income quintiles, and it is greater

[87] See Table A1-14, Table A1-15 and Table A1-16 in Annex 1 for a detailed breakdown of constraints to human capital accumulation across the income distribution.

among girls and in low-exposure areas.[88] This may indicate that access to education is not the main problem, but that the additional costs associated with schooling—expenditures for books, uniforms, and tutoring, for example—are too much for some households to bear. Eighty percent of household out-of-pocket educational expenditures are for expenses other than school fees (Box 4).

Box 4: Household education expenditure in Cox's Bazar

The growth in incomes and consumption in the last two decades in Bangladesh has been accompanied by an increase in the share of education expenditures in household budgets. In 2016, the share of education expenses in total consumption had almost doubled with respect to 2000 (7.7 versus 4.3 percent, respectively) (Bhatta et al. 2019). By this measure, Cox's Bazar performs above the national average, with about 7 out of 10 households reporting expenditure on education in 2016. Furthermore, Cox's Bazar is among the 10 Bangladeshi districts with the highest share of households reporting education expenditure (HIES 2016). However, despite having a relatively large share of households reporting education expenditure, in Cox's Bazar, these expenses' share in the average household's total consumption is relatively lower than in other Chittagong division districts and the national average. In absolute terms, the median household in Cox's Bazar spends 5 and 16 percent less than the median household at national and division level, respectively. In 2016, while the median household in Bangladesh spent Tk. 802 per month on education (about Tk. 516 per student), in Cox's Bazar this amount was Tk. 764 per month (about Tk. 384 per student). Furthermore, poor households still have substantially lower private spending on education than richer households, though the gap in expenditure per student is smaller in Cox's Bazar. The lower spending of the poor also translates into a lower education share in their total budget (Bhatta et al. 2019).

In the last 16 years, expenditure by level of education at national level has increased for all levels of education (Bhatta et al. 2019). Households in Cox's Bazar are spending, by level of education, about the same as median national and division households. Indeed, while expenditures at national level are 300 Tk, 843 Tk, and 1338 Tk for primary, secondary, and tertiary education, in the district, the median household was spending 331 Tk, 836 Tk, and 1475 Tk, respectively (Table B4-1). Similar to typical households at national level, in Cox's Bazar, 20 percent of education expenditure goes to cover fees, but

[88] See Table A1-17.

this share increases as one moves upward in the education distribution. The remaining 80 percent of the expenditure is to cover books, tutoring, transport, and other costs, such as those for uniforms, footwear, hostel, tiffin, internet/e-mail, schooling donation, and others (Table B4-2).

Table B4-1: Median expenditure on education by quintile, Cox's Bazar, Chittagong division, and Bangladesh, 2016

	Median expenditure			Median expenditure per student		
	Bangladesh	Chittagong Division	Cox's Bazar	Bangladesh	Chittagong Division	Cox's Bazar
1	315	323	326	202	190	180
2	548	651	649	362	387	291
3	773	841	785	509	506	368
4	1,127	1,255	1,036	725	713	563
5	1,933	1,755	1,099	1,310	1,143	907
Total	802	911	764	516	554	384

Source: HIES 2016.

Table B4-2: Components of educational expenditure, by education level, Cox's Bazar, 2016

	Fees	Books	Tutoring	Transport	Others
Total	21%	19%	15%	3%	43%
Primary	14%	20%	7%	2%	57%
Secondary	22%	20%	21%	3%	35%
Tertiary	36%	20%	12%	6%	25%

Source: HIES 2016.

Effective access to education for Rohingya children has improved but remains severely limited. The 2020 GoB decision to allow for education using the Myanmar curriculum may improve the quality of education inputs for Rohingya children, but COVID-19-related restrictions have delayed implementation of the plan. As previously discussed, a large-scale 2019 assessment of educational programming in Rohingya camps noted positive trends, with more learning centers being built and improvements in staffing (Pascaud and Panlilio 2019). However, without an adequately structured curriculum, most adolescents are still left out of the system. While the transition to the Myanmar curriculum will be a welcome step, additional efforts will be needed to enroll and keep children in school, ensure minimum quality standards, and provide some form of educational certification.

Ongoing policy dialogue and operations show positive momentum and offer opportunities to address shortfalls in education services for the Rohingya. However, substantial challenges remain. The main challenges for ongoing operations are clear. The NGO-led delivery of education has resulted in a fragmented approach, offering services that remain suboptimal in scale and quality. The language of instruction is English, and Rohingya children have not yet been able to access Bangla or Myanmar curricula, although rollout of the Myanmar curriculum is expected soon. Teacher capacities are limited and access to technology is restricted. So far, instruction has remained non-formal, with limited sequencing between years and no recognition of studies or accreditation of providers.

Constraints to productive inclusion in the labor market

In Cox's Bazar, productive and remunerative labor market participation for both men and women is constrained by low educational attainment, limited access to export-oriented, labor-intensive manufacturing jobs that have so far fueled growth in Bangladesh, and physical distance from the country's growth poles. The reliance on subsistence agriculture and low-value, informal service-sector jobs in Cox's Bazar reflect the district's low productive, human-capital base and the lack of alternative employment opportunities.

Data from the 2019 CBPS shows that only 60 percent of host adults in Cox's Bazar can read, one-third of the adult population has no schooling at all, and an additional 25 percent of adults have only some primary education. Among adults ages 20-29, men in Cox's Bazar show far lower levels of educational attainment than men in the same age group nationally. Taken together, these patterns suggest that almost 60 percent of the adult population in host communities cannot access any type of skilled employment. Educational attainment levels are lower for host communities in areas of high exposure to Rohingya: 38 percent of adults in high-exposure areas never attended school, compared to 32 percent in low-exposure areas. Only 52 percent of adults in high-exposure areas can read, compared to 62 percent in low-exposure areas. The share of adults who received some secondary schooling is 10 percentage points higher in low-exposure areas than in high-exposure areas.

These constraints are further compounded for women and are evident in their low levels of labor force participation, particularly in market-oriented activities. Additional barriers affecting women include differential access to productive inputs and assets compared to men; women's role in home-based and caretaking activities; market failures and institutions; and social norms constraining women's mobility (Genoni et al. 2021). Within the host community in Cox's Bazar, low overall educational attainment is accompanied by significant gender gaps. Thirty-seven percent of adult women have no schooling, compared to 29 percent of men. Men are almost twice as likely as women to complete secondary school, while most women who do attend school drop out during secondary school. In particular, women in high-exposure areas have poorer educational attainment on average than those in low-exposure areas.

Women's potential to generate incomes and engage in productive, paid work outside the home and the farm is further constrained by prevailing norms around asset ownership, home- and care-related responsibilities, and mobility (Anderson and Eswaran 2009). Restrictions on women's ability to inherit property inhibit their ability to start businesses and access credit for expansion, due to a lack of collateral. The expansion of microcredit finance to women has partially eased this constraint. This has increased female economic engagement in livestock, poultry, and small textiles manufacturing. Some women also enjoy increased avenues of employment with NGOs as health workers and teachers (Raihan and Bidisha 2018).

According to CBPS 2019 data, 27.3 and 16.5 percent of women are participating in the labor force in high- and low-exposure areas, respectively. Women living in low-exposure areas are more likely than those in high-exposure areas not to participate in the labor market because of household responsibilities (84 versus 73 percent of women not in the labor force in low- and high-exposure areas, respectively), although this is the most frequently cited reason across both areas. Among women who are not in the labor force in high-exposure areas, a quarter report that this is because of social norms and family objections.

Evidence suggests that easing constraints on Bangladeshi women's decision making and expanding their control over assets and earnings in the livestock and aquaculture value chains can help close gender gaps in economic participation. For instance, women's role in livestock tends to be focused on home-based activities such as feeding and milking cows, raising small ruminants, and raising backyard poultry. Women's role in marketing, their ability to access earnings and make decisions about these businesses are severely constrained by limited voice, agency, and mobility; poor access to inputs and credit; and lack of business skills (World Bank 2018b). Similarly, women's participation in farming and fishery is concentrated in casual, unpaid work in the lower production segments of value chains, and their ability to participate in marketing and business management is similarly constrained by norms and lack of control over assets and incomes (Shelly and D'Costa 2001; World Bank 2018a).

Constraints to private sector activity and entrepreneurship

The private sector in Bangladesh faces a challenging and deteriorating business environment. The country's ranking in Doing Business has fallen from 65th in 2016 to 168th out of 190 countries in 2020. This situation is reflected in other assessments of the regulatory environment, such as the World Economic Forum's 2019 Global Competitiveness Index, where Bangladesh ranks 109th of 141 countries on the "institutions" pillar. The business environment favors established, connected firms and sectors, and disadvantages new entrants, including young, small establishments and investors trying to expand or start their business.

A complex licensing environment makes it difficult to start or to close a business, as documented in a recent IFC report (IFC 2020). Starting a business requires investors to navigate a complicated process involving more than 150 services from 34 line agencies. An insufficient insolvency framework makes it difficult for firms to close down and creditors to collect on debts. Bangladesh performs very poorly in terms of the ability to enforce contracts, ranking second to last in this dimension on the Doing Business indicators. It takes four years on average to resolve a contract dispute in Bangladesh, and it is estimated that associated costs make up two-thirds of the claim value. The difficulties of enforcing contracts may explain why large companies prefer to keep their operations vertically integrated.

Broadly speaking, in Cox's Bazar, firms are constrained by four factors: (i) firm capabilities, (ii) access to finance, (iii) access to markets, and (iv) business environment and the lack of a level playing field. Identification of these constraints is imperative to channel interventions for the development of private-sector enterprises.

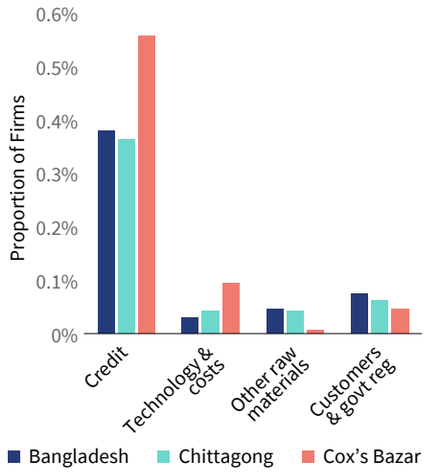
Using establishment data from HIES, Figure 4-1 plots the percentage of non-agricultural firms that report having faced a constraint that affects their business performance, from among credit, technology and costs, raw materials, government regulations, and lack of customers. Insufficient finance is a key obstacle to firm growth (Malhotra et al. 2007), and it has been found that small firms face bigger challenges in obtaining finance compared to larger firms (Schiffer and di Mauro 2001; Beck et al. 2002).[89]

Bangladeshi firms, and Cox's Bazar firms in particular, feel most constrained by lack of credit. Around 60 percent of firms in Cox's Bazar report credit to be the major impediment to business. The figure is around 40 percent for firms in Chittagong and Bangladesh. At

[89] Financing is important for firms because it helps in expansion of operations, innovation, and investing in production facilities and new staff (OECD 2006). However, many firms that are willing to expand find it difficult to obtain credit from financial institutions. This essentially constitutes the "financing gap" faced by firms. This gap is more prevalent in developing countries than in advanced economies, where banks have developed various risk-management strategies for lending to firms (OECD 2006).

the national level, there is an estimated gap of US$2.8 billion between the financing needs of small and medium enterprises (SMEs) and the funds available to them. Moreover, the scarce finance that is available to SMEs is offered at higher rates of interest than credit to larger firms. These constraints are even more binding for female-owned and managed small enterprises. More generally, firms lack access to long-term finance, relying heavily on lending from commercial banks, which is in turn constrained by banks' own dependence on short-term deposits. As the recent Bangladesh Private Sector Diagnostic (IFC 2020) notes, other sources of long-term finance such as venture capital, private equity, and fin-tech remain significantly underdeveloped in Bangladesh.

Figure 4-1: Key constraints faced by non-agricultural enterprises: Bangladesh, Chittagong, and Cox's Bazar, 2016



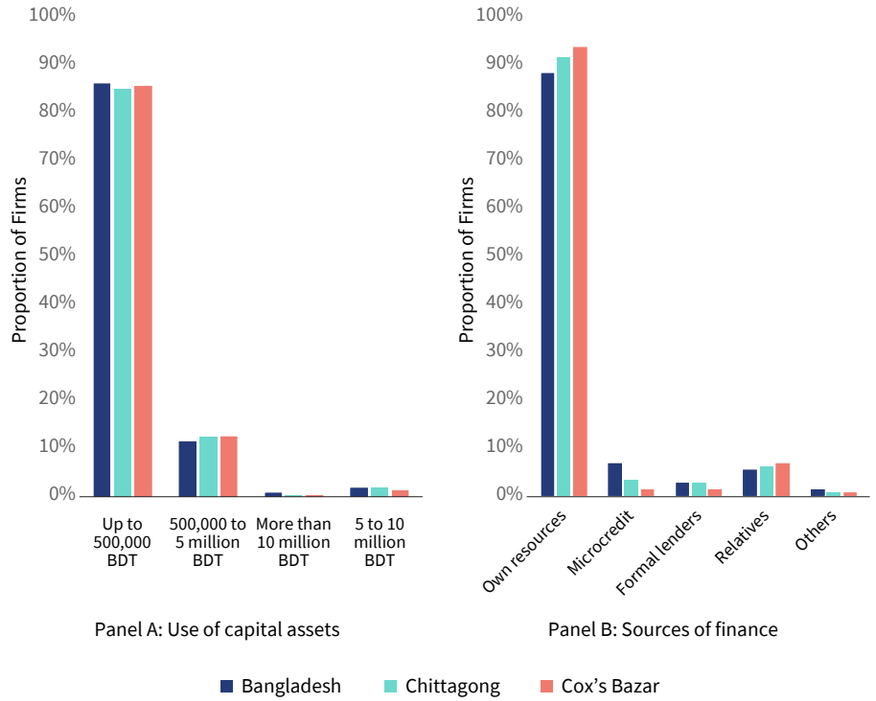
Source: World Bank staff calculations using HIES 2016.

The challenges in accessing credit for business are evident in Cox's Bazar. Panel A of Figure 4-2 shows the amount of capital used by businesses in Cox's Bazar. More than 80 percent of firms have capital assets of only between 600 and 6,000 USD when starting a business. One must also consider the sources of finance that entrepreneurs use (Panel B). More than 80 percent of firms in Bangladesh report that they use their own sources of finance; the same is true for about 90 percent of firms in Cox's Bazar. The next available source of finance is from entrepreneurs' relatives, an informal source. This suggests that there are significant credit market frictions affecting firm performance. It is not clear whether these frictions stem primarily from the supply side (available liquidity in banks) or the demand side (poor quality of firm credit applications and insufficient collateral).

Access to and use of technology also appear to be major constraints for firms. While information and communication technology (ICT) penetration has been increasing rapidly in Bangladesh, the infrastructure for digital communications and services remains underdeveloped. The country's telecom industry has expanded to become the fifth-largest mobile market in the Asia-Pacific region, and recent efforts by the Government of Bangladesh, such as the Digital Bangladesh program, have helped expand the accessibility and use of mobile and internet technologies. However, continued access and quality issues have limited businesses' ability to leverage digital technologies. This is compounded by the relatively high cost of internet connections, the second highest in the South Asia region (IFC 2020). Figure 4-1 suggests that around 10 percent of all firms operating in Cox's Bazar report technology to be the second major business constraint

they face. Data from the economic census suggests that only 1 percent of Cox's Bazar firms use information technology (IT) in their daily operations. Across Bangladesh, the share of firms using IT in daily operations was also low, about 4 percent.

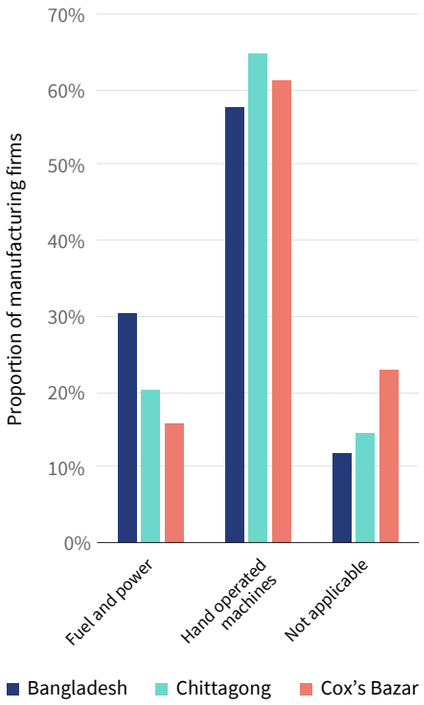
Figure 4-2: Uses and sources of finance for business: Bangladesh, Chittagong, and Cox's Bazar



Source: World Bank staff calculations using the 2013 Economic Census (use of capital assets, left panel) and the 2016 HIES (sources of finance, right panel).

The use of capital and machines can be important for driving down firm costs, and existing data suggests very limited use of mechanization and power in production processes: in Bangladesh generally and especially in Cox's Bazar. Given that firms report costs to be a key constraint, and that capital is a critical part of firm production process, it is important to assess capital use among firms in Bangladesh. Plotting the share of manufacturing firms using fuel and/or power versus hand-operated machines in manufacturing processes, Figure 4-3 suggests that only 18 percent of such firms in Cox's Bazar use power and/or fuel machines in their production. This figure is lower than the Bangladeshi national average, 30 percent, and much lower compared to firms in other developing countries. A large share of firms use only hand-operated machines as the means of producing goods or operating the firm.

Figure 4-3: Use of machines among manufacturing firms, Cox's Bazar, Chittagong, and Bangladesh, 2013



Source: World Bank staff calculations using the 2013 Economic Census.

Identifying the appropriate instrument to improve firm productivity is inhibited by lack of appropriate data. There is a clear need to increase access to credit and financing for firms in Cox's Bazar, and to promote the adoption of new technology and modernizing the means of production. While there is evidence from other countries on the varying efficacy of different financial-support instruments, identifying the binding constraints in the context of Cox's Bazar is a prerequisite to testing and rolling out interventions.[90] Similarly, the literature analyzing the effect of public support for technology adoption on firm performance is relatively scant, especially when focusing on developing countries.[91] The instruments to be picked in the case of Cox's Bazar will depend on the base or initial level of technology of firms, along with sector context. Relatedly, the importance of ICT has to be aligned with the economic opportunities that are present in the district and whether the sectors that will drive growth are really ICT-facilitated sectors. Lack of detailed and recent data on firm performance, productivity, and value chains hinders the identification of specific policy interventions.

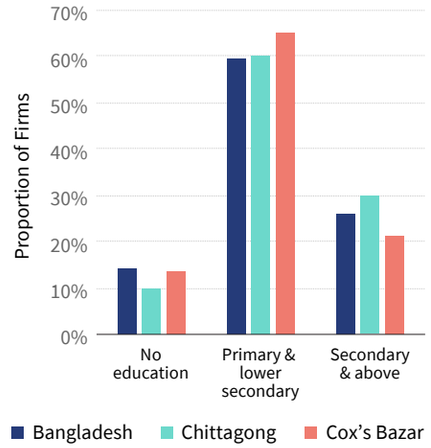
[90] New financial-support instruments such as early-stage equity investment; demand-driven financial supports (vouchers and public procurement programs); indirect instruments (fiscal incentives, loan guarantees); inducement instruments; and recognition awards have been used worldwide to help overcome firms' financial constraints. A recent meta-analysis of 16 studies assessed the impact of SME financing programs in developing countries. It found positive effects on capital investments, firm performance, and employment, as well as insignificant effects on profitability and wages (Kersten et al. 2017). Other recent literature has shown that, while experimental evidence on grants documented high marginal return to capital within targeted firms, randomized experiments providing loans show a weaker impact on firm performance (Woodruff 2018).

[91] The promotion of technology adoption has become one of the main policies aimed at enhancing productivity in many countries in the world. There are several instruments to encourage technology upgrading, including matching grants, thematic funding, guaranteed loans, targeted credit, public procurement programs, and fiscal incentives. While the impact of public support for technological upgrading is positive, its effects on firm performance are not always significant, due to the time horizon under analysis.

The performance of a firm depends on the education of the owner, and on how the education system prepares students to be employers of labor.[92] Technology adoption and the financial performance of firms are positively correlated with firm owners' education levels (Barker and Mueller 2002; Farag and Mallin 2018; Kaur and Singh 2018). Better-educated owners take measured risks, create more business ideas, and are well informed regarding their external environment. Analysis suggests that the most educated population in Bangladesh sorts into wage employment, while entrepreneurship is pursued by those who cannot find a better wage employment opportunity. The absence of entrepreneurship in the education curriculum and of private-sector-led programs for apprenticeship and on-the-job training further limit entrepreneurial opportunities.

In Cox's Bazar, entrepreneurship appears to be perceived as an inferior livelihood choice for educated people. Owners of nearly 65 percent of district firms have only attained primary or lower secondary education, compared to 60 percent in Bangladesh and Chittagong (Figure 4-4). Only 20 percent of Cox's Bazar firms are owned by people who have completed secondary education, a slightly lower figure than in Bangladesh and Chittagong. CBPS data enables comparison of the educational background of wage earners versus entrepreneurs in Cox's Bazar. Results show that more educated individuals are likely to work as wage employees (Figure 4-5). This suggests that entrepreneurship in Cox's Bazar, although it offers higher income, is not seen as an attractive opportunity for the more educated population.

Figure 4-4: Education level of firm owners, Bangladesh, Chittagong, and Cox's Bazar, 2013



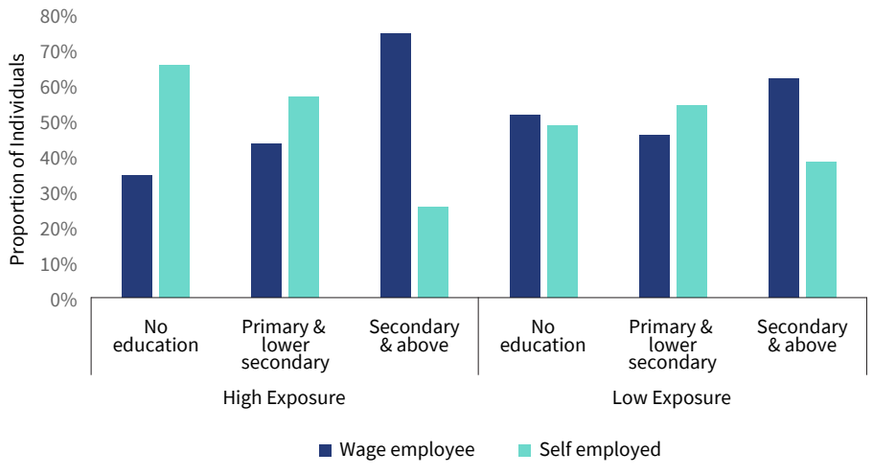
Source: World Bank staff calculations using the 2013 Economic Census.

Problems in accessing markets may also be substantial and affect a firm's performance, growth, and survival in the long run. The discussion has so far focused on supply side factors such as access to finance, capital, and technology, but it is also well recognized that demand shocks can positively influence firm growth (Woodruff 2018). Firms may face several constraints when attempting to access product markets, due to the presence of high transportation costs and other trade barriers, customers' lack of information about product characteristics (price and quality), and lack of trust in unfamiliar suppliers, among other factors. More broadly, business relationships are vital for firm growth. However, these

[92] For example, see Magoutas et al. (2011) for evidence on the relationship between owner's education and firm outcomes in Greek manufacturing.

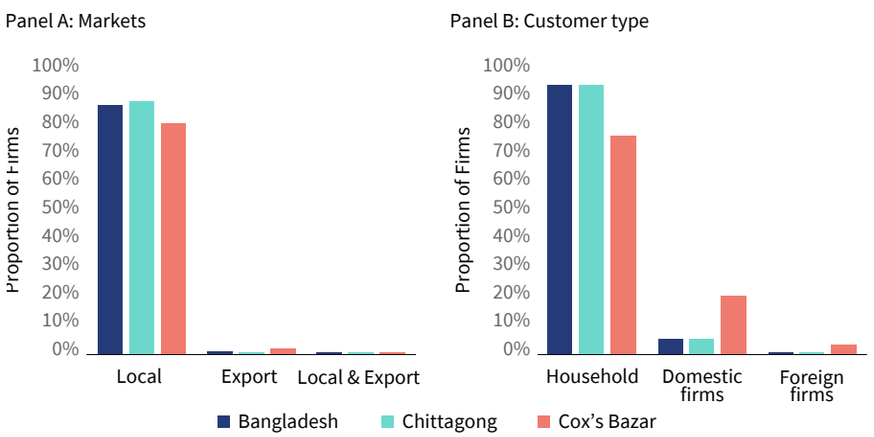
relationships may not emerge efficiently due to networking frictions, such as lack of information or trust, implying a network-based barrier. One can gain insights by investigating the main markets for firms in Cox's Bazar, in particular the extent to which firms sell only locally (Figure 4-6, left panel).

Figure 4-5: What kind of work for the highly skilled? Main job, by workers' education levels, Cox's Bazar, 2019



Source: World Bank staff calculations, CBPS 2019.

Figure 4-6: Firms' main markets and customer types: Bangladesh, Chittagong, and Cox's Bazar



Source: World Bank staff calculations using the 2013 Economic Census (markets, left panel) and the 2016 HIES (customer type, right panel).

Eighty percent of firms in Cox's Bazar sell locally. The numbers are not significantly different for either Chittagong and/or Bangladesh as a whole. However, a very small share (2.5 percent) of firms are also engaged in selling to foreign enterprises. Interestingly, the proportion of firms doing so in Cox's Bazar is higher than in Chittagong and Bangladesh. HIES household establishments data shows the types of customers to which firms sell their products. This data suggests that an overwhelmingly large percentage of firms (around 75 percent) sell to households or individuals. Around 20 percent of firms sell to domestic enterprises, whereas around 5 percent sell to foreign enterprises (Figure 4-6, right panel).

Identifying opportunities

Options exist in Cox's Bazar to tackle several of the major constraints to inclusive growth that have just been discussed. This subsection presents directions for action based on current evidence, while highlighting knowledge gaps for future research. The subsection first summarizes what is known about local comparative economic advantage in Cox's Bazar sub-districts, focusing on economic sectors with strong local development potential, including fishing and aquaculture, tourism, and manufacturing. It then looks at opportunities to unlock inclusive growth potential in Cox's Bazar by developing connectivity and infrastructure. Next, it considers existing governance and service delivery capacities in the district and ways to improve them. Finally, it discusses potential economic opportunities associated with the humanitarian response in Cox's Bazar.

Localized comparative advantage

Given data gaps, it is difficult to clearly identify productive activities with high potential to accelerate inclusive growth in Cox's Bazar. The lack of recent data on the value of economic activities for Bangladesh, and especially in Cox's Bazar district, complicates the identification of the sectors and/or products with the most growth potential. While there is some information on the quantity of industrial and service-sector establishments, volume of employment by activity, and other indicators, 2013 is the latest year of information. At a more granular level, firm productivity data is also missing, which makes it difficult to understand how well local establishments are performing, the challenges that they face, and possible links to national and global value chains. Overall, this makes it difficult to assess the productivity, comparative advantages, or growth trajectory pertaining to any activity. An enterprise survey is planned in Cox's Bazar to help fill this critical data gap.

While existing data sources do not allow for an analysis of the competitiveness of different sectors in Cox's Bazar, there is some suggestive evidence of existing specialization in certain types of non-agricultural economic activity in some upazilas. This may indicate localized comparative advantage. In all upazilas, the wholesale and retail trade sector accounted for the largest number of firms, ranging from 37 percent in Chakaria to

60 percent in Teknaf (2013 Economic Census). That being said, non-agricultural activity was relatively concentrated in the northern parts of the district, as highlighted in previous chapters. Chakaria and Cox's Bazar Sadar alone accounted for 47 percent of the district's non-agricultural firms, followed by Ramu and Teknaf, which accounted for another 29 percent. In contrast, Ukhia and Maheshkhali were home to only 8 percent of non-agricultural firms each, while Pekua and Kutubdia had the smallest shares, 5 and 3 percent[93].

Chakaria stands out as the home of the RMG and textile manufacturing sector in the district. This upazila alone accounted for more than a quarter of all non-agricultural enterprises in Cox's Bazar, and for three-quarters of all RMG and textile manufacturing firms in the district. 1 in 4 non-agricultural enterprises in Chakaria were engaged in RMG and textile manufacturing. Other important non-trade sectors in Chakaria were salt extraction, transport, and other services (including tailoring), each of which accounted for between one-fifth and one-fourth of all enterprises in the district.

Cox's Bazar Sadar, not surprisingly, was home to a diverse set of service activities. These featured firms engaged in hospitality sectors - accommodation, food and tourism-related services (25 percent of such firms in the district); education (22 percent); and other services including tailoring (27 percent). Firms in Cox's Bazar Sadar also account for a substantial share of the district's manufacturing. In salt extraction and the "other industry" category, including manufacture of wood and wood products except furniture, Cox's Bazar Sadar is home to roughly a quarter of all district firms. Within Cox's Bazar Sadar, services including trade accounted for 84 percent of non-agricultural firms. This data predates the influx of humanitarian assistance, organizations and workers to Cox's Bazar, which will have increased the demand for housing, transport, and urban services.

Ramu, along with Chakaria and Ukhia, accounted for 80 percent of firms engaged in the transport and storage sector in 2013. In addition to being home to a third of transport firms, Ramu hosted a small cluster of firms engaged in manufacturing wood products and furniture. Although the latter accounted for only 7 percent of firms in the upazila, these represented 28 percent of all such firms in the district.

Maheshkhali accounted for 28 percent of all salt extraction firms in Cox's Bazar, and 1 in 4 firms in the upazila were engaged in this activity in 2013. Maheshkhali was otherwise dominated by trading activities. While more recent data is not available, available data suggests that this upazila is lagging behind others in the district, due both to limited connectivity and a limited set of work opportunities. Complementary investments in connective infrastructure and urban services will be needed to take advantage of the large-scale capital investments expected in the energy complex and deep seaport in Matarbari.

[93] See Table A1-18 in Annex 1.

Teknaf, characterized by its disconnectedness from the rest of Cox's Bazar, its long coastline, and its border with Myanmar, did not appear to have any clusters of specialization in 2013, perhaps because this spatial disconnectedness required the production of services and manufacturing locally. However, the economies of Teknaf and Ukhia may well have been profoundly reshaped by the large influx of humanitarian assistance being transported through and delivered within these upazilas. More recent data will be needed to understand this.

Fishing and aquaculture

Fishing and aquaculture development have the potential to create livelihoods and generate income in Cox's Bazar. If organized well and in tandem with environmental standards, they can contribute to dietary diversity and nutrition, with a lower carbon footprint than other animal proteins. With increasing sea levels and salinization of coastal land, a shift from land-based agriculture to aquaculture may be inevitable for coastal areas in the country. Inland, farmed aquaculture has expanded substantially in Bangladesh, making it one of the world's top five largest producers of inland capture and culture. This has been driven by expanding domestic demand. Over 90 percent of farmed fish (excluding shrimp) are sold on the domestic market (Rashid and Xiang 2019). At the same time, commercial shrimp production has also expanded, becoming the third-largest sector in terms of export earnings. However, shrimp exports have been declining in recent years, due to challenges in maintaining international food standards and traceability requirements (UN Conference on Trade and Development 2017), particularly due to the high concentration of subsistence farming with outdated practices, low productivity and product quality.

Cox's Bazar has a comparative advantage at the national and international level in terms of shrimp cultivation and sea-caught fish. Natural characteristics such as saltwater endow the district with high potential for cultivating many types of fish. Currently, shrimp production from Cox's Bazar serves both local and international markets. Bangladesh exported $532.03 million worth of fish and fishery products during FY 2016-17, of which almost 90 percent was contributed by shrimp (Department of Fisheries Bangladesh 2017). Besides export of crab and dry fish to Southeast Asia and the Middle East has potential for expansion.

Shrimp aquaculture in coastal areas of Cox's Bazar provides income options and promotes food security. Fish represents an important source of protein for hosts as well as Rohingya. In this sense, the influx has increased the potential to develop the sector (FAO 2019). This could foster the absorption of many low-skilled workers, mainly in rural areas. While it boosts job opportunities and incomes, developing the fish industry can also bring foreign currency into the country. The establishment of high-tech firms in fish processing—particularly frozen and dry fish processing and shrimp cultivation and export—could further spur the region's economic development (Lemma et al. 2018).

Although 90 percent of total fish and fishery exports are dominated by shrimp, the shrimp industry is hamstrung by several factors. These include consistently low prices, diseased seed, value chain inefficiencies, traditional methods of farming, declines in shrimp processing plants, shortages of quality raw materials, and a lack of scientific culture (USAID 2019). Three types of barriers to exporting shrimp, for instance to the European Union (EU), have been documented: (i) government practices and regulations, including restrictive trade practices, customs, and administrative entry procedures; (ii) technical barriers to trade, including standards, testing and certification; and (iii) specific limitations, including import licensing, exchange rate control, export restraints, measures to regulate domestic prices, and requirements concerning marking, labeling, and packaging (Naureen et al. 2006).

Despite the potential for a large international market for dry fish, increasing non-tariff measures (NTMs) have emerged as a critical barrier to exports. These NTMs have emerged from the Uruguay Round of the Multilateral Trade Negotiations and Agreements on Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary (SPS) measures. The WTO, SPS, and TBT agreements imposed a bound obligation to the exporting member countries to improve food quality as per set international standard. However, the compliance cost related to SPS obligations is too high, and the Government of Bangladesh is reluctant or otherwise unable to meet the set criteria (Ahmed, Islam, and Shamsuddoha 2007).

Tourism

Prior to COVID-19, tourism was the largest and fastest-growing industry in the world. And with the longest sandy sea beach in the world, Cox's Bazar has the potential to become one of the world's major tourist attractions. While recent years have witnessed a huge expansion in hotels, motels, and restaurants in the district, infrastructure facilities and improved communications are yet to be developed to a commensurate level to foster the district's potential as a tourism hub (Lemma et al. 2018)

The development of tourism in Cox's Bazar would foster the growth of other sectors, particularly transport, food, and accommodation, as well as retail trade and personal services. Tourism-driven growth creates additional opportunities for investment, development, and infrastructure spending (Kyungmi, Muzaffer, and Sirgy 2013). Locally generated tax revenues can also increase through lodging and sales taxes, revenues from air travel and other transportation taxes, as well as taxes on business and fuel (Bhattacharjee, Polas, and Rahman 2018). Tourism and hospitality are also a labor-intensive source of growth and, with the accompanying skills and training, could provide new, better quality jobs for local residents. Finally, it could provide a boost for the local handicrafts sector, which has a rich heritage (Lemma et al. 2018).

Several ongoing initiatives seek to boost tourism in the district, including the Naf Tourism Park, Sabrang Tourism Park, and Sonadia Eco-Tourism Park, with a target to create 200,000 jobs, and full tax exemptions granted by the Bangladesh Economic Zones Authority for the

first ten years (USAID 2019).[94] The increased presence of humanitarian workers and development actors in Cox's Bazar, and the accompanying need for accommodation and office space, has also increased earnings in the hotel industry and the rental value of real estate, which could further boost incentives to invest. At the same time, investments are being made to upgrade the district airport to international standards.

Despite the obvious potential to develop tourism, structural challenges remain. For one, concerns about safety and security of tourists and occasional acts of hijacking and kidnapping prevent a larger number of tourists from visiting and staying longer.[95] Lack of branding and promotion also constrains tourism growth. The lack of promotion of the country as a tourist destination implies that Bangladesh continues to possess a somewhat negative image abroad among potential tourists (USAID 2019). The business environment is also not conducive to increased private investment, and there are high direct and indirect barriers to entry for new businesses due to imperfect competition. Finally, the recent Rohingya influx and concerns about security may have a negative impact on the development of tourism in Cox's Bazar as local and foreign investors may be more hesitant to make large investments in the industry (Lemma et al. 2018).

Manufacturing export clusters in Cox's Bazar

Manufacturing export firms in Cox's Bazar are entirely concentrated in the RMG sector and in Chakaria. Manufacturing firms represent 14 percent of total firms in Cox's Bazar, of which 3 percent[96] reported exporting their products on the 2013 Economic Census.[97] However, while this share is slightly larger than at the national and division levels, the district only represents 2 percent of Bangladesh's total manufacturing export firms (Figure 4-7). Ninety-eight percent of Cox's Bazar firms that are selling their products in the international market are in the RMG sector. Furthermore, 84 percent of the exporting firms are located in Chakaria and 12 percent in Ramu. Less than 1 percent of nonagricultural firms selling their products on the international market are located in Teknaf and Ukhia (Figure 4-8).

In contrast to national and Chittagong division patterns, most Cox's Bazar export firms have fewer than 10 employees. While 7 percent of exporting firms in the district have between 2 and 9 workers, 90 percent of exporting firms have 1 worker, and only 3 percent

[94] Siam International of Thailand will invest around $500 million out of the total budget of $3 billion for infrastructure development. Sabrang Tourism Park will be the first exclusive tourism park in the Cox's Bazar district, encompassing an area of 1,027 acres. Sonadia Eco-Tourism Park in Maheshkhali is developing on 9,467 acres of land (Dhaka Tribune 2018; Daily Star 2018).

[95] Siddiqi Raquib, "Second SAARC Tourism Ministers meet ends with no breakthrough," The New Nation, June 11, 2006; Amin Sakib-Din, "The role of tourism in Bangladesh economy," The New Nation, December 6, 2006.

[96] See Table A1-19 in Annex 1.

[97] The census only asks this question to firms in the manufacturing sector, so this is an underestimate of exporting firms.

have more than 10 employees. Most of these firms are in the RMG sector. The structure of firms with access to international markets is completely different at national and division level. 70 and 50 percent of exporting firms have more than 10 employees in Bangladesh and Chittagong, respectively (Table 4-6). Among them, 1 out of 4 exporting firms has more than 100 employees.[98]

Among agricultural enterprises, the fisheries sector is a key export cluster in Cox's Bazar. As previously discussed, agricultural products are the third export cluster in Bangladesh. In 2017, the sector represented 3 percent of total national exports, of which 35 percent was comprised of frozen shrimp exports. While this is also an important export activity for Cox's Bazar, only 6 out of 162 Bangladeshi shrimp processing factories are located in the district.[99]

Table 4-6: Main activities and size of export firms in Cox's Bazar, Chittagong, and Bangladesh, 2013

Activities	Cox's Bazar	Chittagong	Bangladesh
Manufacture of leather and related products		1%	3%
Manufacture of fabricated metal products		6%	3%
Manufacture of food products		7%	8%
Manufacture of furniture		13%	7%
Other manufacturing	2%	18%	14%
Manufacture of textiles and RMG	98%	55%	65%
Firm Size	**Cox's Bazar**	**Chittagong**	**Bangladesh**
1 worker	90%	19%	5%
2 workers	4%	4%	2%
3-4 workers	2%	10%	9%
5-9 workers	1%	17%	15%
10 plus workers	3%	50%	69%
Total number of export firms	358	2,245	16,988

Source: World Bank staff calculations using the 2013 Economic Census.

[98] See Table A1-20 in Annex 1.
[99] https://www.unescap.org/sites/default/files/6-%20%20Sea%20Food%20Export%20from%20Bangladesh-Kabir.pdf. See also Mahmud (2018).

Figure 4-7: Distribution of exporting firms by districts, Bangladesh, 2013

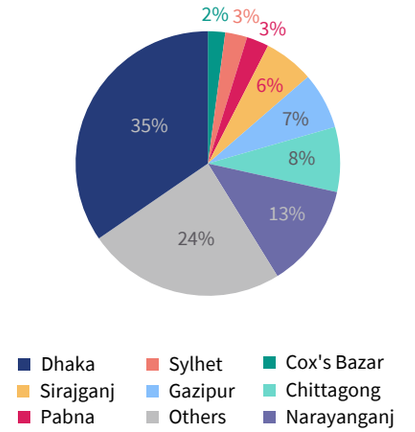
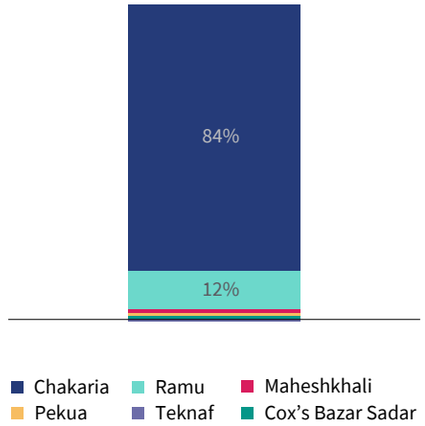


Figure 4-8: Distribution of exporting firms by upazilas in Cox's Bazar, 2013



Source: WB staff calculations, Economic Census 2013.

Economic connectivity and infrastructure enhancements

The current state of transportation infrastructure prevents most of Cox's Bazar district from profiting from the jobs and economic opportunities to be created by the proposed deep seaport in Matarbari. Average travel times to the port from upazilas in Cox's Bazar is principally shaped by geography, with the southern upazilas remaining effectively disconnected, even taking into account proposed improvements in road and ferry connections. The latter improvements are described in detail further below.

Current access to the proposed deep seaport at Martarbari is quite low, even for nearby areas in Chakaria, because of poor quality roads servicing the port site from the main highway and the surrounding communities. Further afield, the most direct commuting route across the Cox's Bazar bay and up Maheshkhali's central road is blocked by the lack of a dedicated ferry and the modest state of the road. Potential commuters would instead be forced to use the Chittagong road, adding 30-60 minutes in commuting time that effectively places the commute out of reach for most. Furthermore, there is a risk that, if multimodal logistic services are not enhanced, Cox's Bazar would face negative exposures from the traffic between greater Dhaka and Chittagong,[100] through increased congestion (the average speed on inter-city roads is only 30 kilometers per hour) and high levels of pollution (IFC 2020).

[100] The majority of container freight movement takes place between greater Dhaka and Chittagong: 70 percent of container traffic from Chittagong goes to Dhaka, with almost 95 percent going by road (IFC 2020).

Box 5: Modeling accessibility

It is possible to model the impacts of several transportation investment scenarios on accessibility to services, economic integration, and equitable growth. To do so, analysts downloaded geospatial data for all roads and ferries in Cox's Bazar (and onwards to Chittagong) from OpenStreetMap, assigned them speeds according to their type,101 and used the resulting network to calculate travel times between all origins (population points) and destinations (services, markets, and others).

To calculate the accessibility improvements from proposed investments, analysts increased the speeds for selected road or ferry segments to their projected post-investment levels and then re-calculated the origin-destination travel times. The projected speed improvement is usually 2-3 times existing speeds, depending on the specific road segment.

The resulting origin-destination travel time figures are then used to prepare average travel times and accessibility indices for each destination under each scenario. Average travel times record the mean travel time to the nearest service or place of employment per administrative unit – unions in most cases. Accessibility indices employ a more sophisticated measure of potential accessibility, which measures access to all the services, jobs, and population centers in the district, to better account for the cumulative nature of access. One category of accessibility indices, commonly known as gravity models, calculates destinations' economic gravity by weighting their potential accessibility measurements by their attractiveness and the inverse of the travel-time distance between them, when calculating this cumulative access. The analysis here follows Yoshida and Blankespoor (2010) in employing a negative exponential model to calculate the gravity indices. More detail on the technical methodology can be found in the Annex.

Three scenarios additional to the current transportation setup are considered and visualized:

- The main roads servicing the Martarbari port and Maheshkhali upazila are upgraded
- The above roads are upgraded, and a dedicated ferry line is set up connecting Maheshkhali and Cox's Bazar city across the bay
- The above investments are made, and upgrades are made to the principal southern highway connecting Ukhia and Teknaf to Cox's Bazar Sadar.

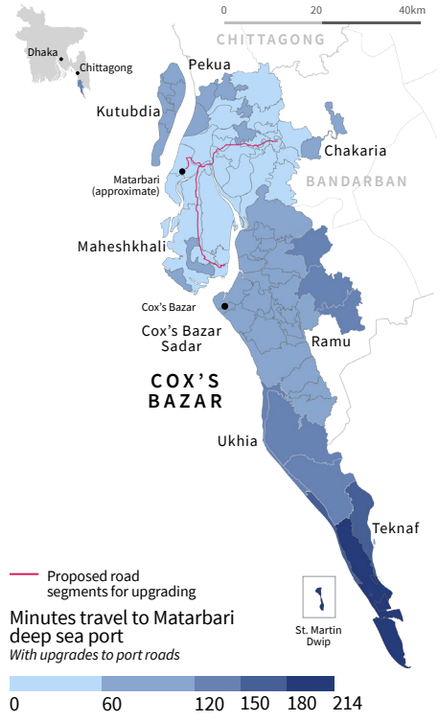
[101] Typology adapted from the Bangladesh Roads and Highways Authority. See Table A2-1 in Annex 2.

All the travel times, accessibility indicators, and economic gravity calculations displayed in the maps and corresponding charts presented here are the result of World Bank staff calculations. These calculations leverage data from the following sources:

- Transport: OpenStreetMap
- Population: Facebook and CIESIN 2016 (based on Bangladesh Bureau of Statistics Census 2011)
- Population, Economic Census: Bangladesh Bureau of Statistics 2013
- Administrative borders, markets, services: Local Government Engineering Department (LGED) 2019

The accessibility methodology, its theoretical underpinnings, and the data inputs are described in greater detail in the Annex.

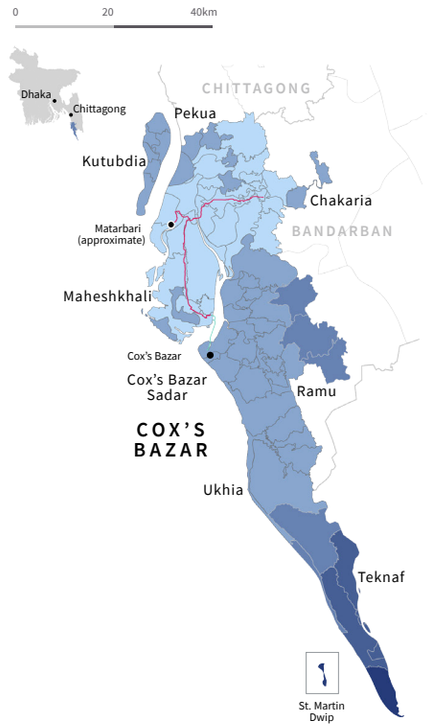
Map 4-1: Estimated travel times to Matarbari port, with upgrade of key roads



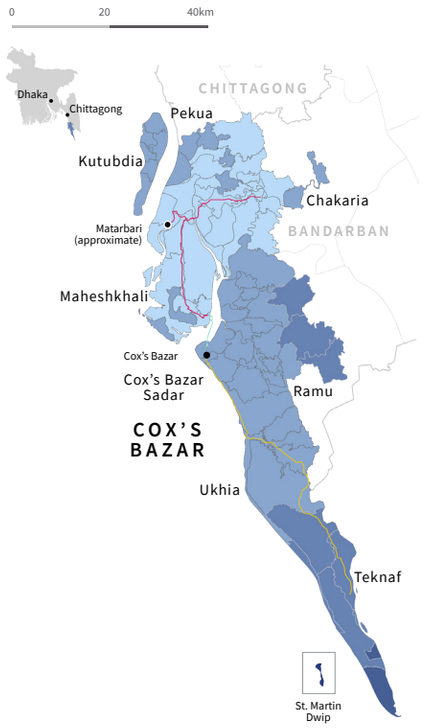
Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

The proposed upgrades to key feeder roads shown in Map 4-1 would greatly improve access to the port for the whole district, although the establishment of a rapid ferry across the Cox's Bazar Bay as shown in Map 4-2 is necessary to make commuting from northern Ukhia viable. The maximum feasible commuting distance for desirable, high-quality jobs in Cox's Bazar district is unknown, but previous research in Dhaka showed residents endured mean commute times of approximately 70 minutes, with significant shares tolerating times of up to 100 minutes (RSTP Household Survey 2014). The ADB's planned upgrades to the southern road linking Cox's Bazar Sadar, Ukhia, and Teknaf significantly complement these investments by extending the plausible commuting catchment of the deep seaport throughout Ukhia, as shown in Map 4-3. Even with the full suite of investments, commuting from eastern Ramu, southern Ukhia, and Teknaf will likely be impossible, so residents of these areas are unlikely to be physically connected to any potential growth and employment opportunities from the investments in Matarbari.

Map 4-2: Estimated travel times to Matarbari port, with upgrade of key roads and ferry



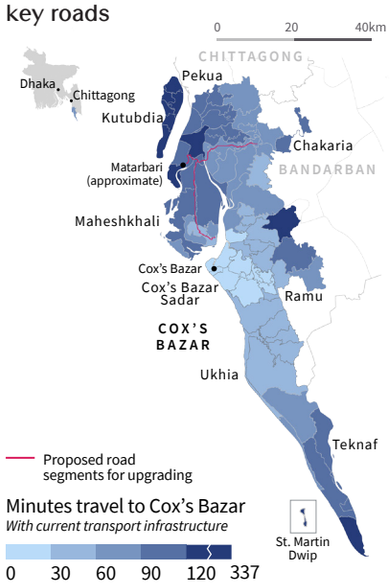
Map 4-3: Estimated travel times to Matarbari port, with upgrade of key roads, ferry, and AH41 (N1) Highway



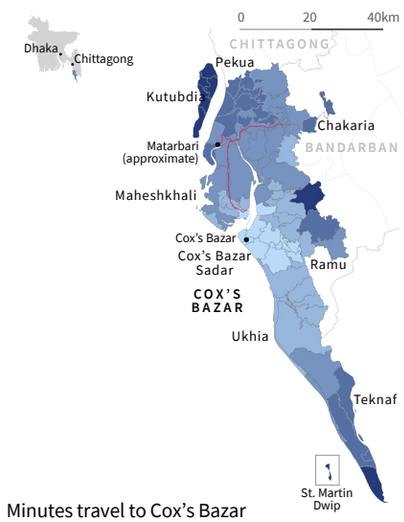
Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

By increasing accessibility from all sides, the proposed upgrades to key roads, ferries, and the AH41 highway collectively further increase the centrality of the Sadar to Cox's Bazar. As seen in Map 4-4 and Map 4-5, the proposed northern road and ferry upgrades would integrate southern and central Maheshkhali with the Sadar's markets and perhaps create commercial opportunities for farmers there. Map 46 shows that the AH41 highway upgrade would do the same for Ukhia. These also increase opportunities for tourists flying into Cox's Bazar to more easily access areas outside of the city. However, remote areas like Kutubdia, eastern Ramu, and Teknaf will remain distant from the city even with these upgrades.

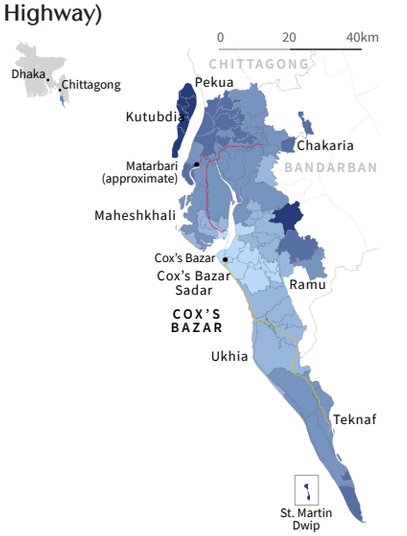
Map 4-4: Estimated travel times to Cox's Bazar Sadar, with upgrade of key roads



Map 4-5: Estimated travel times to Cox's Bazar Sadar, with upgrade of key roads and ferry



Map 4-6: Estimated travel times to Cox's Bazar Sadar, with upgrade of key roads, ferry, and AH41 (N1 Highway)



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

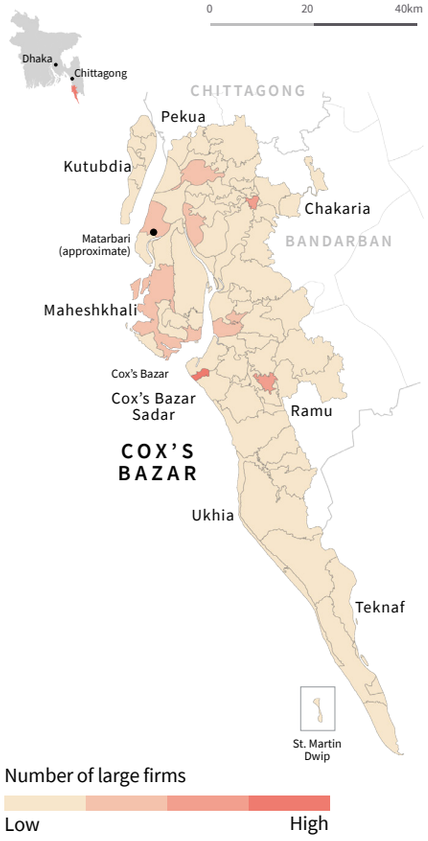
A successful southern commuter strategy could have negative secondary effects on travel speeds. If a ferry successfully enables commuting to Matarbari from southern Cox's Bazar, increased congestion within Cox's Bazar Sadar may result: the current pier location requires northbound traffic from Teknaf or Ukhia to route through beachfront and downtown roads already congested from tourist and commercial traffic. At its worst, this could negate some or all potential improvements to commute times from the south. Further investment in traffic-alleviating connecting roads, road widening, pavement maintenance, traffic dividers, and signals within Cox's Bazar Sadar may be needed to mitigate these potential side effects (Hussain and Mallick 2017).

Transport investments will support growth in some upazilas

Further analysis investigates the potential benefits of the planned investments for growth in the district and the spatial inclusivity of growth. The approach simulates improvements in accessibility for large firms, growth centers, and employment clusters of good/secure jobs and documents any growth exposures by upazila. Large firms are defined as firms with more than 10 workers. Growth centers are important markets characterized by having permanent multimodal structures and managing a large volume of trade, as identified by the Bangladesh Planning Commission. Secure employment is defined as individuals who are business owners or on a full-time contract. The workings of the accessibility models, accessibility indexes, and gravity models are described in Box 5 and further elaborated in the Annex.

Firms in northern and central Cox's Bazar are best positioned to exploit transport investments. Large firms with the greatest growth potential are only present in a handful of unions in Maheshkhali, Chakaria, and Cox's Bazar Sadar (Map 4-7). In a spatial statistical analysis,[102] these firms disproportionately cluster in the urban unions around Cox's Bazar Sadar, implying that they effectively form a single economic cluster in and around the Sadar upazila.

Map 4-7: Unions with significant presence of large firms, Cox's Bazar



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

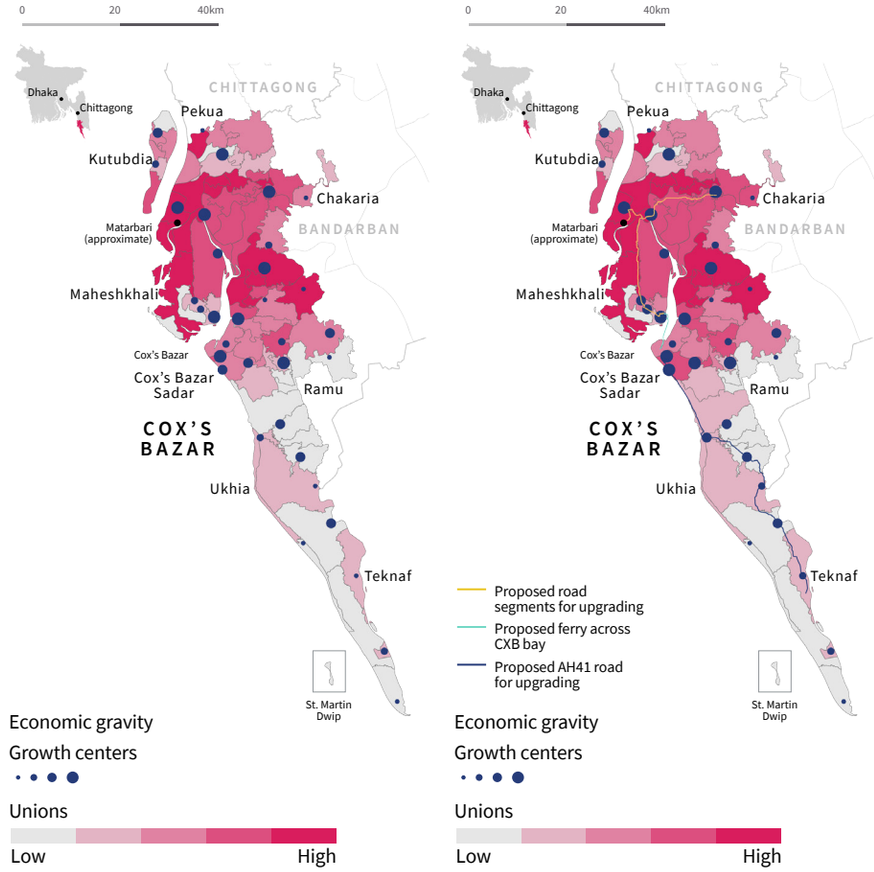
The planned transport upgrades increase the economic weight of these urban unions near Sadar, as well as the weight of Maheshkhali, where Matarbari is located. Map 4-8 shows the current accessibility of populated areas in Cox's Bazar, averaged by union, to large firm clusters. Along with unions in Ukhia and Teknaf, southern parts of Maheshkhali

[102] In a Gedis-Ord Local GI* "hotspot analysis," these unions showed the only statistically significant (z-score > 1.96) spatial concentration of large firms. Adjoining unions were defined as belonging to the same cluster "neighborhoods" for this analysis when defining spatial weights.

and northern unions in Pekua and Kutubdia have limited access to these clusters of growth. With the proposed transport investments, the economic weight of unions surrounding Cox's Bazar Sadar and parts of southern Maheshkhali increases significantly (Map 4-9), whereas unions in Teknaf and Ukhia are affected only marginally.

Map 4-8: Large firm accessibility indices (markets weighted by large firms), pre-transport investments

Map 4-9: Large firm accessibility indices (markets weighted by large firms), post-transport investments



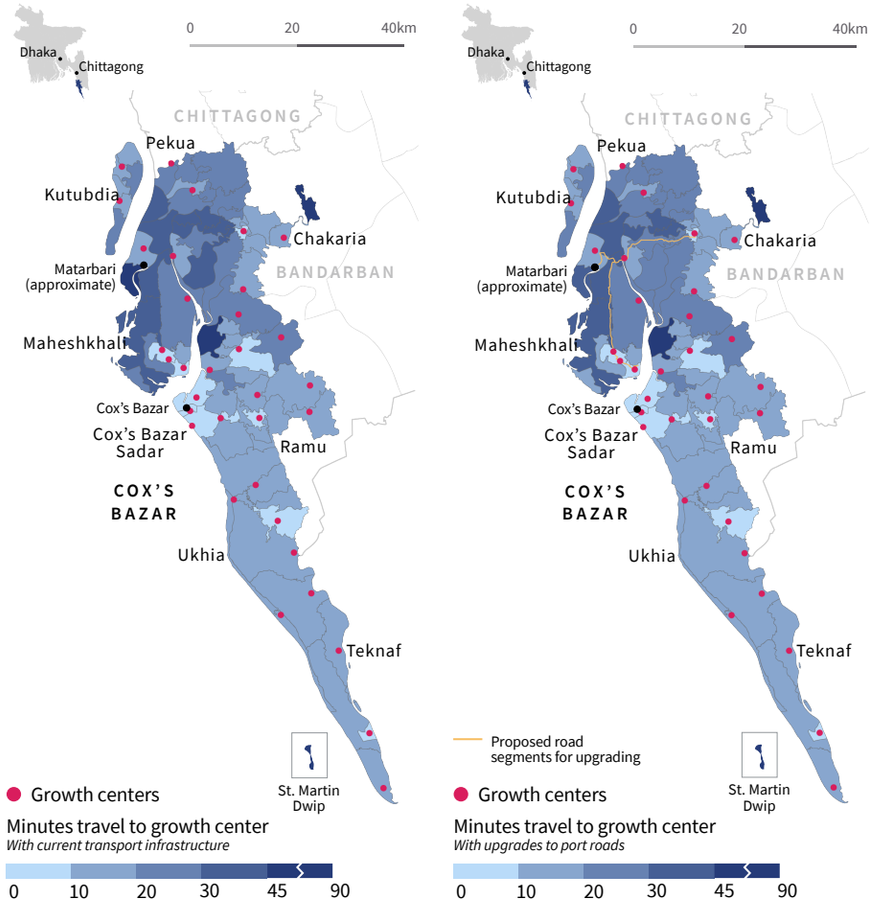
Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Higher levels of investment in transportation will better integrate existing markets in the north-central core but fail to integrate peripheral markets in southern Cox's Bazar, Kutubdia, and northern Chakaria. Upgrades to roads surrounding Martarbari would modestly increase the accessibility of government-designated growth centers (major markets)

for residents in Maheshkhali and Chakaria (see Map 4-10 for pre-transport investment accessibility versus Map 4-11 for post-transport investment accessibility). Additional upgrades to ferries would integrate southern Maheshkhali residents better with Cox's Bazar Sadar's commercial markets. By contrast, market accessibility indices barely improve in Ukhia and Teknaf, even taking into account the ADB's proposed upgrades to the main southern AH41 road. In line with improvements in access, notable increases can be seen in the economic weight of growth centers in Cox's Bazar Sadar and southern Maheshkhali before (Map 4-12) and after (Map 4-13) investments.

Map 4-10: Travel times to growth centers, (current) pre-investment

Map 4-11: Travel times to growth centers, post-investment

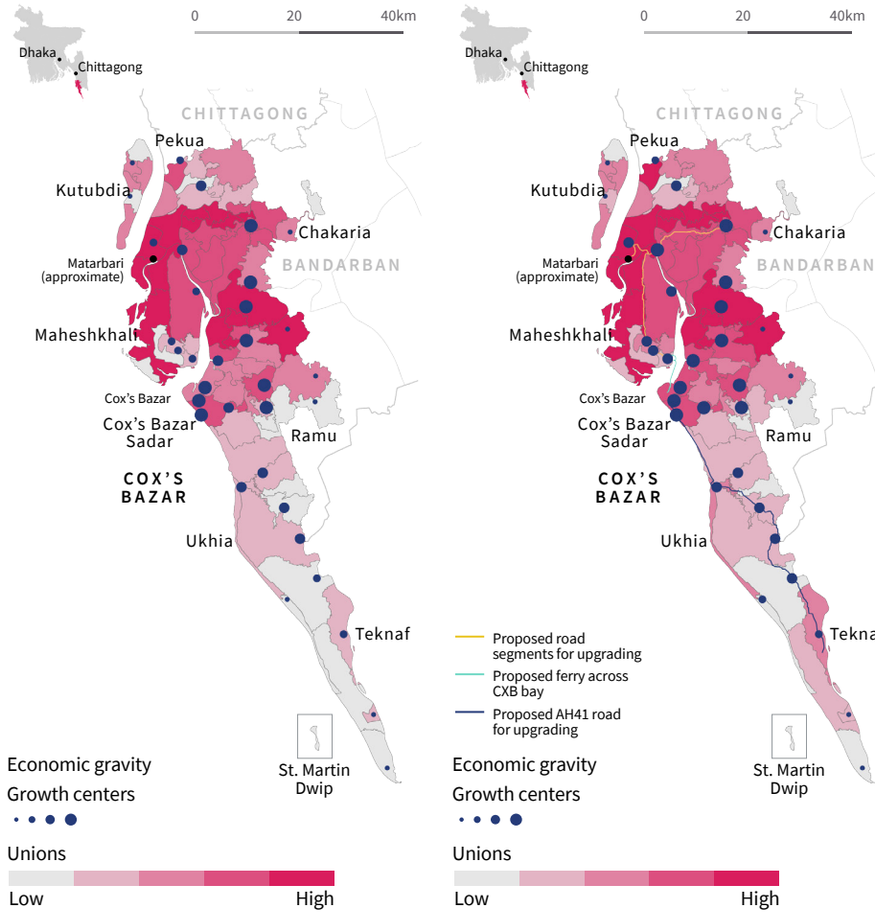


Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Alone, the substantial proposed transportation investments cannot transform the current geography of employment opportunities in Cox's Bazar. Accessibility to non-agricultural employment remains clustered around northern and central Cox's Bazar, even with the improvements in access displayed in Map 4-13 and Map 4-15. These investments raise the overall index of accessibility to jobs and boost the prospects of a few unions in particular, but don't fundamentally resolve low levels of access in southern Cox's Bazar, Kutubdia, or northern Chakaria.

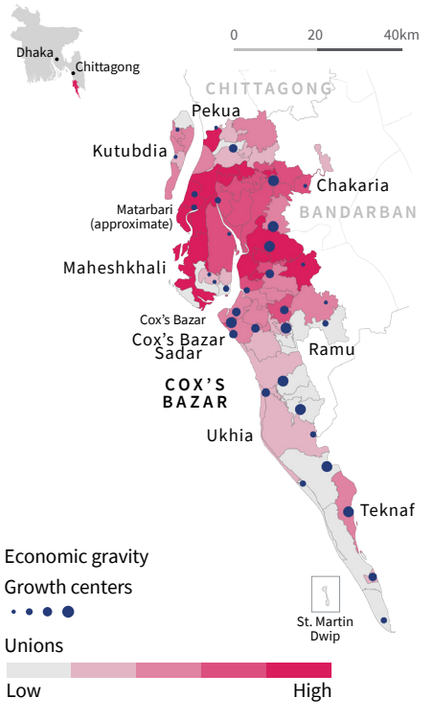
Map 4-12: Market accessibility index (growth centers), pre-investment (unweighted)

Map 4-13: Market accessibility index (growth centers), post-investment (unweighted)

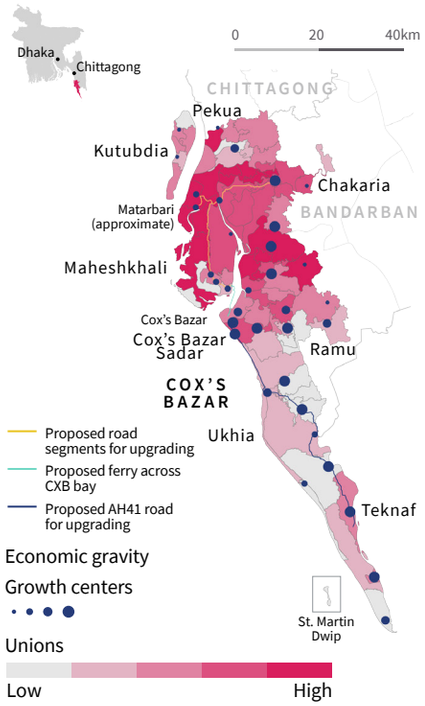


Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

Map 4-14: All firms accessibility indices (markets weighted by firms), pre-transport investment



Map 4-15: All firms accessibility indices (markets weighted by firms), post-transport investment



Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

While the share of insecure employment in the district is relatively low, the inability to access secure employment is more pronounced in certain upazilas.[103] **In particular, northern parts of the district have greater access to better-quality jobs. Together with proposed transportation investments, efforts are needed to create high-quality non-agricultural jobs in or nearer upazilas that now have limited access.** Five percent of workers in Cox's Bazar have an insecure job (are unpaid, part-time, or irregular workers), though this share is lower than at the national (8 percent) and division (6 percent) levels. Substantial differences exist across upazilas. Cox's Bazar Sadar and Pekua have the largest shares of insecure workers in the district, at 8 and 11 percent, respectively. In Teknaf and Ukhia, only 4 and 3 percent of workers have insecure jobs. Assessing the distribution of the relatively insecure and secure jobs across upazilas, we find that 43 percent of all secure jobs (full time workers and business or enterprise owners) are located in the capital

[103] Secure employment is defined as being a business owner or on a full-time contract. It contrasts with vulnerable, insecure employment for unpaid, part time, and irregular workers.

of the district, followed by Pekua, Ramu, and Teknaf, which are home to 13, 15, and 10 percent of secure jobs, respectively. On the other hand, only 4 percent of all enterprise/business owners and full-time workers are located in Ukhia. At the same time, Cox's Bazar Sadar and Chakaria account for 47 percent of all vulnerable jobs in the district, with Teknaf in third place, hosting 14 percent of vulnerable workers in Cox's Bazar.[104] Map 4-16 shows that northern Cox's Bazar currently enjoys much higher accessibility to relatively secure employment. Residents there have access to high-quality jobs in Cox's Bazar Sadar, smaller firms throughout the north, and the university cluster in Ramu. After the full suite of proposed transport investment (Map 4-17), southern Maheshkhali and Cox's Bazar are more tightly integrated with the job clusters in Ramu and the north, but accessibility continues to lag in the south, apart from a modest increase in Teknaf. These maps indicate a need to create additional non-agricultural jobs in or closer to Ukhia and Teknaf.

Map 4-16: High-quality jobs accessibility indices (markets weighted by high-quality job numbers), pre-transport investment

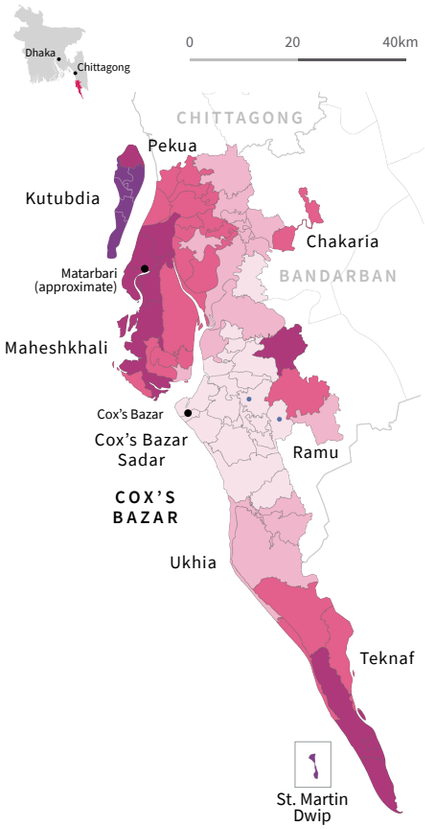
Map 4-17: High-quality jobs accessibility indices (markets weighted by high-quality job numbers), post-transport investment

Note: Estimations based on an internal model of travel times (See Annex 2) and population distribution models from the High-Resolution Settlement Layer from Facebook and the Center for International Earth Science Information Network 2016.

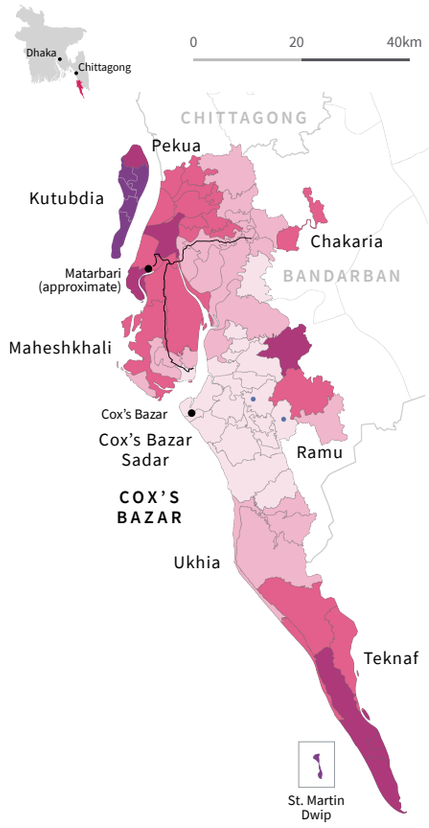
[104] See Tables A1-21 and Table A1-22 in Annex 1.

Infrastructure investments may make a modest contribution to long-term human capital formation. As present access to primary and secondary schools is mostly very good, transportation investments will only exert a significant impact on access to tertiary education (Map 4-18 versus Map 4-19). Upgrades to roads for Matarbari would modestly increase accessibility to universities for residents of northern Maheshkhali and Chakaria, while a ferry and the ADB-built southern road would similarly improve accessibility for southern Maheshkhali, Ukhia, and Teknaf. However only for Maheshkhali and Ukhia would this likely reduce the mean travel time below a threshold of approximately 90 minutes.

Map 4-18: Travel times to tertiary education, pre-transport investment



Map 4-19: Travel times to tertiary education, post-transport investment



Governance and service delivery

The Rohingya influx has been accompanied by a large-scale humanitarian response in a context of weak local governance. Local governments in affected areas have limited funds, functions, personnel, and capacity to manage the response.[105] Between 2017 and 2020, funding of the Rohingya crisis response has averaged US$564 million,[106] and has been largely successful in delivering basic needs and food security to the displaced population (World Bank 2020c, based on CBPS 2019). However, district and local governments in Bangladesh do not currently participate actively and contribute to decision-making and investments at their level. This implies that there are few avenues for citizens and the host community to shape the responsiveness of government programs and policies to their needs. Elected representatives of local government institutions rarely participate in the identification, appraisal, approval, implementation, and monitoring of investment projects funded through the Annual Development Plans (World Bank, forthcoming).

A World Bank report (World Bank 2020b) documents variable capacity at different levels of local government. *Paurashavas*, or municipal governments, generally have better capacity than local government institutions at the district level. Likewise, *upazila parishads*[107] (present in both urban and rural settings) appear to be more capacitated than *union parishads*. In practice, neither *upazila parishads* nor *union parishads* have sufficient command over other government departments in their area. While lower-tier local governments are closer to citizens, capacity gaps limit their ability to advocate for local preferences and needs. Among the four *paurashavas* in Cox's Bazar (Chakaria, Cox's Bazar Sadar, Maheshkhali, and Teknaf), the actual number of permanent staff is currently well below the "standard," and there are serious shortfalls in administration, engineering, and health and family planning departments. At the *zila parishad* level, as well, both staff and budgets are relatively small, in line with the limited portfolio of activities. At lower tiers of government, both staffing and mandates are larger. However, when comparing Cox's Bazar to other districts, for *paurashavas*, the level of per capita expenditure in the district is twice as high as the national average, while for *union parishads*—the lowest tier of government, with the longest list of subjects in its mandate—expenditure is only 75 percent of the national average.

An analysis of district-level public expenditure allocations suggests great unevenness across districts and relatively fixed allocations across districts under certain expenditure heads, irrespective of population size. In terms of education, health, agriculture, and local governance expenditures (to the extent that they can be spatially allocated), Cox's Bazar does not appear to be attracting public resources on par with its population size (Box 6).

[105] See Khan (2016).
[106] OCHA Financial Tracking Service, Bangladesh: 2020 Joint Response Plan for Rohingya Humanitarian Crisis (January-December), https://fts.unocha.org/appeals/906/summary
[107] An upazila parishad consists of a chairman, two vice-chairpersons (one of them a woman), chairmen of all union parishads under the upazila concerned, mayors of all municipalities, if there are any, and women members of the reserved seat.

Box 6: Analyzing district-level public expenditure in Bangladesh

The allocation of public resources at district level in Bangladesh appears highly uneven. Dhaka division receives the highest share of executed budget that can be spatially allocated, followed by Chittagong division. In fact, Dhaka receives the most executed budget, both allocated and unallocated, with a large component of unallocated budget spent on public services that are overwhelmingly concentrated in Dhaka (Figure B6-1 & Figure B6-2).

Per capita allocated education expenditure is higher in Barisal and Khulna divisions and in the eastern part of Chittagong division than in other areas of the country. Cox's Bazar district falls in the bottom of the distribution in terms of per capita allocations both at the national level and within the division. Per capita allocations in Rangmati and eastern districts in Chittagong division are high due to their small population, while per capita allocations are low in Cox's Bazar, in part due to a relatively high concentration of population in this district compared to its eastern neighbors. Public resource allocations include a fixed component which may partially explain the patterns observed (Figure B6-3 & Figure B6-4).

Figure B6-1: Expenditure allocation (BDT) in proportion to school-age population (0-14 years), by district

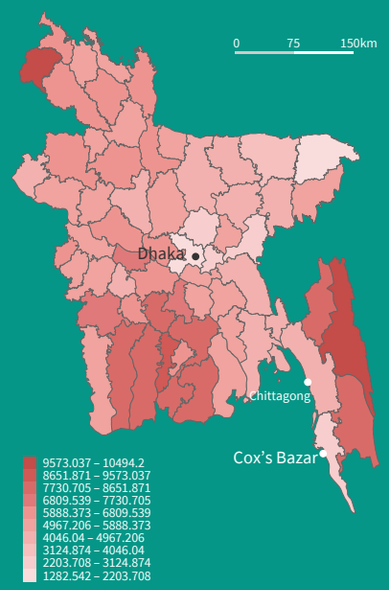


Figure B6-2: Per capita allocated health expenditure (BDT), by district

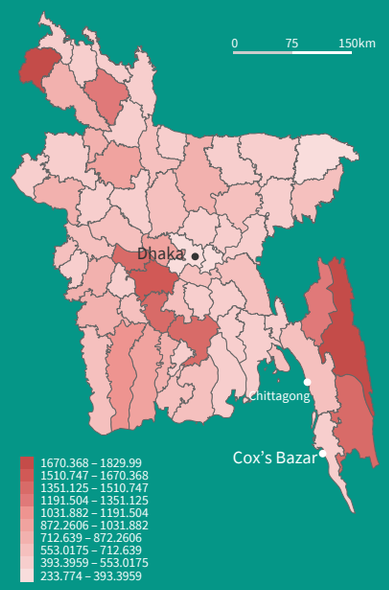


Figure B6-3: Per capita allocated local governance expenditure (BDT), by district

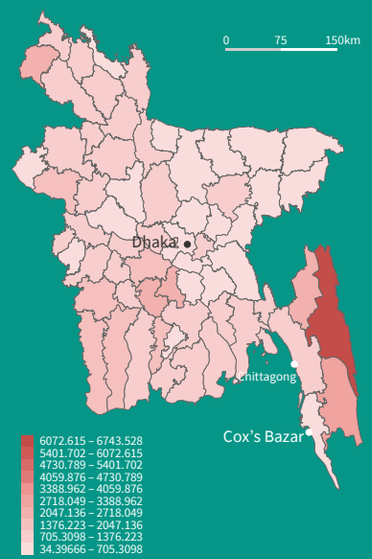
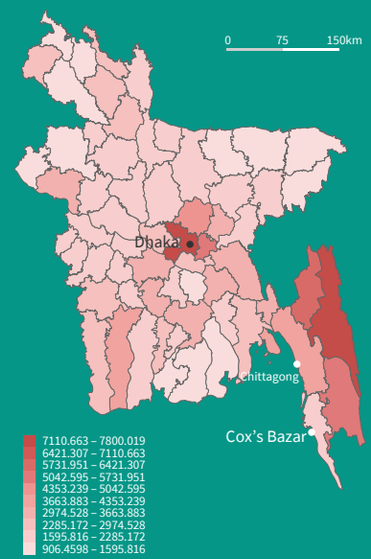


Figure B6-4: Allocated agricultural expenditure per acre of cropped area (BDT), by district



Within public spending categories, per capita allocation on health is relatively higher in Khulna, Barisal, and urban areas close to Dhaka, as well as in the eastern districts of Chittagong division.

Allocated spending per capita under the local governance head is relatively similar but low among most districts, with the exception of Rangamati. Chittagong (in particular Rangamati), Khulna, and Barisal receive high per capita budget allocations for local governance. However, most of this budget is for loans, capital transfers, and fixed assets, that is, spatially unallocated. A significant share of local governance expenditure (21 per cent), allocated and unallocated, is for construction of rural roads, with another 10 percent for other roads, highways, and bridges.

Allocated agricultural expenditure is distributed using the net cropped area. The map shows a disproportional distribution of resources toward urbanized areas around Dhaka. In addition, except for Cox's Bazar, the southeastern districts in Chittagong division are also relatively well positioned. Over the period 2011-18, 25 to 50 percent of allocated agricultural expenditure went to fertilizer subsidies. On distributing these subsidies spatially (for 2016-17), besides east Chittagong, districts in Khulna receive high spending per acre of cropped land.

Source: World Bank staff calculations based on BOOST.

The humanitarian response in Cox's Bazar is moving into the medium term, creating opportunities to build broad-based linkages with host community livelihoods and boost the local multiplier of aid. But the local government appears disconnected from the management of Rohingya affairs, which are entirely overseen by the national government. Local government institutions have a constitutional mandate to lead local development by managing the work of public officials, maintaining public order, planning and delivering services, and levying taxes. As long as policies covering the Rohingya are determined at the national level, local governments and the host population may perceive themselves as shut out from efforts to link humanitarian assistance with local development. The first phase of the UNDP-led development planning exercise could help bridge this gap between local needs and centrally determined spending priorities and inform investment decisions by government and development partners.

Humanitarian assistance and local economic activity

The most recent influx of displaced Rohingya from Myanmar necessitated an immediate, large-scale humanitarian response, averaging over 600 million USD per year since 2017. Food security and nutrition remain the single largest aid category, accounting for roughly 30 percent of all assistance. As noted above, this support has been largely successful in meeting basic food needs for the Rohingya population in the camps in Teknaf and Ukhia (Figure 4-9 and Figure 4-10). However, available funding falls short of the requirements estimated by the United Nations (UN). The COVID-19 pandemic has restricted UN agencies' ability to deliver a full range of assistance, narrowing the focus to life-saving humanitarian aid. Simultaneously, the pandemic has generated new needs for support.

Such a large influx of humanitarian assistance can increase local economic activity and generate a demand impetus through multiple channels. First, the humanitarian effort has been supported by a large number of international and domestic staff working with non-governmental organizations, humanitarian, and development organizations. They generate demand for local accommodation and hospitality services, travel to and from Cox's Bazar to national and international headquarters, and transport materials from the district center to the Rohingya camps in Teknaf and Ukhia. Second, humanitarian assistance of this magnitude requires procurement of food and service delivery supplies at scale. Much of this material continues to be procured internationally or through Dhaka and Chittagong. While these processes generate demand for transport services, new pilot initiatives signal the potential to procure more assistance locally, expanding local incomes and consumption. Third, the assistance economy has the potential to create new jobs, especially for well-educated hosts, to provide facilitating services such as translation, but more importantly to work in delivering services in camps. Finally, cash assistance delivered to Rohingya in camps will probably not be spent entirely within camps, and is likely to be spent in local shops, which will lead to higher levels of economic activity in and around the Rohingya camps.

Figure 4-9: Share of total funding by clusters in Cox's Bazar humanitarian response, 2017-2019

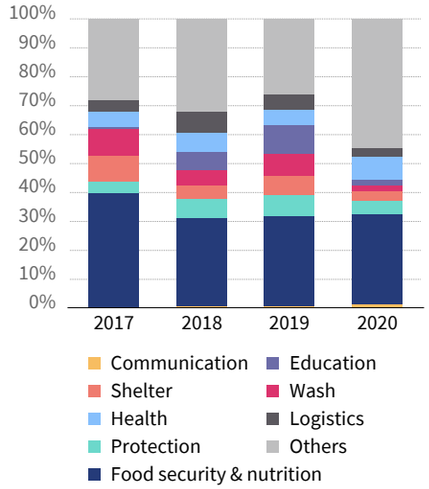
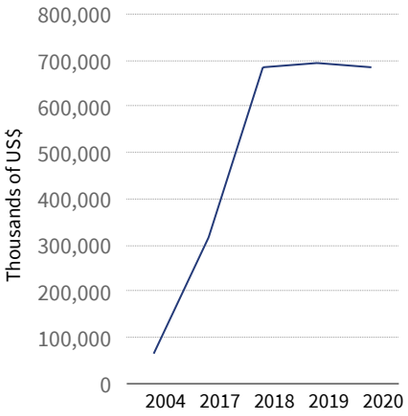


Figure 4-10: Evolution of funding in Cox's Bazar humanitarian response, 2010-2019



Note: 2020 includes COVID-19 funding.
Source: World Bank staff calculation, OCHA.[108]

There is some indicative evidence that the influx of humanitarian and development assistance, together with the presence of workers and staff, has already shaped the local economy in meaningful ways. Air traffic between Cox's Bazar and Dhaka has increased substantially (Box 7); there is increased demand for real estate and accommodation in Sadar; and traffic flows have intensified on the Sadar-Teknaf main road that connects the airport and district headquarters to the camps.

Box 7: Airport activity in Cox's Bazar since the Rohingya influx

The expansion of humanitarian assistance in Cox's Bazar following the 2017 Rohingya influx has been accompanied by an increase in the number of international and domestic staff working with humanitarian and development organizations in the district; a rise in travel back and forth from Dhaka and other international airports; and an increase in associated cargo operations (Table B7-1). This is evidenced in an increase in airport activity in Cox's Bazar. Between 2017 and 2018, passenger traffic at the district's airport increased 111 percent, and the number of passengers traveling on the Dhaka-Cox's Bazar route increased 40 percent (BBS 2019).

[108]Data downloaded from https://data.humdata.org/dataset/e31467b1-0f37-40ea-b5be-558cf8c1b8aa

Table B7-1: Cox's Bazar airport traffic

				Percentage Change		
	Passenger ('000)	Freight/ mail (tonnes)	Air traffic movements	Passenger	Freight mails	Air traffic movements
2014	87	3541	3915			
2015	107	2809	5452	23	-21	39
2016	154	2087	4852	44	-26	-11
2017	256	1676	5688	66	-20	17
2018	539	3834	7131	111	129	25

Source: BBS (2018).

In response to increasing operations, and to support the development of Cox's Bazar, the GoB plans to upgrade the local airport to international status. In 2019, Bangladesh's civil aviation authority began a runway expansion project to accommodate international flights and fully loaded wide-body aircraft. This project complements the construction of an international passenger terminal, which was completed in 2019. [109]

Preliminary analysis using changes in nightlight intensity provides evidence of greater economic activity in markets near the Rohingya camps.[110] There are 34 officially designated growth centers within Cox's Bazar district, of which five are within five kilometers of one of the Rohingya camps (Table 4-4 and Map 4-20). To explore the hypothesis that the expansion in assistance to respond to the Rohingya influx was accompanied by increased demand and activity in local markets, researchers measured changes in monthly nightlight intensity in a 500-meter buffer around growth centers. The points are visualized in Figure 4-14. The dark blue line shows how markets within 5km of a Rohingya camp show more economic activity (proxied by NTL) after the arrival of the Rohingya (dashed vertical line) when compared with markets farther away. The results hold in regression specifications that are summarized in Annex 3. The main finding, which is robust to changes in specification, is that, while markets further away from Rohingya camps also have a positive increase in NTL activity, markets closest to camps (within five kilometers) experience much larger increases. This provides some suggestive evidence of increased local demand and economic activity near Rohingya camps.

[109] http://caab.portal.gov.bd/site/page/748bfeaa-b00a-43f5-9523-39d7d4e169bc. | https://www.thefinancialexpress.com.bd/trade/coxs-bazar-airport-runway-project-underway-1548219691

[110] Nightlight intensity has been shown to have a strong correlation with economic activity and growth (see for example Henderson et al. 2012; Donaldson et al. 2016). This metric has been used in the past to assess the impact of refugees on host community welfare (Alix-Garcia et al. 2018). Data on nighttime lights (NTL) intensity over time from the U.S. National Oceanic and Atmospheric Administration (NOAA) are combined with several additional kinds of data, including growth center locations from the Local Government Engineering Department (LGED); host population location and counts from Facebook's and CIESIN's High Resolution Settlement Layer (HRSL); and recently displaced Rohingya population counts.

Map 4-20: Location of growth centers in Cox's Bazar

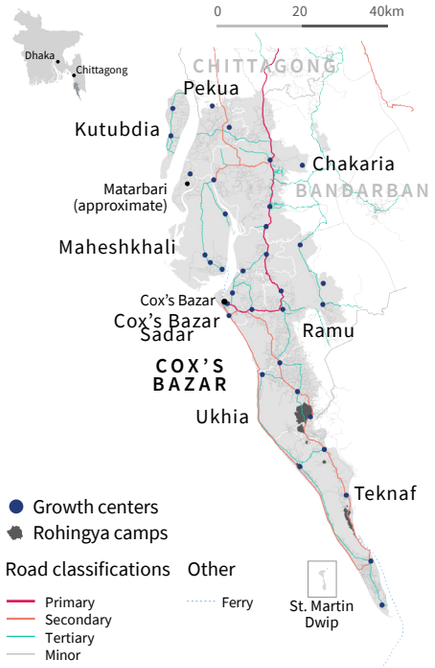
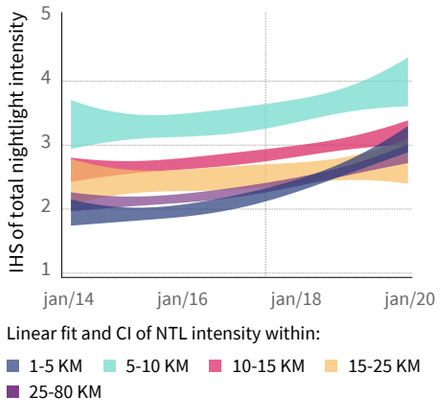


Table 4-4: Growth centers in Cox's Bazar district, by distance from Rohingya camps

Distance from camps	Number of growth centers
5 km	5
5 to 10 km	1
10 to 15 km	2
15 to 25 km	3
25 to 80 km	23
Total in Cox's Bazar	34

Source: World Bank staff calculations based on LGED and population location data.

Figure 4-11: Quadratic fit of monthly nightlight intensity around growth centers over time



Source: Staff calculation using NOAA nightlight intensity.
Note: Vertical line is on August 2017. To reduce variance and include zeros, calculations use the inverse hyperbolic sine (IHS) of total nightlight intensity within the 500-meter buffer around each growth center. Results are consistent using a logarithmic

However, major evidence gaps remain in assessing the local economic impact of the humanitarian economy and its potential to deliver widespread benefits to host communities. These will need to be filled. Specifically, a detailed understanding of changes in economic activity in the district since the influx is needed. It should document the nature and scope of new types of employment opportunities for hosts, focusing on Sadar, Ukhia, Teknaf, and the main road connecting Sadar to the Rohingya camps. The humanitarian effort has already shifted towards greater local integration, including direct investments and programming to promote host community livelihoods and income generation. Efforts have been made to link the assistance given to the Rohingya to spending in local markets supporting local

producers (WFP's farmers' market pilot offers one example). Such initiatives hold promise to boost spending in local markets in the district and generate better incomes for the host community. More work is needed now to quantify the benefits. If in-kind food aid can be procured locally in larger proportions, Bangladeshi producers of cereals, produce, eggs, poultry, and fish can stand to gain. To achieve this, they will need to deliver quality goods at scale.

CHAPTER 5.

Areas for policy action

Policy context, challenges, and opportunities

The district of Cox's Bazar has faced an unprecedented, exogenously driven increase in population density due to the 2017 Rohingya influx. This increase in density is not a natural, endogenously driven outcome signaling agglomeration economies and urbanization benefits. In Bangladesh, the latter forces continue to be concentrated in the megacities of Dhaka and Chittagong and their surrounding areas. Therefore, the local economy of Cox's Bazar district cannot naturally generate (nor should it be expected to) the types of jobs, incomes, or growth that would otherwise accompany such increases in density. The district's potential for inclusive growth continues to be constrained by its lack of integration to the national economy and the latter's growth drivers. The district is also poorly connected with growth sectors in economic terms, with the current economic structure comprising largely of low-productivity services and agriculture. Poor human capital and skills, a business environment that favors older, established, larger firms to the detriment of new, small firms, and barriers to women's economic participation all limit the inclusivity of the current growth model. Consequently, local growth opportunities which leverage the district's natural endowments, such as tourism and aquaculture, remain largely unrealized. Addressing these growth challenges may also pave the way for an additional growth impetus from rising local demand for food and basic necessities to support the Rohingya population, and the increase in accompanying humanitarian assistance.

Cox's Bazar's pre-existing human capital endowments and local economic structure cannot readily manage the increased population density or effectively translate a potential demand impetus into a realized boost in economic activity. A large share of the district's

adult population is illiterate. Poor educational quality and financial constraints combine with other factors to prevent school-age children from attending school and completing their education. Overall, Cox's Bazar's human capital endowment remains poor. The local economy is largely reliant on low-productivity agriculture and services, with a small concentration of manufacturing and large firms in the northern unions. Finally, as noted, the district's promising geographic and economic endowments – for tourism and hospitality or aquaculture, for instance – have not yet been effectively engaged.

The district remains effectively distant and disconnected from the existing forces of growth and income generation in Bangladesh in at least two ways. First, high travel times isolate Cox's Bazar from the growth poles of Dhaka and Chittagong. Existing transport infrastructure and associated costs (including congestion) make it difficult for firms to be based in Cox's Bazar and for local workers to reach jobs outside the district. Within the district, the northern unions around Chakaria have some connectivity with Chittagong, but Teknaf and Ukhia, facing the brunt of the increased population density, will remain largely disconnected even after planned infrastructure upgrades are in place.

Second, the private sector in the district is largely disconnected from the country's growth model, which has relied on export-oriented, labor-intensive manufacturing. The readymade garment industry boom at the national level has largely left Cox's Bazar behind. It is likely that, absent concerted effort, any new growth sectors which emerge in the national economy will do the same. Large conglomerates in Bangladesh, including in the manufacturing sector, are comprised of a few, very large, old, and connected family firms, many of which are based in Dhaka and Chittagong (Genoni et al. forthcoming). Given the existing benefits to agglomeration in these two urban centers, the preferential treatment these firms can obtain through special economic zones (SEZs), and their ability to inhibit the entry of smaller, younger firms, it is unlikely that these firms would readily move to Cox's Bazar. Moreover, fledgling local comparative advantages in Cox's Bazar, say in tourism, will need a policy shift that brings in foreign direct investment to yield benefits at larger scale. A regulatory framework will also need to be in place to ensure that investments in this sector are ecologically sustainable and environmentally friendly. Similarly, for any expansion in the fisheries sector—for example, in shrimp exports—an appropriate policy framework will need to be in place and effectively implemented to allow local industry to meet export standards and certifications. The political economy considerations and competing priorities that have so far limited action in this policy space will need to change for the status quo to shift.

More generally, the majority of Cox's Bazar's small, informal firms are disadvantaged by the challenging business environment at the national level, and limited access to capital, digital technologies, and a skilled labor force. At the national level, new firms, including young, small establishments and investors trying to expand or start their business, are disadvantaged by the barriers to entry and growth and the lack of a level playing field. Access to finance, and reliance on own sources of financing for businesses, are

a major constraint to firms in Cox's Bazar. Beyond the connectivity challenges discussed above, the lack of locally available skilled labor may limit the ability of the economy to effectively leverage promising geographic and economic endowments for tourism, hospitality, or aquaculture. Productive participation in the labor market is limited by low educational attainment, limited access to well-paying jobs, and physical distance from the country's growth poles. These constraints are more binding for women and are compounded by women's unequal access to productive assets, as well as by prevailing norms about women's role and mobility outside the home. Human capital deficits begin early in life. The demographic profile of the district, with a large and growing young population, underscores the need for investments in early childhood and expansion of basic services. If delivered equitably, these investments can address existing deprivations, and set the stage for greater productive potential.

In light of these constraints, and based on the existing evidence base, this report identifies four sets of key growth drivers in the district. These may be classified into major growth drivers, which aim to leverage pre-existing growth opportunities in tourism and aquaculture and ease structural constraints to inclusive growth, and secondary growth drivers, which take advantage of emerging opportunities.

The first major potential growth driver centers around the comparative advantage and natural endowment of the district, i.e., growth opportunities related to tourism, hospitality and aquaculture. Concerted efforts are needed to leverage the natural endowments of the district, while ensuring and promoting ecological sustainability. Activating these growth opportunities will require a conducive business environment to attract investment and foster ecologically sustainable development choices. Investments in connecting and facilitating infrastructure will help develop value chains and linkages with the local economy. The local labor market will not naturally be able to take advantage of these new work opportunities, unless investments are made in building sector-specific skills, in collaboration with the private sector.

The second major growth driver identified in the report is improved connectivity and accessibility within Cox's Bazar, and from the district to the rest of the country. Currently, connectivity within the district and beyond is constrained by congestion, reliance on road transport rather than multiple modes, and limited capacity for high traffic and cargo volumes. Planned infrastructure investments generally continue to focus on expanding connectivity between and to Dhaka and Chittagong, limiting the likely benefits for residents of the district.

Two secondary factors have the potential to shift the growth trajectory of Cox's Bazar, if these opportunities are carefully fostered and linked to the local economy and population. These are the Matarbari energy complex and deep seaport, and international humanitarian and development assistance for the Rohingya response. First, the large-scale, capital-intensive investments planned in and around Matarbari will not naturally

create a large number of jobs, and certainly not for the host community. The energy complex and port will need to be better connected to Cox's Bazar district both physically and in terms of employment potential. This will require careful identification, in collaboration with the private sector, of the skills profiles needed, together with investments in local skills development for jobs in and around the port, including in related value chains such as transport and storage. There is potential to link to the fledgling growth cluster in Chakaria and some northern unions by identifying and fostering forward and backward linkages. Large, export-oriented firms remain unlikely to move a significant share of their operations to Matarbari unless the district (including Sadar upazila) secures the necessary infrastructure to be well connected to international markets and to Dhaka and Chittagong. Beyond investments in airport and road infrastructure, there is a need to upgrade standards in the hospitality sector to support a business clientele, including improved ICT services.

The Rohingya influx has been accompanied by a significant inflow of humanitarian and development assistance to the district. This report has shown evidence of increasing growth near the Rohingya camps, as proxied by the increase in nighttime lights. Indeed, Cox's Bazar is among a limited number of districts in Bangladesh that display some signs of growth in recent years. The increasing share of women in high-exposure areas working in the NGO and related services sector could signal the emergence of new types of work for the host community, generated by the aid economy. These are not necessarily restricted to the areas around the Rohingya camps in Teknaf and Ukhia. It is reasonable to assume that the increased presence of humanitarian workers and organizations in the district will lead to greater demand for housing, office space, transportation services, restaurants, and hospitality services, and for local facilitation such as translation services.

The humanitarian effort has already shifted towards direct investments and programming to promote host-community livelihoods and income generation. Increased efforts are underway to link the assistance given to the Rohingya to spending on local products in local markets. Development interventions by multilateral agencies such as the World Bank are designed to support both host communities and the displaced. By facilitating partnerships between the humanitarian community and government, development agencies can support investments in service delivery and monitoring in the district, while strengthening national systems. Local government institutions need greater capacity in last-mile service delivery and advocacy for local people's needs in development priorities.

Taken together, these findings point to the need for a comprehensive, evidence-based, multi-sector approach to improve inclusive growth and welfare in Cox's Bazar. This includes raising living standards by investing in portable assets such as health and education; removing distortions in the local investment climate; and creating a level playing field for the district's private sector, with access to adequate services and infrastructure. Improving physical and economic connectivity to growth opportunities, while investing in

local people's capacities and skills, will open a wider set of economic opportunities for all in Cox's Bazar. Government can play a critical role in coordinating private, public, humanitarian, and development actors to leverage local growth potential and help capitalize on the district's natural advantages.

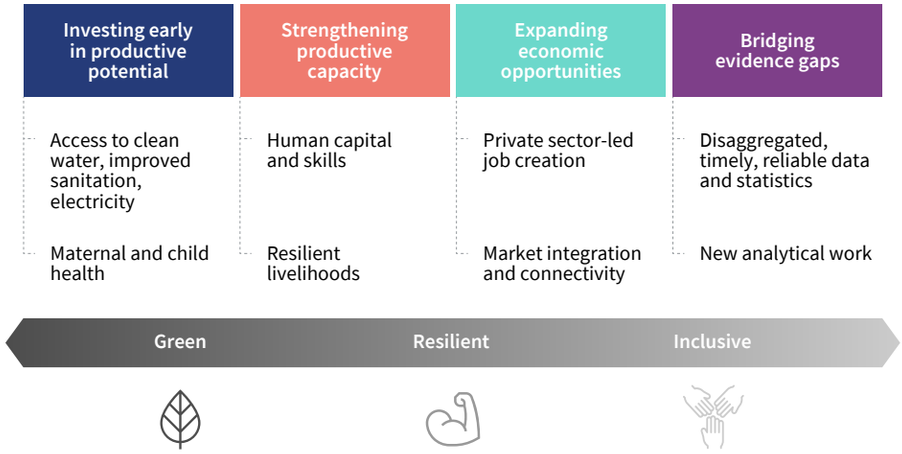
Finally, data and evidence gaps will need to be filled to guide future policy and interventions. Ongoing research is needed to understand: (i) how the local economy is already evolving in response to the Rohingya influx; (ii) sector-specific challenges to growth for the local private sector; and (iii) the potential for humanitarian and development interventions to work at scale to improve the livelihoods of hosts and the displaced.

Policy recommendations

The report's policy recommendations aim to foster inclusive economic growth in local communities through four sets of interventions: (i) foundational, early investments in the productive potential of the district's youngest residents; (ii) strengthening the productive potential of the district's workforce; (iii) expanding opportunities for work and economic participation; and (iv) bridging key evidence gaps. Policy recommendations under points (i), (ii), and (iii) focus on areas where the evidence base is relatively solid: the need for increasing the productive capacity of the population, the range of economic opportunities available, and investing in children early to redress lifelong inequality of opportunity. More generally, these recommendations focus on ways to expand the economic pie and level the playing field so that different groups can access opportunities, achieving a more equitable distribution of the benefits of growth. Finally, there are important data and evidence gaps, particularly related to the implications of the Rohingya influx for service delivery and labor market competition and opportunities, which will need to be bridged to better understand how to orient the policy response.

This chapter uses the Green, Resilient, and Inclusive Development (GRID) framework to organize key policy recommendations. All three elements of the GRID framework are particularly salient for Cox's Bazar district. The district simultaneously faces grave risks from the consequences of climate change and, at the same time, relies on its natural capital and endowment for growth impetus. Environmental sustainability and climate change prevention, mitigation, and adaptation must be central to its development strategy. Building resilience within the population and the economic structure to bear risk and uncertainty will be critical to the sustainability of any growth strategy. Last but not least, inclusion – in terms of access to services, jobs, and productive opportunities – is essential to the effectiveness of any growth strategy, so that the benefits of the latter are widely accessible.

Figure 5-1: Key policy recommendations



Early investments in productive potential

With 40 percent of the district's population made up of children below the age of 15, and half the Rohingya population below the same age, the demographic composition of the local population has important implications for early childhood interventions, maternal and childcare, and access to basic services such as clean drinking water, improved sanitation, and electricity. With such a large young population, relevant interventions will benefit many. Investing early in children has been shown to have major benefits over the lifetime. Moreover, such investments are strategic, because they address inequality of opportunity at birth and can set the foundations for a more productive and inclusive future.

Access to clean water, improved sanitation, and electricity

- Inclusive – Expand access to private sources of clean water and reduce reliance on shared sources, particularly in host communities close to Rohingya camps.
- Inclusive – Broaden access to improved sanitation facilities across the district.
- Inclusive – Increase water, sanitation, and hygiene (WASH) investments in camps to reduce reliance on shared facilities. Within camps, overcrowding and poor sanitation and housing conditions, including a reliance on shared facilities, remain a concern from a public-health perspective, particularly in the context of the COVID-19 pandemic.
- Inclusive – Promote investments in distribution and transmission capacity to increase the number of hours of grid electricity across the district, and particularly in host communities close to camps.

- Green – Invest in solar and wind-based energy generation to expand access to electricity. Improve coordination between international organizations and local government to expand programs and subsidies to increase the use of solar panels.
- Resilient – Modify the scheme of national electricity prices to achieve a cost recovery rate, which is essential to the sustainability of the system.
- Resilient – Strengthen local government mandates, allowing community preferences to be reflected in budget allocations and expenditures, particularly outside Municipal and City Corporations.
- Resilient – Strengthen links and communication between local government entities and humanitarian agencies to better align resource use with local needs. Stronger links between local government entities and humanitarian agencies could help better align resource flows with local needs. A robust social contract connecting the state, non-state actors, business, and local government institutions is essential to improve service delivery in Cox's Bazar. Improved service delivery would benefit tourism and local trade and ultimately boost the national economy.

Maternal and child health

- Resilient – Expand nutritional programs among hosts, including early detection of child malnourishment and programs in good nutrition practices for young mothers. Bolster awareness and adherence to vaccinations, along with pre- and post-natal care. This will increase resilience among vulnerable host households in the context of COVID-19 in the short term, and of undernourishment in the medium term.
- Inclusive – Increase coordination between humanitarian actors and local government to expand nutritional programs already present in camps to host communities to guarantee access to basic nutrients for children.
- Inclusive – Expand social assistance support to female-headed households, particularly those headed by young mothers, so that they do not have to trade off caring for young children and earning a living.
- Inclusive – Expand programs to close immunity gaps among children living in camps and protect against future infectious outbreaks through scale-up and strengthening of routine immunization services. Despite repeated vaccination campaigns, immunity gaps persist among children living in camps. This is particularly true of diseases like diphtheria, which require serial vaccinations to achieve maximum protection (Feldstein et al. 2020). There is a need to close immunity gaps and protect against future outbreaks by expanding and strengthening routine immunization.

Strengthening productive capacity

Low educational attainment and persistent gender gaps in outcomes remain a concern for policy action. Tertiary education is still limited, especially for women and poor households. Opportunities exist to tackle economic constraints that make it difficult for low-income families to finance education expenses. Doing so may improve education indicators

for both females and males. Out-of-pocket expenditures on uniforms, tuition, books, and transport make up a substantial proportion of necessary education costs for households. This suggests that, by itself, a no-fee policy for public schools may not suffice to eliminate financial constraints on education. Closing the gender gap might require a longer process, considering that social norms discouraging female education are deeply rooted. Along with access, the quality of education will also need to be improved to promote better learning outcomes and build skills in demand in the private sector.

At the same time, given the district's high exposure to climate and environmental risk, together with local people's limited ability to absorb risk, investing in households' capacity to mitigate and manage risk will be important for income generation and livelihoods diversification. Agricultural incomes will remain central to livelihoods and welfare in the district. Currently, heavy reliance on rice cultivation runs counter to the district's agroecological advantages but is consistent with the more favorable policy environment for rice. Complementary investments to increase agricultural productivity outside of rice could promote a more diversified cropping pattern, including higher-value crops. As the latter are likely to be perishable, mitigating risks associated with such diversification will be essential for the strategy to bear fruit.

Human capital and skills

- Inclusive – Provide (pro-poor) scholarships to women and economically disadvantaged students at secondary and higher level (Bhatta et al. 2019).
- Inclusive – Conditional cash transfers may be targeted to areas and social groups with lower educational attainment and higher risk of dropping out – including children in high-exposure areas, girls, and teenagers.
- Inclusive – Strengthen measures to enhance the quality of the school learning environment and improve the teacher-student ratio. These steps can boost the quality of education and reduce dropouts.
- Inclusive – Pilot and expand implementation of the Myanmar curriculum for Rohingya children in camps, while easing mobility and safety concerns to increase enrollments. Provide incentives to keep young adolescents and youth enrolled in school. Gradually increase the number of grades of education with minimum quality standards and trained educators, continue nutrition support programs, and expand school feeding. Implement education certification for primary and secondary school completion.
- Inclusive – As the crisis transitions to the next phase, humanitarian and development organizations, as well as the GoB, need to consider how education and vocational programs can be more inclusive of host community and Rohingya youth. The best solutions may link youth-focused programs to productive opportunities for work.
- Inclusive – More generally, the education system may not currently be geared to invest in market-relevant skills for the local labor market, particularly tourism and hospitality-related services, as well as the international labor market. Development partners and multilateral agencies can support the GoB by incorporating

private-sector engagement and input into their own programming and operations focused on skills, training, and employment. This way, partners will better understand the actual demand for skills and be able to design more appropriate programs. Employment-oriented skills and vocational training, particularly for younger cohorts of better-educated labor market entrants, may need to be specifically designed for and driven by private-sector entities involved in:

  - Infrastructure mega-projects, including the planned Matarbari deep seaport and energy hub
  - Special economic zones in Maheshkhali
  - Tourism and hospitality services
- Resilient – From a medium-term perspective, investing in market-relevant skills for migrants can also boost the potential of migration as a driver for improved welfare, reducing the pressure on local labor markets.
- Inclusive – There is a clear need for psychosocial support to Rohingya youth and adolescents, expanded access to and awareness of sexual and reproductive health services, and continued support to survivors of sexual and gender-based violence and trauma.
- Inclusive – Services must be designed to fully cover current cohorts of children and deliver missed vaccine doses to older children. More generally, given risk factors and living conditions in camps, a system for continuous real-time health surveillance is needed in the medium term.
- Inclusive – Implement the already-designed pilot initiative to provide secondary education for grades 6 to 9 in Myanmar language. This will expand access to education for secondary school-aged adolescents. Overall, longer-term policy dialogue would need to address such issues as: (i) limited supply of trained teachers and spaces for learning centers; (ii) consistency of funding; (iii) cultural restrictions that discourage adolescent girls from attending school; and (iv) skills development and opportunity to engage youth in the Rohingya camps.
- Inclusive – Adopt the Learning Passport model to formalize GoB commitment to extend curriculum and develop inclusive, quality education and skills-development for adolescents and youth. The development partnership is based on a Rohingya Education Response Plan, endorsed by the major partners.
- Inclusive – Expand the World Bank's Reaching Out-of-School Children (ROSC II) project. So far, around 314,926 children and youth are studying at 3,236 Learning Centers in 32 camps, based on an agreed Learning Competency Framework and Approach (LCFA) known as GIEP (Guideline on Informal Education Program).

Resilient livelihoods

- Resilient – Financial and insurance instruments need to evolve, if they are to be meaningful sources of credit and insurance.
  - Reliance on property as collateral makes it harder for small farmers and micro and small enterprises to access credit. This especially affects women and landless

households. Expanding the collateral registry's mandate to include movables and immovables as collateral will help expand access to credit.
    - Another key constraint is the lack of access to insurance instruments, particularly weather-risk insurance, which is salient for Cox's Bazar.
- Green – From a medium-term perspective, better environmental and forest management is critical to managing risk in Cox's Bazar. Fuelwood is the single greatest source of household energy for hosts and initially also for the Rohingya, which led to increasing deforestation. Subsequently, the humanitarian effort has expanded access to alternative energy sources in camps, but hosts continue to rely on traditional sources such as fuelwood.
- Green – The climate and topography of Cox's Bazar mean local communities are exposed to multiple natural hazards and experience recurring extreme weather events. Vulnerable Bangladeshi communities in the district have long borne the brunt of cyclones, landslides, and flash floods. The Rohingya crisis has increased the size of the population at risk and is creating new risks due to deforestation, hill-cutting, and pressure on infrastructure. Ongoing efforts need to be supplemented by medium-term responses to increase the resilience of local communities. For instance, the Delta Management Plan points out the need to extend and improve cyclone shelters and strengthen anti-flood embankments.
- Resilient – Climate change and the increasing number of extreme weather events will require farmers to change or adapt their current cropping systems, as well as their fisheries activities. Complementary to policies to enhance crop diversification and income generation, actions are needed to improve resilience in the agricultural sector. Examples include:
    - Developing field trials of climate-resilient cropping patterns and associated water management systems
    - Introducing technologies to adapt aquaculture activities, given increasing salinity in marine fisheries.
- Green – Cox's Bazar has an opportunity to invest in new renewable energy sources to boost the reliability and quality of electricity access, transition to a cleaner energy mix, and reduce costs. Options include using small-scale grids to expand access to remote and marginal areas; leveraging wind and solar energy sources; and limiting households' reliance on firewood by investing in improved cookstoves.[111]
- Resilient – Implement the Emergency Multi-Sector Rohingya Crisis Response (EMRCR) and Safety Net System for Poorest (SNSP) projects, both of which have components that address the economic and social resilience of the vulnerable through their engagement in community services and workfare schemes. Under these schemes, Rohingya households will participate in subprojects and activities intended to: enhance community services for the vulnerable (including at-risk youth, women, disabled persons, and the elderly); strengthen engagement mechanisms

[111] For case studies in refugee camps, see the 2019 IFC report "Private Sector & Refugees: Pathways to Scale."

(through mobilization, outreach, and grievance-redress activities); contribute to climate and environmental risk mitigation; improve camp living conditions through cleaner environments; and prevent anti-social behavior.
- Resilient – Specific policy recommendations from the Bangladesh Rural Income Diagnostic (Genoni et al. forthcoming) may be particularly relevant, including:
    - Review and reform input subsidies policies with a special focus on fertilizers, while complementing with extension services to promote more efficient use of fertilizers. These actions could help lift two important constraints to reducing yield gaps at the farm field, especially for Boro paddy: (i) the overuse and imbalanced use of fertilizer, resulting in declining soil fertility; ii) inadequate farm knowledge and practices.
    - Expand use of mechanization for seed establishment, crop protection, irrigation (particularly high-efficiency irrigation technologies), and harvesting operations. Evidence on constraints affecting agriculture mechanization is outdated. Revisiting government subsidy and trade policies in setting incentives for investment can be important.
    - Improve irrigation systems. In Cox's Bazar, tube well systems cover only 21 percent of irrigated land, while 69 percent is irrigated with power pumps, and 10 percent still relies on traditional irrigation methods (BBS 2018c). The lack of irrigation may limit investments in alternative crops such as betel nut and leaf, which yield a higher return per unit of area cultivated than rice. The district appears to have an agroecological advantage in the crop, but it also needs frequent watering and fertilizer application, which may limit its adoption. Slopes are better suited for betel cultivation, so an expansion may not need to be at the cost of rice cultivation, but deforestation risks will have to be carefully managed.

Expanding economic opportunities

National-level constraints to firm growth and job creation are even more salient in Cox's Bazar. These include lack of access to finance, limited technology adoption, and the need to upgrade firm and entrepreneur capabilities. The lack of a level playing field and fair, transparent regulatory regime has long posed a challenge to small- and medium-scale enterprises. Growth has hitherto been led by the export-oriented readymade garment industry, which has benefited from export processing zones and special industrial zones with guaranteed access to necessary infrastructure and a streamlined regulatory environment. Cox's Bazar is a case in point, where the absence of a vibrant RMG industry is accompanied by a relatively stagnant private sector and few alternative sources of dynamism and job creation. The high degree of informality and the dominance of very small 1-2 person enterprises also exemplify the constraints to growth and the limited perceived benefits of formalization. Most enterprises appear to be involved in secondary or subsistence activities to complement household income, rather than entrepreneurial activities. Policy action will be needed to ensure that the private sector in Cox's Bazar has a level playing field and can take advantage of existing and emerging growth opportunities.

There is significant potential to expand the local multiplier effect of humanitarian assistance in Cox's Bazar. Doing so can boost local incomes and livelihoods for hosts, while improving sustainability and reducing the costs associated with delivering assistance. A new approach to the Rohingya response can provide hosts and the displaced with enhanced services and economic opportunities, while strengthening links with national and local government institutions.

Finally, there is a clear need to invest in upgrading the transport network to foster effective connectivity within Cox's Bazar and between the district and Bangladesh's main growth centers. These are even more important to ensure broad access to basic services, and to foster backward and forward linkages of new growth opportunities within the local economy.

Firm growth and private sector-led job creation

- Resilient/Green – Promote foreign direct investment in tourism and hospitality. Concerted effort is needed, including in marketing and environmentally sustainable tourism infrastructure and planning, if the potential of this sector is to be realized.
- Resilient – Upgrade infrastructure and ICT services for the international business clientele.
- Resilient – Fishing and aquaculture development could be fostered, if complementary investments are made to facilitate storage, transport, marketing, and quality and standards assurance and certification. Relatedly, there is potential to develop the Vannamei shrimp variety, which is less prone to disease than the dominant tiger shrimp variety, but this would require international certification (IFC 2020).
- Resilient – More generally, realizing the potential of aquaculture, particularly as an export-oriented growth sector, will likely require a comprehensive approach. This may include bringing in foreign investment and expertise; establishing clear standards and implementing them uniformly; expanding access to technological know-how; providing certification facilities; and vertical integration or cooperatives to expand the effective scale, market access, and investment ability of the numerous small producers in the sector.
- Inclusive – Chakaria and the surrounding northern unions could emerge as a hub for non-agricultural economic activity based on their current comparative advantage, conditional on resolving connectivity challenges.
- Inclusive – Services are a potential source for additional self-employment, particularly among the better educated. Business and vocational skills programs may help foster some of these nascent activities.
- Inclusive – Build backward and forward linkages with the Matarbari investments and international humanitarian and development efforts.
- Inclusive – The Emergency Multi-Sector Rohingya Crisis Response (EMRCR) and Safety Net System for Poorest (SNSP) projects have developed community workfare schemes. These programs aim at reducing the likelihood of at-risk youths' participation in anti-social behavior by engaging them in workfare on basic infrastructure maintenance, as well as camp cleaning and maintenance activities. The

infrastructure work is designed to help reduce climate vulnerability and disaster risks. Engaging working-age youth can contribute towards improved mental and emotional wellbeing through participation in labor-intensive activities that also serve to enhance camp livability.

- Inclusive – Expanding the share of locally sourced and procured food assistance delivered in Rohingya camps is more cost effective and allows for a diversification of the food basket for the Rohingya. Equally importantly, it creates a potentially large source of demand for agricultural products in the local market. This is particularly true for seasonal and perishable produce and can provide an important boost for local livelihoods. WFP has already made a number of changes in this regard, which should be pursued once COVID-19-related restrictions are lifted. Development assistance in Cox's Bazar could also incentivize implementing agencies and service providers to expand the use of locally sourced products and hire qualified local personnel.
- Inclusive – The reliance of the Rohingya on assistance can be a source of significant and relatively consistent demand for locally produced food and non-food items. For the host community, a larger local market reduces transaction costs and the costs of marketing for perishable products. This can enable diversification and encourage farmers to invest returns in productive improvements.
- Resilient – The private sector can be engaged in humanitarian assistance. Firms may share technological capabilities and expertise, adapt business models to sell goods and services to the Rohingya, and integrate into value chains by working with both host community and Rohingya enterprises (IFC 2019).
- Inclusive - Bangladesh's pioneering role with micro-finance opens the door to explore pioneer micro-leasing of productive assets. This could potentially be combined with more attention to platform economies (such as Uber), which have the potential to unite the supply by many small/micro businesses, for instance to create access to export markets for firms that would otherwise be too small to access such sophisticated markets.

Market integration and connectivity

- Inclusive – Connectivity investments focused on upgrading existing networks will be important. These can reduce the cost of accessing jobs, inputs, and markets for local people and firms. They can also better connect the southern parts of the district to the more economically vibrant northern unions.
- Resilient – Well-documented national-level logistics constraints are equally important in Cox's Bazar. Priority issues include:
  - The policy and regulatory framework on infrastructure development should expand to encompass integrating multiple modes of transport, improving the quality of services, and improving road safety.
  - Logistics services markets will benefit from a more level playing field and greater competition among industry players.

  - Road cargo transport remains critical for domestic and international trade linkages. Important agendas include increasing capacity to track and monitor shipments, ensuring that trucks meet quality and safety standards, and ensuring that trucks are appropriately loaded. These actions will help optimize investments in transport infrastructure and reduce logistics costs at ports and major trade hubs.
- Inclusive – Expanding access to and quality of digital infrastructure in the district through fiber-optic infrastructure, 4G capacity expansion, and telecom towers will be particularly important, if Cox's Bazar is to leverage new growth opportunities.
- Inclusive – There is a need for a comprehensive policy agenda to expand the coverage, access, and use of digital technologies by households, firms, and farms. If successful, the agenda can increase these actors' potential access to markets, enhance their capacity to manage risks, and ultimately boost their productivity and income-generation capacity.

Bridging evidence gaps

- Investments in data and evidence are needed to assess how the local labor market is evolving in response to the aid economy and seize emerging opportunities. A second phase of the present diagnostic work will attempt to fill some of the gaps and identify locally binding constraints to firm entry, growth, and dynamism. In addition to identifying current and potential channels for the growth of businesses and jobs linked to the assistance economy, data and evidence are needed to quantify the job creation related to government, humanitarian, and development investments in the district.
- While there is some suggestive evidence of increased economic activity around camps, more data and evidence are needed to understand how the influx of humanitarian assistance has affected local host communities: for example, by potentially increasing competition for low-skill jobs, while also providing new work and income-earning opportunities for hosts, including better-educated youth.
- More work is needed to confirm whether Cox's Bazar truly has a comparative advantage in salt extraction and what scope there is to promote this activity.
- Given the generally low education and skill levels of the Rohingya, there may be opportunities to expand their engagement in labor-intensive activities in farming, construction, and environmental restoration in or near camps, without creating local competition. New data collection and analytical work can help understand the scope for these types of activities.
- Analysis finds suggestive evidence of higher male dropouts in tertiary education in areas of high exposure to Rohingya camps. More work is needed to assess if this reflects more local job opportunities in the camp and humanitarian-aid economy for relatively well-educated hosts. While dropping out of school for these types of aid-economy jobs may make economic sense in a context of low returns to education, the sustainability of these jobs is an open question.
- Pressure from domestic tourism and the influx of humanitarian assistance in the district pose pressures for the delivery of urban services, including solid waste management and sanitation. More work is needed to generate evidence for an appropriate policy response.
- The weak mandates of local governments limit the degree to which community preferences are reflected in budget allocations and expenditures, particularly outside Municipal and City Corporations. The limited ability to disaggregate public expenditure data to different sub-national levels constrains analysts' capacity to correlate expenditures with outcomes. Understanding the efficiency and efficacy of public expenditures is critical to bridge gaps in achieving the Sustainable Development Goals (SDGs). This applies across Bangladesh's districts and regions, and across upazilas and unions within districts. Efforts to address the SDG challenge will need to be based on intra- and inter-regional comparisons.

References

ADB (Asian Development Bank). 2016. “Proposed Multitranche Financing Facility and Technical Assistance Grant People’s Republic of Bangladesh: South Asia Subregional Economic Cooperation Chittagong-Cox’s Bazar Railway Project. Phase 1.” Mandaluyong City, Philippines: ADB.

Ahmed, Dr Munir, Nazrul Islam, and Md Shamsuddoha. 2007. “Value Chain Analysis in the Dry Fish Production and Marketing of Post Harvest Fishery Products (PHFP) in the Coastal Belt of Bangladesh.”

Ahmed, Faizuddin, et al. 2010. Poverty maps of Bangladesh 2010 (Vol. 2). Technical report. Washington, DC: World Bank Group.

Ainul, Sigma, Iqbal Ehsan, Eashita Haque, Sajeda Amin, Ubaidur Rob, Andrea Melnikas, and Joseph Falcone. 2018. *Marriage and Sexual and Reproductive Health of Rohingya Adolescents and Youth in Bangladesh: A Qualitative Study.* Population Council.

Alam, Akhtar, Peter Sammonds, and Bayes Ahmed. 2019. “Cyclone Risk Assessment of the Cox’s Bazar District and Rohingya Refugee Camps in Southeast Bangladesh.” *Science of the Total Environment 704,* Article 135360. 10.1016/j.scitotenv.2019.135360.

Alix-Garcia, J., E. Artuc, and H. Onder. 2017. “The Economics of Hosting Refugees: A Host Community Perspective from Turkana.” Working paper. World Bank, Washington, DC. https://openknowledge.worldbank.org/handle/10986/26269

Alix-Garcia, Jennifer, Sarah Walker, Anne Bartlett, Harun Onder, and Apurva Sanghi. 2018. “Do Refugee Camps Help or Hurt Hosts? The Case of Kakuma, Kenya.” *Journal of Development Economics* 130(C):66–83.

Anderson, Siwan, and Mukesh Eswaran. 2009. “What Determines Female Autonomy? Evidence from Bangladesh.” *Journal of Development Economics* 90(2):179–91.

Barker, Vincent L., and George C. Mueller. 2002. "CEO Characteristics and Firm R&D Spending." *Management Science* 48(6):782–801.

BBS (Bangladesh Bureau of Statistics). 2010. "Census of Agriculture 2008." Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

-----. 2013. "District Statistics 2011. Cox's Bazar." Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

-----. 2015. *Population Projection of Bangladesh: Dynamics and Trends 2011-2061.* Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

-----. 2018a. "Report on Agriculture and Rural Statistics 2018. Agriculture and Rural Statistics Survey (ARSS) Project 2017." Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

-----. 2018b. "The National Student Assessment 2017. Grade 3 and 5." Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

-----. 2018c. "Yearbook of Agricultural Statistics 2017." Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

-----. 2019. "Statistical Yearbook Bangladesh 2018." Dhaka: Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

BBS and UNICEF (Bangladesh Bureau of Statistics and United Nations Children's Fund). 2015. "Multiple Indicator Cluster Survey 2012– 2013." Dhaka, Bangladesh: BBS.

Beck, T. A., A. Demirguc-Kunt, and V. Maksimovic. 2002. *Financing Patterns around the World: The Role of Institutions.* Washington, D.C.: World Bank.

Bhatta, Saurav Dev, Maria Eugenia Genoni, Uttam Sharma, Buyant Erdene Khaltarkhuu, Laura Maratou-Kolias, and T. M. Asaduzzaman. 2019. "Bangladesh Education Sector Public Expenditure Review." Dhaka, Bangladesh: Government of the People's Republic of Bangladesh.

Bhattacharjee, Amitab, Mohammad Rashed Hasan Polas, and Lutfor Rahman. 2018. "Challenges and Prospects of Tourism in Cox's Bazar: An Empirical Study."

Black, Robert E., Cesar G. Victora, Susan P. Walker, Zulfiqar A. Bhutta, Parul Christian, Mercedes de Onis, Majid Ezzati, Sally Grantham-McGregor, Joanne Katz, Reynaldo Martorell, and Ricardo Uauy. 2013. "Maternal and Child Undernutrition and Overweight in Low-Income and Middle-Income Countries." *The Lancet* 382(9890):427–51. doi: 10.1016/S0140-6736(13)60937-X.

Blankespoor, Brian, M. Shahe Emran, Forhad Shilpi, and Lu Xu. 2018. "Transport Costs, Comparative Advantage, and Agricultural Development: Evidence from Jamuna Bridge in Bangladesh." SSRN Electronic Journal 10.2139/ssrn.3176160.

Blankespoor, Brian, and Nobuo Yoshida. 2010. "Accessibility Methodology Bangladesh." Washington, DC: World Bank.

Bloom, Nicholas, and John Van Reenen. 2010. "Why Do Management Practices Differ across Firms and Countries?" *Journal of Economic Perspectives* 24(1):203–24.

Corna, Francesca, Fahmida Tofail, Mita RaniRoy Chowdhury, and Cécile Bizouerne. 2019. "Supporting Maternal Mental Health of Rohingya Refugee Women during the Perinatal Period to Promote Child Health and Wellbeing: A Field Study in Cox's Bazar." *Intervention* 17(2):160. doi: 10.4103/INTV.INTV_28_19.

Deichmann, U. 1997. "Accessibility Indicators in GIS." New York: United Nations, Statistics Division, Department for Economic and Social Information and Policy Analysis.

Delmelle, Elizabeth Cahill, and Irene Casas. 2012. "Evaluating the spatial equity of bus rapid transit-based accessibility patterns in a developing country: the case of Cali, Colombia." Transport Policy 20(C): 36-46.

Department of Fisheries Bangladesh. 2017. "Yearbook of Fisheries Statistics Of-Bangladesh 2015-2016." Dhaka, Bangladesh: Government of the People's Republic of Bangladesh.

Donaldson, Dave. 2018. "Railroads of the Raj: Estimating the Impact of Transportation Infrastructure." **American Economic Review** 108(4–5):899–934.

Ellis, Peter, and Mark Roberts. 2016. "Leveraging Urbanization in South Asia: Managing Spatial Transformation for Prosperity and Livability." Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/22549

FAO (Food and Agriculture Organization of the United Nations). 2019. "FAO Fisheries Sector Support Programme." Rome: FAO.

Farag, Hisham, and Chris Mallin. 2018. "The Influence of CEO Demographic Characteristics on Corporate Risk-Taking: Evidence from Chinese IPOs." *The European Journal of Finance* 24(16):1528–51.

Farole, Thomas, and Yoonyoung Cho. 2017. "Job Diagnostic Bangladesh." Washington, DC: World Bank.

Feldstein, L.R., S.D. Bennett, C.F. Estivariz, G.M. Cooley, L. Weil, et al. 2020. "Vaccination coverage survey and seroprevalence among forcibly displaced Rohingya children, Cox's Bazar, Bangladesh, 2018: A cross-sectional study." PLOS Medicine 17(3): e1003071. https://doi.org/10.1371/journal.pmed.1003071

Filipski, Mateusz J., Gracie Rosenbach, Ernesto Tiburcio, Paul Dorosh, and John Hoddinott. 2020. "Refugees Who Mean Business: Economic Activities in and around the Rohingya Settlements in Bangladesh." *Journal of Refugee Studies* feaa059. doi: 10.1093/jrs/feaa059.

Fox, William F., and Balakrishna Menon. 2008. *Decentralization in Bangladesh: Change Has Been Elusive.* Paper 0829. International Center for Public Policy, Andrew Young School of Policy Studies, Georgia State University.

Gautam, Madhur, and Rashid Faruqee. 2016. *Dynamics of Rural Growth in Bangladesh: Sustaining Poverty Reduction.* Washington, DC: World Bank.

Genoni, Maria Eugenia. forthcoming. "Survey Design and Sampling: A Methodology Note for the 2019 Cox's Bazar Panel Survey." Washington, DC: World Bank.

Genoni, Maria Eugenia, Saurav Dev Bhatta, Uttam Sharma, Buyant Erdene Khaltarkhuu, and Laura Maratou-Kolias. 2019. "Equity in Education Outcomes and Spending In Bangaldesh." In *Bangladesh Poverty Assessment. Facing old and new frontiers in poverty reduction. Volume II.* Washington, DC: World Bank.

Genoni, Maria Eugenia, Madhur Gautam, Mansur Ahmed, and Pablo Tillan. Forthcoming. "Rural Income Diagnostic. Enabling Faster and More Equal Income Growth in Rural Bangladesh." Washington, DC: World Bank.

Germanwatch. 2020. "Global Climate Risk Index 2020." Retrieved (https://germanwatch.org/en/cri).

GFDRR (Global Facility for Disaster Reduction and Recovery). 2018. "Rohingya Crisis 2017-2018. Draft Rapid Impact, Vulnerability and Need Assessment." Washington, DC: GFDRR.

GoB (Government of Bangladesh). 2005. "Rural Road Master Plan 2005." Dhaka, Bangladesh: Government of the People's Republic of Bangladesh.

Geurs, Karst, and Bert Wee. 2004. "Accessibility evaluation of land-use and transport strategies: Review and research directions." Journal of Transport Geography 12: 127-140. 10.1016/j.jtrangeo.2003.10.005.

Gordon, Eleanor, Hannah Jay, and Katrina Lee-Koo. 2018. "Adolescent Rohingya Girls in Bangladesh: One Year On." Policy brief. Clayton, Australia: Plan International/Monash University. http://docs.wixstatic.com/ugd/b4aef1_5c13068eb067467587b7a2420bc6ecad.pdf

Goswami, Grover, D. Medvedev, and E. Olafsen. 2019. *High-Growth Firms: Facts, Fiction, and Policy Options for Emerging Economies.* Washington, DC: World Bank.

Guglielmi, Silvia, Nicola Jones, Jennifer Muz, Sarah Baird, Khadija Mitu, and Muhammad Ala Uddin. 2020. "'How Will My Life Be?': Psychosocial Well-Being among Rohingya and Bangladeshi Adolescents in Cox's Bazar." London: GAGE.

Haltiwanger, J., R. S. Jarmin, and J. Miranda. 2013. "Who Create Jobs? Small versus Large versus Young." *Review of Economics and Statistics* 95(2):347–61.

Haltiwanger, John, R. S. Jarmin, R. Kulick, and J. Miranda. 2017. "Contribution to Job, Output, and Productivity Growth." Pp. 11–62 in *Measuring Entrepreneurial Businesses: Current Knowledge and Challenges, National Bureau of Economic Research Studies in Income and Wealth.* Chicago: University of Chicago Press.

Hasan-ul-Bari, S. M., and Tarek Ahmed. 2018. "Ensuring Sexual and Reproductive Health and Rights of Rohingya Women and Girls." *The Lancet* 392(10163):2439–40. doi: 10.1016/S0140-6736(18)32764-8.

Hassan, Mohammad Mehedy, Audrey Culver Smith, Katherine Walker, Munshi Khaledur Rahman, and Jane Southworth. 2018. "Rohingya Refugee Crisis and Forest Cover Change in Teknaf, Bangladesh."

Henderson, J. Vernon, Adam Storeygard, and David N. Weil. 2012. "Measuring Economic Growth from Outer Space." *American Economic Review* 102(2):994–1028. doi: 10.1257/aer.102.2.994.

Herrera Dappe, Matias, Charles Kunaka, Mathias Lebrand, and Nora Welsskopf. 2020. "Moving Forward Connectivity and Logistics to Sustain Bangladesh's Success." Washington, DC: World Bank.

Hill, Ruth, and Maria Eugenia Genoni. 2019. "Bangladesh Poverty Assessment. 'Facing Old and New Frontiers in Poverty Reduction.'" Washington, DC: World Bank.

Hussain, Imran Bin, and Nobel Mallick. 2017. "Changes of Land Use with Urban Growth - A Study on Cox's Bazar, Bangladesh." *International Journal of Scientific & Engineering Research* 8(4):6.

IFC (International Finance Corporation). 2019. *Private Sector and Refugees. Pathways to Scale.* Washington, D.C: International Finance Corporation.

-----. 2020. *Bangladesh Country Private Sector Diagnostic. Creating Market in Bangladesh. Unleashing the Private Sector to Sustain Development Success.* Washington, D.C: World Bank.

IOM (International Organization for Migration). 2018. "Rapid Mental Health and Psychosocial Needs Assessment." Geneva: IOM.

IOM and ACAP. 2020. "Different and Unequal. How COVID-19 Affects Different Sex, Age, Ability and Populations Differently." Geneva: IOM.

ISCG (Inter Sector Coordination Group). 2017. "Situation Report: Cyclone Mora." Cox's Bazar, Bangladesh: ISCG.

JICA (Japan International Cooperation Agency). 2016. "Preparatory Survey on the Cross-Border Road Network Improvement Project. Final Report." Dhaka, Bangladesh: JICA.

-----. 2018a. "Preparatory Survey on the Matarbari Port Development in People's Republic of Bangladesh. Volume 1." Dhaka, Bangladesh: JICA.

-----. 2018b. "Preparatory Survey on the Matarbari Port Development in People's Republic of Bangladesh. Volume 3." Dhaka, Bangladesh: JICA.

Jovanovic, Boyan. 1982. "Selection and the Evolution of Industry." *Econometrica* 50(3):649–70.

Kaur, Rupinder, and Balwinder Singh. 2018. "CEO Characteristics and Firm Performance: A Study of Indian Firms." *Indian Journal of Corporate Governance* 11(2):185–200.

Kersten, Renate, Job Harms, Kellie Liket, and Karen Maas. 2017. "Small Firms, Large Impact? A Systematic Review of the SME Finance Literature." *World Development* 97(C):330–48.

Khan, Niaz Ahmed. 2016. "Challenges and Trends in Decentralised Local Governance in Bangladesh." *ISAS Working Papers* 222:19.

Kyungmi, Kim, Uysal Muzaffer, and Joseph Sirgy. 2013. "How Does Tourism in a Community Impact the Quality of Life of Community Residents?" *International Journal of Tourism Management* 36:527–40.

Lemma, Alberto Francesco, Maria Quattri, Jessica Hagen-Zanker, Selim Raihan, and Abu Eusuf. 2018. "Bangladesh Economic Dialogue on Inclusive Growth." EDIG Research Reports No. 4, "Strategies for Inclusive Growth in Cox's Bazar" (4):68.

Lopez-Pena, Paula, C. Austin Davis, A. Mushfiq Mobarak, and Shabib Raihan. 2020. "Prevalence of COVID-19 Symptoms, Risk Factors, and Health Behaviors in Host and Refugee Communities in Cox's Bazar: A Representative Panel Study." Policy Brief. New Haven, CT: Yale Y-RISE. http://yrise.yale.edu/prevalence-of-covid-19-symptoms-risk-factors-and-health-behaviors-in-host-and-refugee-communities-in-coxs-bazar-a-representative-panel-study/

Magoutas, A., G. Agiomirgiannakis, and T. Papadogonas. 2011. "Education and firm performance: Empirical evidence from Greece." *International Journal of Economic Research,* 8 (2), 141-152.

Mahmud, Shakil. 2018. "Frozen Foods: Emerging Influential Export Earning Sector for Bangladesh."

Malhotra, M., Y. Chen, A. Criscuolo, Q. Fan, I. Hamel, and Y. Savchenko. 2007. *Expanding Access to Finance: Good Practices and Policies for Micro, Small and Medium Enterprises.* Washington, D.C: World Bank.

Mathon, D., P. Apparicio, and U. Lachapelle. 2018. "Cross-border spatial accessibility of health care in the North-East Department of Haiti." Int J Health Geogr 17, 36. https://doi.org/10.1186/s12942-018-0156-6

Ministry of Environment and Forest, UNDP, and UN WOMEN. 2018. "Environmental Impact of Rohingya Influx." Dhaka, Bangladesh: Ministry of Environment and Forest, Government of Bangladesh.

Ministry of Health and Sports, Myanmar. 2017. *Myanmar Demographic and Health Survey 2015-2016*. Naypyidaw, Republic of the Union of Myanmar: Ministry of Health and Sports.

Munoz-Raskin, Ramon, 2010. "Walking accessibility to bus rapid transit: Does it affect property values? The case of Bogotá, Colombia." *Transport Policy* 17(2): 72-84.

Naureen, M., D. S. Kabir, M. S. Ali, and M. Kamal. 2006. "Status of the Shrimp Sector in Bangladesh in the Context of HACCP and Trade Issues: A Review."

OECD (Organisation for Economic Cooperation and Development). 2006. "The SME Financing Gap: Theory and Evidence." *Financial Market Trends* 2006(2):89–97.

Oishi, Shafiqua, and Nazmul Alam. 2020. "Risk factors associated with Acute Respiratory Infection (ARI) among children under 10-years in Rohingya refugee camp." Recent Research in Science and Technology. 32-35.

Páez, Antonio, Darren Scott, and Catherine Morency. 2012. "Measuring Accessibility: Positive and Normative Implementations of Various Accessibility Indicators." Journal of Transportation Geography: online first. doi: 10.1016/j.jtrangeo.2012.03.016

Pascaud, Yannick, and Rafael Panlilio. 2019. "Education Needs Assessment (ENA): Rohingya Crisis Response." Washington, DC: World Bank.

Plummer, Michael G., Peter J. Morgan, and Ganeshan Wignaraja, eds. 2016. *Connecting Asia: Infrastructure for Integrating South and Southeast Asia.* Cheltenham: Edward Elgar.

Raihan, Selim, and Haque Bidisha. 2018. "Female Employment Stagnation in Bangladesh."

RHD (Roads and Highways Department). 2019. "Initial Environmental Examination Emergency Assistance Project: Improvement of National Highway (N1) from Link Road (Cox's Bazar) to Teknaf." Dhaka, Bangladesh: RHD.

RHD, ADB (Roads and Highways Department and Asian Development Bank). 2018. "Resettlement Plan for Cox's Bazar-Teknaf Road N1." Dhaka, Bangladesh: RHD.

Ripoll, Santiago. 2017. "Social and Cultural Factors Shaping Health and Nutrition, Wellbeing and Protection of the Rohingya within a Humanitarian Context."

Schiffer, M., and Beatrice Weder di Mauro. 2001. "Firm Size and the Business Environment: Worldwide Survey Results." Working Paper. World Bank - International Finance Corporation, Washington, DC.

Shelly, A.B., and M. D'Costa. 2001. "Women in aquaculture: Initiatives of CARITAS Bangladesh." Global Symposium on Women in Fisheries, Sixth Asian Fisheries Forum, 29 November, Taiwan, China.

Summers, A., A. Humphreys, E. Leidman, et al. 2018. "Notes from the Field: Diarrhea and Acute Respiratory Infection, Oral Cholera Vaccination Coverage, and Care-Seeking Behaviors of Rohingya Refugees - Cox's Bazar, Bangladesh, October-November 2017." *Morb Mortal Wkly* Rep 2018;67(18):533-535. doi:10.15585/mmwr.mm6718a6

Tallis, Heather, Cindy Huang, John Herbohn, Karen Holl, Sharif A. Mukul, and KAM Morshed. 2019. "Steps Toward Forest Landscape Restoration in the Context of the Rohingya Influx."

Tobler, W. 1993. "Three Presentations on Geographical Analysis and Modeling: Non-Isotropic Geographic Modeling; Speculations on the Geometry of Geography; and Global Spatial Analysis (93-1)." UC Santa Barbara: National Center for Geographic Information and Analysis. Retrieved from https://escholarship.org/uc/item/05r820mz

Toufique, K., and N. Ahmed. 2014. "Barriers to Developing the Fisheries Sector in Bangladesh." *Bangladesh Institute for Development Studies* 1407.

Truelove, S., O. Abrahim, C. Altare, S.A. Lauer, K.H. Grantz, A.S. Azman, et al. 2020. "The potential impact of COVID-19 in refugee camps in Bangladesh and beyond: A modeling study." *PLoS Med* 17(6): e1003144. https://doi.org/10.1371/ journal.pmed.1003144

UNDP (United Nations Development Program). 2018. "Impacts of the Rohingya Refugee Influx on Host Communities." New York: UNDP.

UNDP and UN Women. 2017. "Rohingya Crisis in Bangladesh: Early Recovery Joint Assessment." New York: UNDP.

UNHCR (United Nations High Commissioner for Refugees). 2018. "Operational Update 5-20 2018." Geneva: UNHCR.

-----. 2019. "Joint Response Plan for Rohingya Humanitarian Crisis. January December 2019." Geneva: UNHCR.

-----. 2020. "Joint Response Plan for Rohingya Humanitarian Crisis. January-December 2020." Geneva: UNHCR.

UNICEF (United Nations Children's Fund). 2017. "Progress on Drinking Water, Sanitation and Hygiene." New York: UNICEF.

-----. 2019. "Multiple Indicator Cluster Surveys 2019." New York: UNICEF.

USAID (United States Agency for International Development). 2018. "Rapid Education and Risk Analysis. Cox's Bazar." Washington, DC: USAID.

-----. 2019. "Comprehensive Private Sector Assessment." Washington, DC: USAID.

Woodruff, Christopher. 2018. "Addressing Constraints to Small and Growing Businesses." Working paper. International Growth Center (IGC), London. https://www.theigc.org/wp-content/uploads/2018/11/IGC_ANDE-review-paper_final-revised.pdf.

World Bank. 2009. World Development Report 2009: *Reshaping Economic Geography.* Washington, DC: World Bank.

-----. 2018a. "Project Appraisal Document on a Proposed Credit to the People's Republic of Bangladesh for a Sustainable Coastal and Marine Fisheries." Washington, DC: World Bank.

-----. 2018b. "Project Appraisal Document on a Proposed Credit to the People's Republic of Bangladesh for a Livestock and Dairy Development Project." Washington, DC: World Bank.

-----. 2019a. "Cox's Bazar Panel Survey. Brief III." Washington, DC: World Bank.

-----. 2019b. "Cox's Bazar Panel Survey. Brief IV." Washington, DC: World Bank.

-----. 2019c. "Infrastructure Connectivity." *Japan G20 Development Working Group* 13.

-----. 2020a. "Bangladesh Human Capital Index." Washington, DC: World Bank.

-----. 2020b. "Cox's Bazar Local Government Capacity and Service Delivery Assessment. Options of Using LGIs for Service Delivery, Local Economic Development and Disaster Management." Washington, DC: World Bank.

-----. 2020c. "Cox's Bazar Panel Survey. Brief V." Washington, DC: World Bank.

-----. 2020d. "'World Development Indicators Online Database.'" Washington, DC: World Bank. Retrieved (https://data.worldbank.org/data-catalog/world-development-indicators.).

-----. Forthcoming. "Political Economy Assessment and Analysis of Public Investment Management Draft Report." Washington, DC: World Bank.

Yoshida, N., and U. Deichmann. 2009. "Measurement of Accessibility and Its Applications." *Journal of Infrastructure Development* 2009;1(1):1-16. doi:10.1177/097493060900100102

Zafar, Prepared Ali, Iuliia Mironova, and Liane Lohde. 2020. "Bangladesh: Country Private Sector Diagnostic Concept Note." Washington, DC: World Bank.

ANNEX 1:

Additional tables and figures

Table A1-1: Road speeds by type

Road classification (OpenStreetMap)	Mean speed (k/h)
Trunk; primary	55
Secondary	40
Tertiary	30
Residential; living street	20
Road; service; unclassified	15
Ferry	15
Track	10
Pier	5
All link roads, e.g. primary_link	-5

Source: Based on Bangladesh road classifications, adapted from Blankenspoor and Yoshida (2010).

Table A1-2: Incidence of crime in the neighborhood, as reported by CBPS 2019 respondents

Stratum	Harassment	Physical Violence	Gender Based Violence
High exposure	57%	58%	47%
Low exposure	57%	48%	38%
Rohingya camp	36%	43%	40%

Source: CBPS-2019.

Table A1-3: Exposure to trauma events among CBPS 2019 respondents

	Experienced			Witnessed			Heard about it		
	High exposure	Low exposure	Camp	High exposure	Low exposure	Camp	High exposure	Low exposure	Camp
Being close to death	33%	28%	53%	16%	15%	19%	21%	29%	17%
Serious injury	29%	36%	33%	37%	28%	44%	25%	22%	16%
Unnatural death of family or friend	25%	17%	32%	9%	13%	11%	7%	21%	11%
Torture	16%	15%	44%	16%	14%	25%	37%	27%	19%
Murder of family or friend	12%	12%	35%	3%	6%	9%	8%	18%	10%
Imprisonment	12%	15%	14%	40%	28%	48%	43%	38%	32%
Forced separation from family members	11%	9%	25%	6%	8%	11%	15%	23%	15%
Combat situation	11%	16%	44%	30%	25%	40%	47%	41%	14%
Forced isolation from others	4%	5%	30%	11%	10%	24%	39%	35%	27%
Lost or kidnapped	4%	5%	10%	8%	5%	22%	66%	55%	52%
Murder of stranger or strangers	3%	5%	10%	12%	8%	41%	67%	53%	41%
Rape or sexual abuse	2%	2%	6%	4%	7%	29%	74%	58%	61%

Source: CBPS-2019.

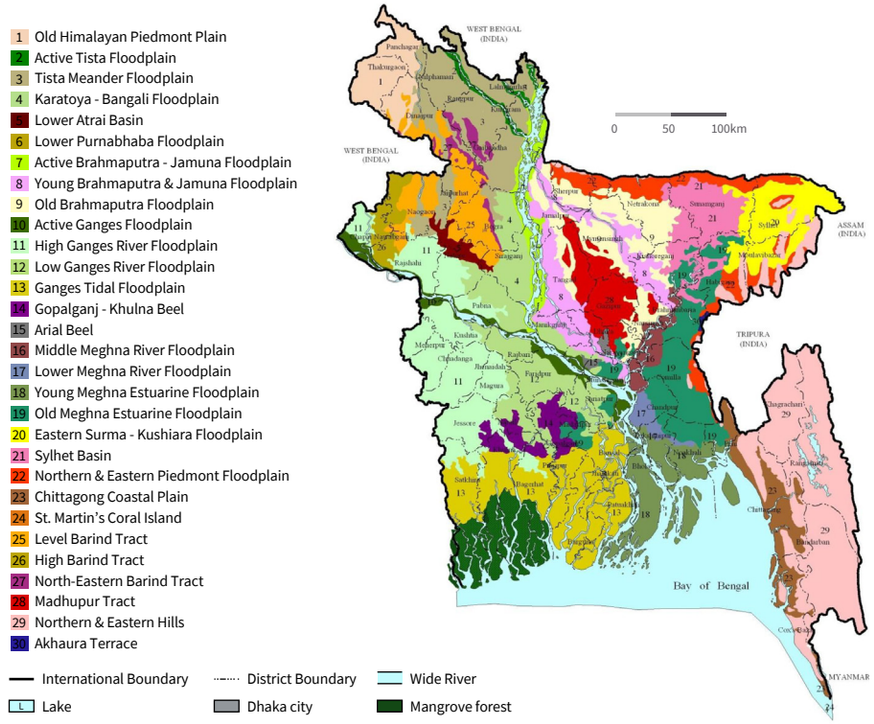
Table A1-4: Trauma symptoms reported by CBPS 2019 respondents

	A little			Quite a bit			Extremely		
	High exposure	Low exposure	Camp	High exposure	Low exposure	Camp	High exposure	Low exposure	Camp
Recurrent thoughts or memories of the most hurtful or terrifying events	45%	40%	37%	19%	24%	45%	5%	6%	12%
Recurrent nightmares	35%	37%	49%	7%	9%	15%	1%	1%	2%
Feeling detached or withdrawn from people	29%	27%	39%	5%	9%	11%	1%	2%	2%
Unable to feel emotions	30%	37%	37%	7%	9%	11%	1%	5%	2%
Feeling irritable or having outbursts of anger	48%	44%	46%	15%	19%	14%	2%	4%	2%
Not wanting to interact with others outside the household	15%	20%	20%	3%	6%	5%	1%	1%	1%
Feeling as if you don't have a future	28%	25%	35%	12%	13%	26%	3%	6%	7%
Having difficulty dealing with new situations	26%	32%	41%	4%	7%	12%	1%	1%	3%
Troubled by physical problem(s)	39%	40%	42%	18%	20%	21%	5%	7%	5%
Feeling unable to make daily plans	31%	32%	37%	7%	9%	10%	1%	2%	2%
Feeling that people do not understand what happened to you	35%	31%	36%	12%	12%	15%	1%	2%	3%
Feeling others are hostile to you	28%	30%	26%	9%	11%	6%	2%	2%	1%

	A little			Quite a bit			Extremely		
	High exposure	Low exposure	Camp	High exposure	Low exposure	Camp	High exposure	Low exposure	Camp
Feeling that you have no one to rely upon	31%	29%	34%	12%	11%	13%	2%	3%	2%
Feeling no trust in others	41%	41%	41%	14%	13%	14%	2%	2%	2%
Feeling pow-erless to help others	35%	27%	32%	18%	17%	25%	7%	6%	8%
Spending time thinking why these events happened to you	38%	32%	38%	14%	19%	37%	4%	8%	8%

Source: CBPS-2019.

Figure A1-1: Bangladesh agroecological zones



Source: BBS (2018c).

Figure A1-2: District diversification in coastal plains and northern hills agroecological zone

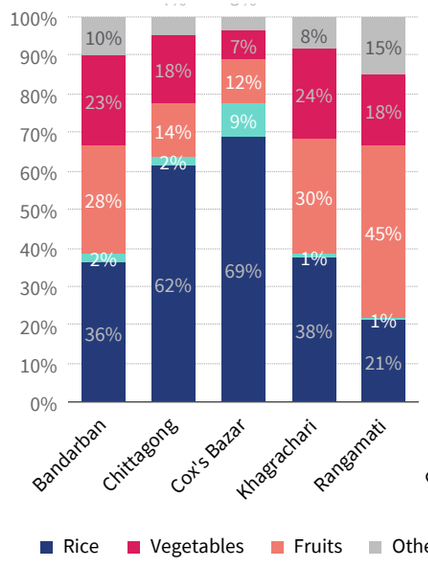
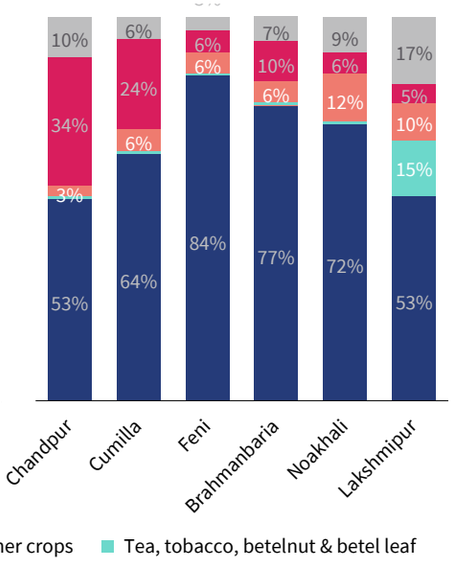


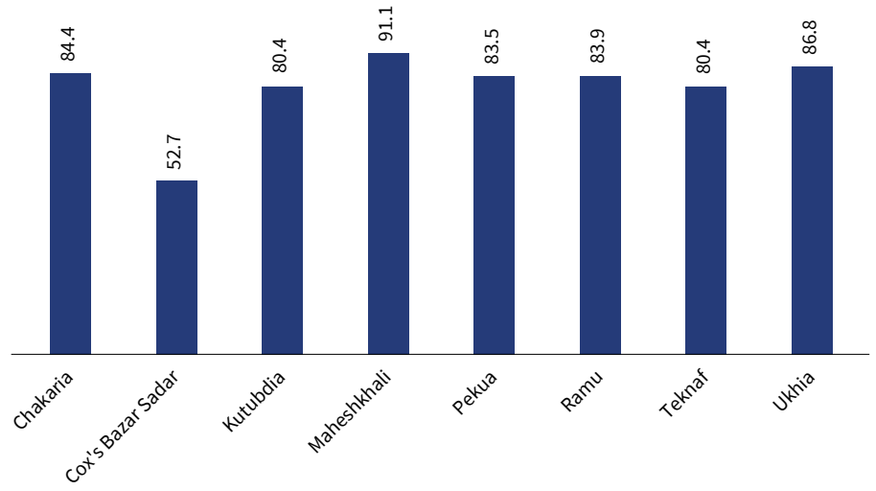
Figure A1-3: District diversification in river and estuarine flood plains agroecological zone



Rice Vegetables Fruits Other crops Tea, tobacco, betelnut & betel leaf

Source: WB staff elaboration, Agricultural yearbook 2017.

Figure A1-4: Share of rural population by upazila, Cox's Bazar



Source: WB staff elaboration, Agricultural yearbook 2017.

Table A1-5: Firm density by upazila

	N firms	Population (000)	Firm density
Kutubdia	2,992	125	24
Maheshkhali	7,817	319	24
Pekua	4,499	170	26
Ukhia	7,835	207	38
Cox's Bazar	23,143	821	42
COX'S BAZAR SADAR	19,529	458	43
Chittagong division without Chittagong Sadar	947,079	20,817	45
Chittagong division	1,327,629	28,451	47
Ramu	13,193	270	49
Bangladesh	7,694,115	144,114	53
Bangladesh without Dhaka district and Chittagong Sadar	6,650,981	124,385	53
Chakaria	25,420	473	54
Teknaf	14,329	263	54

Source: WB staff elaboration, Economic Census 2013 and Population Census 2011.

Table A1-6: Non-agricultural establishment size distribution, Bangladesh vs Chittagong vs Cox's Bazar

	Industry					
	Bangladesh		**Chittagong**		**Cox's Bazar**	
1 worker	277,182	31%	89,875	45%	13,329	71%
2 workers	52,481	6%	10,184	5%	1,318	7%
3-4 workers	398,934	45%	77,112	38%	2,786	15%
5-9 workers	114,784	13%	18,491	9%	1,091	6%
10-35 workers	28,033	3%	2,545	1%	137	1%
more than 35	20,135	2%	2,459	1%	89	0%
	891,549	100%	200,666	100%	18,750	100%
	Services					
	Bangladesh		Chittagong		Cox's Bazar	
1 worker	3,170,779	47%	391,684	35%	27,718	36%
2 workers	1,727,217	25%	317,835	28%	15,809	21%
3-4 workers	1,299,405	19%	304,561	27%	24,301	32%
5-9 workers	499,248	7%	93,805	8%	7,917	10%
10-35 workers	97,374	1%	17,761	2%	1,040	1%
more than 35	8,543	0%	1,317	0%	79	0%
	6,802,566	100%	1,126,963	100%	76,864	100%
	Total					
	Bangladesh		**Chittagong**		**Cox's Bazar**	
1 worker	3,447,961	45%	481,559	36%	41,047	42.9%
2 workers	1,779,698	23%	328,019	25%	17,127	17.9%
3-4 workers	1,698,339	22%	381,673	29%	27,087	28.3%
5-9 workers	614,032	8%	112,296	8%	9,008	9.4%
10-35 workers	125,407	2%	20,306	2%	1,177	1.2%
more than 35	28,678	0%	3,776	0%	168	0.2%
	7,694,115	1	1,327,629	1	95,614	1

Source: Staff calculations based on Economic Census 2013.

Table A1-7: Size-wise distribution of firms, by sector - Bangladesh, Chittagong, and Cox's Bazar

	Extraction of Salt	Manufacture of textiles and RMG	Other Industry	Trade	Transport	Accommodation and food	Education	Other services	Total
					Cox's bazar				
1	**84%**	**87%**	35%	31%	**91%**	3%	9%	**48%**	43%
2	4%	10%	6%	17%	2%	**73%**	10%	16%	18%
3-4	7%	3%	**41%**	**40%**	6%	18%	25%	26%	28%
5-9	4%	1%	15%	12%	1%	4%	**37%**	8%	9%
10 plus	1%	0%	3%	0%	0%	2%	18%	3%	1%
					Chittagong				
1	84%	69%	35%	32%	83%	4%	5%	42%	36%
2	4%	5%	5%	24%	4%	79%	6%	23%	25%
3-4	7%	22%	45%	34%	11%	14%	31%	25%	29%
5-9	4%	2%	12%	10%	2%	2%	36%	7%	8%
10 plus	1%	2%	3%	0%	0%	0%	22%	3%	2%
					Bangladesh				
1	83%	46%	24%	44%	80%	6%	7%	43%	45%
2	4%	6%	6%	24%	10%	76%	6%	26%	23%
3-4	7%	29%	52%	23%	9%	16%	22%	20%	22%
5-9	4%	12%	14%	8%	1%	2%	39%	8%	8%
10 plus	2%	8%	4%	0%	0%	0%	26%	3%	2%

Source: Staff calculations based on Economic Census 2013.

Table A1-8: Sector-wise distribution of firms, by firm size - Bangladesh, Chittagong, and Cox's Bazar

	N of firms	Extraction of Salt	Manufacture of textiles and RMG	Other Industry	Trade	Transport	Accommodation and food	Education	Other services
					Cox's Bazar				
1	41,047	**10%**	**17%**	5%	**34%**	15%	1%	1%	18%
2	17,127	1%	5%	2%	**45%**	1%	31%	2%	14%
3-4	27,087	1%	1%	8%	**67%**	1%	5%	2%	15%
5-9	9,008	2%	0.5%	9%	**61%**	1%	3%	10%	13%
10 plus	1,345	4%	0.4%	12%	9%	1%	9%	**34%**	**30%**
Total	**95,614**	**9%**	**6%**	**5%**	**47%**	**7%**	**8%**	**3%**	**16%**

	N of firms	Extraction of Salt	Manufacture of textiles and RMG	Other Industry	Trade	Transport	Accommodation and food	Education	Other services
					Chittagong				
1	481,559	1%	7%	11%	40%	19%	1%	0%	22%
2	328,019	0%	1%	2%	44%	1%	33%	1%	17%
3-4	381,673	0%	3%	17%	52%	3%	5%	3%	16%
5-9	112,296	0%	1%	15%	52%	2%	3%	13%	15%
10 plus	24,082	0%	3%	17%	7%	1%	3%	35%	33%
Total	**1,327,629**	**0%**	**4%**	**11%**	**45%**	**8%**	**10%**	**3%**	**19%**
					Bangladesh				
1	3,447,961	0%	3%	4%	45%	30%	1%	0%	16%
2	1,779,698	0%	1%	2%	48%	7%	22%	1%	19%
3-4	1,698,339	0%	4%	19%	47%	6%	5%	2%	16%
5-9	614,032	0%	5%	14%	48%	3%	2%	12%	16%
10 plus	154,085	0%	13%	18%	6%	1%	1%	31%	29%
Total	**7,694,115**	**3%**	**8%**	**0%**	**46%**	**17%**	**7%**	**2%**	**17%**

Source: Staff calculations based on Economic Census 2013.

Table A1-9: Upazila-wise distribution of firms by firm-size groups

	Chakaria	Cox's Bazar Sadar	Kutubdia	Maheshkhali	Pekua	Ramu	Teknaf	Ukhia	Total
				N firms					
1	14427	6993	558	1839	682	7215	5813	3520	41047
2	2698	4092	375	1983	1726	3712	1411	1130	17127
3-4	6516	5204	1251	2677	1298	1078	6441	2622	27087
5-9	1606	2665	753	1213	740	1063	487	481	9008
10 Plus	173	575	55	105	53	125	177	82	1345
				Shares					
	Chakaria	Cox's Bazar Sadar	Kutubdia	Maheshkhali	Pekua	Ramu	Teknaf	Ukhia	Total
1	35%	17%	1%	4%	2%	18%	14%	9%	100%
2	16%	24%	2%	12%	10%	22%	8%	7%	100%
3-4	24%	19%	5%	10%	5%	4%	24%	10%	100%
5-9	18%	30%	8%	13%	8%	12%	5%	5%	100%
10 Plus	13%	43%	4%	8%	4%	9%	13%	6%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A1-10: Number of firms by upazila, firm-size groups, and sector

N of workers	N of firms	Extraction of salt	Manufacture of textiles and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services
Chakaria									
1	14427	1200	5746	577	3437	1782	39	67	1579
2	2698	8	186	23	775	46	1327	24	309
3-4	6516	25	156	645	4160	197	251	100	982
5-9	1606	17	21	124	1024	11	42	174	193
10 Plus	173	0	2	19	4	1	5	96	46
Total	**25420**	**1250**	**6111**	**1388**	**9400**	**2037**	**1664**	**461**	**3109**
Cox's Bazar Sadar									
1	6993	1057	685	257	2462	289	116	59	2068
2	4092	37	32	52	2212	23	992	78	666
3-4	5204	71	37	600	3138	68	437	93	760
5-9	2665	6	8	252	1713	27	119	184	356
10 Plus	575	41	1	65	56	6	98	132	176
Total	**19529**	**1212**	**763**	**1226**	**9581**	**413**	**1762**	**546**	**4026**
Kutubdia									
1	558	305	0	8	64	51	0	8	122
2	375	1	0	0	17	0	343	0	14
3-4	1251	32	4	75	826	16	17	34	247
5-9	753	59	0	27	508	2	17	52	88
10 Plus	55	0	0	8	1	0	0	25	21
Total	**2992**	**397**	**4**	**118**	**1416**	**69**	**377**	**119**	**492**
Maheshkhali									
1	1839	966	34	104	358	46	1	8	322
2	1983	144	2	23	852	6	746	6	204
3-4	2677	192	4	128	1789	5	76	34	449
5-9	1213	101	0	61	804	6	20	70	151
10 Plus	105	16	2	8	2	0	0	51	26
Total	**7817**	**1419**	**42**	**324**	**3805**	**63**	**843**	**169**	**1152**

N of workers	N of firms	Extraction of salt	Manufacture of textiles and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services
Pekua									
1	682	192	52	14	168	1	14	6	235
2	1726	10	450	84	622	6	383	4	167
3-4	1298	1	7	62	869	4	116	24	215
5-9	740	37	7	114	428	4	9	45	96
10 Plus	53	0	0	15	5	1	2	20	10
Total	**4499**	**240**	**516**	**289**	**2092**	**16**	**524**	**99**	**723**
Ramu									
1	7215	52	214	675	2769	2073	26	26	1380
2	3712	1	66	98	2226	68	827	33	393
3-4	1078	2	6	316	503	13	31	78	129
5-9	1063	1	2	90	687	5	12	133	133
10 Plus	125	1	0	21	14	3	1	36	49
Total	**13193**	**57**	**288**	**1200**	**6199**	**2162**	**897**	**306**	**2084**
Teknaf									
1	5813	533	406	101	2870	672	11	32	1188
2	1411	14	70	9	502	7	385	7	417
3-4	6441	28	16	186	4977	71	280	125	758
5-9	487	2	4	87	169	4	42	139	40
10 Plus	177	0	1	20	41	0	19	52	44
Total	**14329**	**577**	**497**	**403**	**8559**	**754**	**737**	**355**	**2447**
Ukhia									
1	3520	0	1	150	1792	1198	39	29	311
2	1130	0	0	8	567	4	233	110	208
3-4	2622	0	6	187	1786	10	94	149	390
5-9	481	0	1	70	197	2	11	120	80
10 Plus	82	0	0	6	1	0	2	40	33
Total	**7835**	**0**	**8**	**421**	**4343**	**1214**	**379**	**448**	**1022**

Source: WB staff elaboration, Economic Census 2013.

Table A1-11: Distribution of firms by upazila and by firm-size group within each sector

N of workers		Extraction of Salt	Manufacture of textiles and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services
Chakaria									
1	14427	8%	40%	4%	24%	12%	0%	0%	11%
2	2698	0%	7%	1%	29%	2%	49%	1%	11%
3-4	6516	0%	2%	10%	64%	3%	4%	2%	15%
5-9	1606	1%	1%	8%	64%	1%	3%	11%	12%
10 Plus	173	0%	1%	11%	2%	1%	3%	55%	27%
Cox's Bazar Sadar									
1	6993	15%	10%	4%	35%	4%	2%	1%	30%
2	4092	1%	1%	1%	54%	1%	24%	2%	16%
3-4	5204	1%	1%	12%	60%	1%	8%	2%	15%
5-9	2665	0%	0%	9%	64%	1%	4%	7%	13%
10 Plus	575	7%	0%	11%	10%	1%	17%	23%	31%
Kutubdia									
1	558	55%	0%	1%	11%	9%	0%	1%	22%
2	375	0%	0%	0%	5%	0%	91%	0%	4%
3-4	1251	3%	0%	6%	66%	1%	1%	3%	20%
5-9	753	8%	0%	4%	67%	0%	2%	7%	12%
10 Plus	55	0%	0%	15%	2%	0%	0%	45%	38%
Maheshkhali									
1	1839	53%	2%	6%	19%	3%	0%	0%	18%
2	1983	7%	0%	1%	43%	0%	38%	0%	10%
3-4	2677	7%	0%	5%	67%	0%	3%	1%	17%
5-9	1213	8%	0%	5%	66%	0%	2%	6%	12%
10 Plus	105	15%	2%	8%	2%	0%	0%	49%	25%
Pekua									
1	682	28%	8%	2%	25%	0%	2%	1%	34%
2	1726	1%	26%	5%	36%	0%	22%	0%	10%
3-4	1298	0%	1%	5%	67%	0%	9%	2%	17%
5-9	740	5%	1%	15%	58%	1%	1%	6%	13%
10 Plus	53	0%	0%	28%	9%	2%	4%	38%	19%
Ramu									
1	7215	1%	3%	9%	38%	29%	0%	0%	19%
2	3712	0%	2%	3%	60%	2%	22%	1%	11%
3-4	1078	0%	1%	29%	47%	1%	3%	7%	12%
5-9	1063	0%	0%	8%	65%	0%	1%	13%	13%
10 Plus	125	1%	0%	17%	11%	2%	1%	29%	39%

N of workers		Extraction of Salt	Manufacture of textiles and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services
Teknaf									
1	5813	9%	7%	2%	49%	12%	0%	1%	20%
2	1411	1%	5%	1%	36%	0%	27%	0%	30%
3-4	6441	0%	0%	3%	77%	1%	4%	2%	12%
5-9	487	0%	1%	18%	35%	1%	9%	29%	8%
10 Plus	177	0%	1%	11%	23%	0%	11%	29%	25%
Ukhia									
1	3520	0%	0%	4%	51%	34%	1%	1%	9%
2	1130	0%	0%	1%	50%	0%	21%	10%	18%
3-4	2622	0%	0%	7%	68%	0%	4%	6%	15%
5-9	481	0%	0%	15%	41%	0%	2%	25%	17%
10 Plus	82	0%	0%	7%	1%	0%	2%	49%	40%

Source: WB staff elaboration, Economic Census 2013.

Table A1-12: Share of firm-size groups among total firms, by sector and upazila

N of workers	All sectors	Extraction of Salt	Manufacture of textiles and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services
Chakaria									
1	57%	96%	94%	42%	37%	87%	2%	15%	51%
2	11%	1%	3%	2%	8%	2%	80%	5%	10%
3-4	26%	2%	3%	46%	44%	10%	15%	22%	32%
5-9	6%	1%	0%	9%	11%	1%	3%	38%	6%
10 Plus	1%	0%	0%	1%	0%	0%	0%	21%	1%
Cox's Bazar Sadar									
1	36%	87%	90%	21%	26%	70%	7%	11%	51%
2	21%	3%	4%	4%	23%	6%	56%	14%	17%
3-4	27%	6%	5%	49%	33%	16%	25%	17%	19%
5-9	14%	0%	1%	21%	18%	7%	7%	34%	9%
10 Plus	3%	3%	0%	5%	1%	1%	6%	24%	4%
Kutubdia									
1	19%	77%	0%	7%	5%	74%	0%	7%	25%
2	13%	0%	0%	0%	1%	0%	91%	0%	3%
3-4	42%	8%	100%	64%	58%	23%	5%	29%	50%
5-9	25%	15%	0%	23%	36%	3%	5%	44%	18%
10 Plus	2%	0%	0%	7%	0%	0%	0%	21%	4%

N of workers	All sectors	Extraction of Salt	Manufacture of textiles and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services
Maheshkhali									
1	24%	68%	81%	32%	9%	73%	0%	5%	28%
2	25%	10%	5%	7%	22%	10%	88%	4%	18%
3-4	34%	14%	10%	40%	47%	8%	9%	20%	39%
5-9	16%	7%	0%	19%	21%	10%	2%	41%	13%
10 Plus	1%	1%	5%	2%	0%	0%	0%	30%	2%
Pekua									
1	15%	80%	10%	5%	8%	6%	3%	6%	33%
2	38%	4%	87%	29%	30%	37%	73%	4%	23%
3-4	29%	0%	1%	21%	42%	25%	22%	24%	30%
5-9	16%	15%	1%	39%	20%	25%	2%	45%	13%
10 Plus	1%	0%	0%	5%	0%	6%	0%	20%	1%
Ramu									
1	55%	91%	74%	56%	45%	96%	3%	8%	66%
2	28%	2%	23%	8%	36%	3%	92%	11%	19%
3-4	8%	4%	2%	26%	8%	1%	3%	25%	6%
5-9	8%	2%	1%	7%	11%	0%	1%	43%	6%
10 Plus	1%	2%	0%	2%	0%	0%	0%	12%	2%
Teknaf									
1	41%	92%	82%	25%	34%	89%	1%	9%	49%
2	10%	2%	14%	2%	6%	1%	52%	2%	17%
3-4	45%	5%	3%	46%	58%	9%	38%	35%	31%
5-9	3%	0%	1%	22%	2%	1%	6%	39%	2%
10 Plus	1%	0%	0%	5%	0%	0%	3%	15%	2%
Ukhia									
1	45%	.	13%	36%	41%	99%	10%	6%	30%
2	14%	.	0%	2%	13%	0%	61%	25%	20%
3-4	33%	.	75%	44%	41%	1%	25%	33%	38%
5-10	6%	.	13%	17%	5%	0%	3%	27%	8%
11 Plus	1%	.	0%	1%	0%	0%	1%	9%	3%

Source: WB staff elaboration, Economic Census 2013.

Table A1-13: Breakdown of "Other industry" and" Other services" categories for non-micro enterprises (more than 10 employees), by upazila

	Chakaria	Cox's Bazar Sadar	Kutubdia	Maheshkhali	Pekua	Ramu	Teknaf	Ukhia
Manufacture of food products	1%	1%			2%	1%	2%	4%
Manufacture of tobacco products	1%							
Manufacture of wood and products of wood and cork, except furniture;		1%		2%		1%	1%	
Manufacture of paper and paper products		0%						
Printing and reproduction of recorded media		1%						
Manufacture of rubber and plastics products	1%					1%		
Manufacture of other non-metallic mineral products	1%	1%	4%	2%	8%	9%	3%	
Manufacture of fabricated metal products, except machinery and equipment	1%	1%	7%		2%		1%	
Manufacture of furniture	8%	1%	4%	4%	17%	6%	3%	4%
Other manufacturing	1%							
Electricity, gas, steam and air conditioning supply		4%						
Water collection, treatment and supply		0%						
Construction of buildings		1%						
Publishing activities		0%						
Motion picture, video and television program production, sound recording		0%						
Programming and broadcasting activities		0%						
Computer programming, consultancy and related activities		0%						

	Chakaria	Cox's Bazar Sadar	Kutubdia	Maheshkhali	Pekua	Ramu	Teknaf	Ukhia
Financial service activities, except insurance and pension funding	14%	13%	16%	9%	4%	10%	14%	16%
Insurance, reinsurance and pension funding, except compulsory social security	2%	2%	4%	1%	0%	4%	1%	1%
Real estate activities		1%						
Law and Accounting Activities		0%						
Other professional, scientific and technical activities	1%							
Veterinary activities		0%						
Rental and leasing activities		0%		1%	4%	1%	1%	1%
Employment activities								
Travel agency, tour operator, reservation service and related activities		0%						
Office administrative, office support and other business support activities		0%						
Public administration and defense; compulsory social security	6%	8%	13%	10%	9%	14%	7%	18%
Human health activities	2%	4%	5%	3%	2%	5%	1%	2%
Residential care activities		0%						
Sports activities and amusement and recreation activities							1%	
Activities of membership organizations	2%	1%		1%		3%		
Other personal service activities	1%	1%		1%		2%		1%

Source: WB staff elaboration, Economic Census 2013.

Table A1-14: Constraints on access to education among persons who never attended school, bottom 40 and upper 60, by gender, high- and low-exposure areas

	High exposure					
	Bottom 40		Upper 60		Total	
	Female	Male	Female	Male	Female	Male
No money/too expensive	46%	56%	40%	59%	42%	58%
Family/social restrictions	25%	1%	38%	4%	32%	3%
No schools close to home	7%	5%	6%	7%	7%	6%
Age (too old/too young)	6%	10%	4%	7%	5%	8%
Must work/family chores	5%	12%	4%	11%	4%	11%
Lack of food	3%	6%	1%	3%	2%	4%
Others	8%	9%	7%	9%	7%	9%
	Low exposure					
	Bottom 40		**Upper 60**		**Total**	
	Female	Male	Female	Male	Female	Male
No money/too expensive	50%	65%	37%	55%	44%	60%
Family/social restrictions	27%	5%	38%	4%	33%	4%
Age (too old/too young)	8%	9%	7%	8%	8%	8%
No schools close to home	6%	4%	5%	3%	6%	4%
Must work/family chores	3%	10%	4%	18%	3%	13%
No need/no interest to study	2%	3%	2%	7%	2%	5%
Others	4%	5%	6%	6%	5%	5%

Source: WB staff elaboration, CBPS 2019.

Table A1-15: Constraints on access to education among persons who dropped out of school: bottom 40 and upper 60, by age group and gender, high-exposure areas

Dropped-out	**High exposure**					
	6 to 18 years					
	Bottom 40		**Upper 60**		**Total**	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
No money/too expensive	63%	57%	37%	46%	47%	49%
Family/social restrictions	21%	3%	27%	1%	24%	2%
Do not want to study more/completed studies	7%	24%	9%	34%	8%	31%
Safety concerns	3%	0%	2%	1%	2%	1%
For marriage	3%	0%	15%	0%	10%	0%
Must work/family chores	1%	8%	5%	14%	3%	12%
Lack of food	1%	0%	1%	1%	1%	1%
Others	1%	9%	5%	3%	3%	5%

Dropped-out	High exposure					
	Older than 18					
	Bottom 40		Upper 60		Total	
	Female	Male	Female	Male	Female	Male
No money/too expensive	34%	56%	23%	43%	27%	46%
Family/social restrictions	27%	1%	29%	4%	28%	3%
For marriage	15%	0%	27%	1%	23%	1%
Do not want to study more/completed studies	11%	25%	11%	30%	11%	29%
Must work/family chores	6%	10%	6%	15%	6%	14%
Lack of food	2%	4%	0%	2%	1%	3%
Others	4%	4%	4%	5%	4%	4%

Source: WB staff elaboration, CBPS 2019.

Table A1-16: Constraints on access to education among persons who dropped out of school: bottom 40 and upper 60, by age group and gender, low-exposure areas

	Low exposure					
	6 to 18 years					
	Bottom 40		Upper 60		Total	
	Female	Male	Female	Male	Female	Male
No money/too expensive	51%	57%	37%	36%	43%	45%
For marriage	18%	0%	29%	0%	24%	0%
Family/social restrictions	13%	0%	16%	4%	15%	2%
Do not want to study more/completed stu	9%	20%	9%	32%	9%	27%
Must work/family chores	6%	15%	6%	20%	6%	18%
Disability/illness	2%	2%	0%	3%	1%	3%
Lack of food	1%	6%	0%	2%	1%	4%
Others	0%	0%	3%	3%	2%	2%
	Older than 18					
	Bottom 40		Upper 60		Total	
	Female	Male	Female	Male	Female	Male
No money/too expensive	35%	50%	18%	34%	24%	40%
For marriage	30%	2%	41%	2%	37%	2%
Family/social restrictions	19%	3%	23%	5%	22%	4%
Do not want to study more/completed stu	8%	19%	13%	33%	11%	28%
Must work/family chores	4%	20%	3%	22%	3%	21%
Lack of food	1%	3%	1%	1%	1%	2%
Others	2%	3%	2%	2%	2%	2%

Source: WB staff elaboration, CBPS 2019.

Table A1-17: Share of individuals who dropped out of school, by type of school, quintile, and gender, high- and low-exposure areas

	High exposure											
Quintile	1		2		3		4		5		Total	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Government	65%	70%	60%	73%	63%	64%	50%	65%	58%	60%	59%	65%
Private total	17%	14%	23%	17%	27%	21%	31%	26%	28%	28%	26%	23%
Private (govt. grant)	13%	11%	16%	14%	18%	14%	23%	16%	22%	21%	19%	16%
Private (non-govt. grant)	4%	3%	6%	4%	8%	8%	9%	10%	6%	7%	7%	7%
NGO	2%	2%	3%	2%	1%	0%	2%	1%	2%	0%	2%	1%
Madrasa	16%	14%	15%	8%	9%	15%	17%	8%	13%	12%	14%	11%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Low exposure											
Quintile	1		2		3		4		5		Total	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Government	57%	65%	57%	61%	52%	59%	50%	53%	51%	60%	54%	59%
Private total	27%	25%	28%	27%	34%	26%	33%	32%	39%	31%	32%	29%
Private (govt. grant)	17%	17%	14%	14%	25%	18%	25%	25%	26%	16%	21%	18%
Private (non-govt. grant)	10%	8%	14%	13%	9%	8%	8%	7%	13%	15%	11%	11%
NGO	3%	2%	3%	4%	0%	2%	1%	1%	0%	1%	1%	2%
Madrasa	13%	8%	12%	8%	14%	13%	16%	14%	10%	8%	13%	10%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: WB staff elaboration, CBPS 2019.

Table A1-18: Distribution of firms by sector and upazila, Cox's Bazar

	Upazila's share of total firms, by sector									
	N of firms	Extraction of Salt	Manufacture of textile and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services	Total
Chakaria	27%	24%	74%	26%	21%	30%	23%	18%	21%	27%
Cox's Bazar Sadar	20%	24%	9%	23%	21%	6%	25%	22%	27%	20%
Kutubdia	3%	8%	0%	2%	3%	1%	5%	5%	3%	3%
Maheshkhali	8%	28%	1%	6%	8%	1%	12%	7%	8%	8%
Pekua	5%	5%	6%	5%	5%	0%	7%	4%	5%	5%
Ramu	14%	1%	3%	22%	14%	32%	12%	12%	**14%**	14%
Teknaf	15%	11%	6%	8%	19%	11%	10%	14%	**16%**	15%
Ukhia	8%	0%	0%	8%	10%	18%	5%	18%	7%	8%
Total	95614	5152	8229	5369	45395	6728	7183	2503	15055	95,614.00

	Sector's share of total firms, by upazila									
	N of firms	Extraction of Salt	Manufacture of textile and RMG	Other industry	Trade	Transport	Accommodation and food	Education	Other services	Total
Chakaria	25,420	5%	24%	5%	37%	8%	7%	2%	12%	100%
Cox's bazar sadar	19,529	6%	4%	6%	49%	2%	9%	3%	21%	100%
Kutubdia	2,992	13%	0%	4%	47%	2%	13%	4%	16%	100%
Maheshkhali	7,817	18%	1%	4%	49%	1%	11%	2%	15%	100%
Pekua	4,499	5%	11%	6%	46%	0%	12%	2%	16%	100%
Ramu	13,193	0%	2%	9%	47%	16%	7%	2%	**16%**	100%
Teknaf	14,329	4%	3%	3%	60%	5%	5%	2%	**17%**	100%
Ukhia	7,835	0%	0%	5%	55%	15%	5%	6%	13%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A1-19: Share of firm by market for goods

	Totally Local	Totally Export	Local and Export	Not Applicable	Total
Cox's Bazar	82%	2.57%	0.10%	16%	13,441
Chittagong Division	90%	0.76%	0.41%	9%	192,299
Bangladesh	88%	1.15%	0.83%	10%	857,572
Bangladesh (Not incl. Chittagong and Dhaka)	88%	0.67%	0.66%	11%	736,270
Chittagong Division (Not incl. Chittagong zila)	90%	0.50%	0.17%	9%	133,679

Source: WB staff elaboration, Economic Census 2013.

Table A1-20: Distribution of exporting firms by size, Cox's Bazar, Chittagong, and Bangladesh

	Cox's Bazar	Chittagong	Bangladesh
Less than 10 workers	97%	50%	31%
Between 10 and 24 workers	1%	6%	8%
Between 25 and 99 workers	2%	18%	37%
Between 100 and 250 workers	0%	6%	8%
More than 250 workers	0%	20%	15%
Total N of export firms	358	2,245	16,988

Source: WB staff elaboration, Economic Census 2013.

Table A1-21: Share of vulnerable and secure jobs among all workers in each geographic unit

	Vulnerable jobs	Secure jobs
Chakaria	98%	2%
Cox's Bazar Sadar	92%	8%
Kutubdia	98%	2%
Maheshkhali	97%	3%
Pekua	89%	11%
Ramu	93%	7%
Teknaf	96%	4%
Ukhia	97%	3%
Cox's Bazar	95%	5%
Chittagong	94%	6%
Bangladesh	92%	8%

Source: WB staff elaboration, Economic Census 2013.

Table A1-22: Distribution of total vulnerable and secure jobs in Cox's Bazar, across upazilas

	Vulnerable jobs	Secure jobs
Chakaria	22%	7%
Cox's Bazar Sadar	25%	43%
Kutubdia	5%	2%
Maheshkhali	10%	5%
Pekua	6%	13%
Ramu	11%	15%
Teknaf	14%	10%
Ukhia	7%	4%

Source: WB staff elaboration, Economic Census 2013.

ANNEX 2

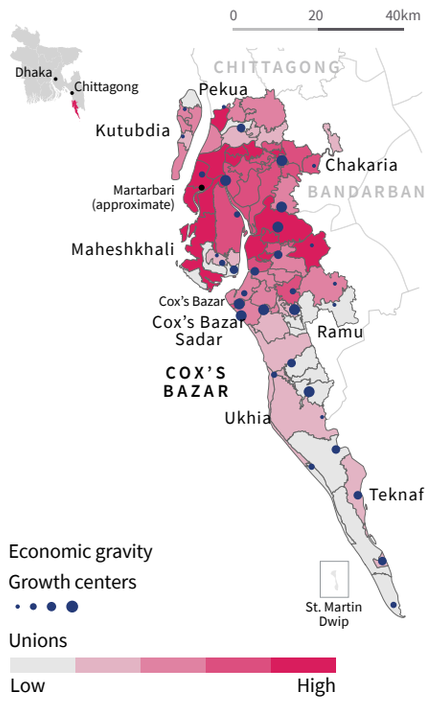
Methodology note - Cox's Bazar accessibility analysis

July 2020

The Cox's Bazar Growth Diagnostic makes heavy use of accessibility maps and charts to explain the relationship between access to services and employment and growth potential in Cox's Bazar (as in Figure A2-1, Figure A2-7, and Figure A2-9). This note explains how we prepared the accessibility analysis figures underpinning these visuals and how the same process might be applied elsewhere, especially in Bangladesh. The note pays special attention to any complications that might result from a change in the scale of the analysis.

This note is meant as a resource for policy makers and technical experts to understand and apply the analysis outputs – not as an exhaustive account of how to replicate the analysis. Those interested in more technical detail should look at GOST's tutorials at the GOSTNets Github Repository, this project's code notebooks on GOST's code repository, or the authors cited herein.

Figure A2-1: A gravity model of union-level accessibility to high quality jobs in Cox's Bazar

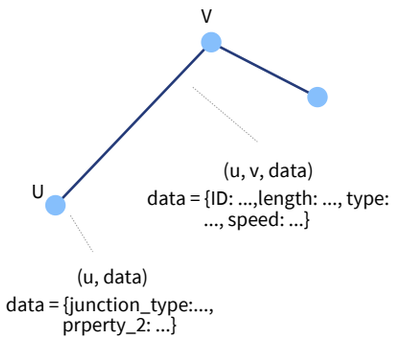


Accessibility modeling process

Calculating travel times using a network analysis

All accessibility statistics were computed using origin-destination (OD) matrices generated in a network analysis. Given a set of origins and destinations, OD matrices show the travel time from every origin to every destination over a transport network, using average travel times across different classes of transport links (main roads, small roads, unpaved tracks, ferries, etc.). The minimum time thus calculated represents the quickest possible access time to that type of destination and in the process reveals the nearest destination. In this case, origins were populated places and destinations were cities, services, or places of employment.

Figure A2-2: Nodes and edges in a network



The network in a network analysis is represented as a collection of *nodes* and *edges*, as in Figure A2-2, where *u* and *v* are distinct nodes and (*u,v*) is an edge. Both nodes and edges can have properties representing their type, size, importance, length, associated speeds, ID number, and/or any other useful characteristic. Edge lengths are calculated in meters and multiplied by the average *meter / hour* speed associated with that type of transport link to yield an average speed per edge (see Table A2-1 for speed details). If desired, some nodes can be assigned "wait times" to represent traffic signals, expected congestion, border crossing delays, etc.

We prepare these networks from existing geospatial data for roads, ferries, paths, or other transportation services. Such geospatial data can come from many sources: official government sources, privately held datasets, open databases like OpenStreetMap, or even GPS traces from field workers.

Network analyses always face a tradeoff between accuracy and performance. A more detailed network will represent edge lengths, network shapes, and the network's "topology" – the connections between segments (edges) – more accurately. The contrasting complex and simple representations of a traffic roundabout in Figure A2-3 exemplify this. Additionally, because origins and destinations in the analysis are "snapped" to the nearest node, usually by calculating the straight-line walking distance to this node, a greater density of nodes provides greater spatial accuracy in terms of start/end destinations and greater walking time accuracy – which can be substantial if either is far from a node. Fewer nodes thus lead to longer snap distances and greater average walking times.

The tradeoff is that holding all these nodes and edges in memory and calculating routes over them is significantly more taxing for computers when working with large networks. Even with significant simplification, regional, national, or international country-scale analyses may have to be conducted on dedicated servers which can handle the associated load. Exact calculation times depend on the complexity of the network vs. the power of the machine employed and are thus difficult to predict. Running the full multi-scenario analysis routine in Cox's Bazaar using a dedicated server with 64 GB RAM and 16 processors took 3-4 hours when fully optimized.

We usually simplify the network by removing nodes and straightening edges below a set density threshold. The exact threshold selected depends on the scale of the analysis area and the importance of accuracy in time readings. For Cox's Bazar, we simplified segments under 50m, whereas for a national analysis we might simplify under 1km. Figure A2-3 and Figure A2-4 below show examples of simplifying an individual junction and a larger network, respectively.

Figure A2-3: Simplifying a junction

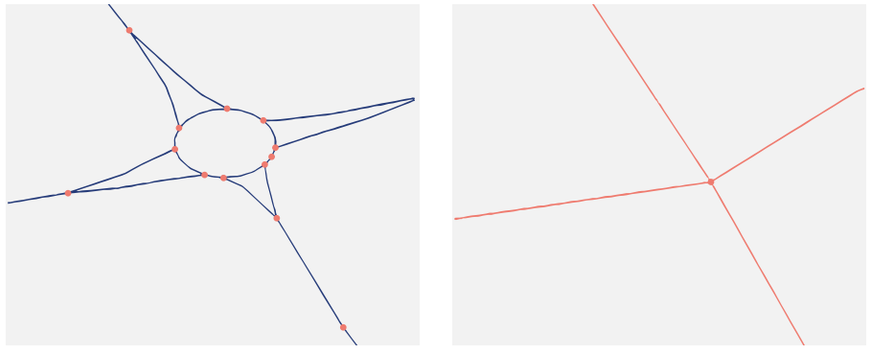
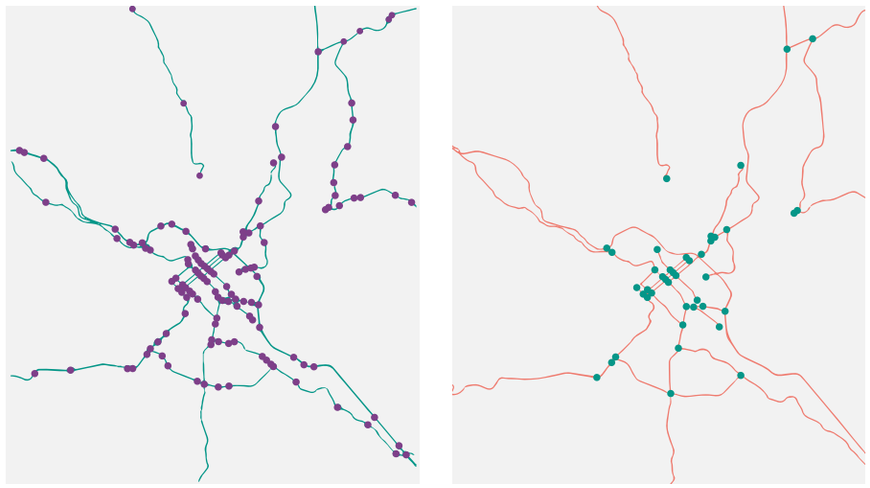


Figure A2-4: Simplifying a small network



Representing origins and destinations

Origins and destinations can take many forms in a network analysis. Both are represented as points that are "snapped" to the nearest node on the network. The length of the snapping distance is used to calculate a to-node walking time specific to each origin or destination. This walking time is added to the calculated network travel time from origin node to destination node.

In a larger-scale analysis (e.g., nationally), origins might be villages, towns, cities, or even the geographic center of administrative units. Given the small spatial scale of the Cox's Bazar analysis we used a more detailed set of origins drawn from the High Resolution Satellite Layer (HRSL), a gridded population model released by Facebook and CIESIN, which is described in greater detail under the Data Quality section. We achieved a high degree of spatial precision in origin locations by representing each cell in HRSL's 30m x 30m grid as an origin – over 100,000 origins in total for the whole district – as shown in Figure A2-6. This high precision allowed us to aggregate accessibility information at almost any level of detail with high confidence in the results – mouza level aggregation would have been possible, if spatial boundaries were available.

Note that processing this number of origins was computationally taxing, and it would not be feasible to employ the same HRSL-derived origins for a regional- or national-scale analysis.

Figure A2-5: Nodes, edges, origins, and destinations in a network

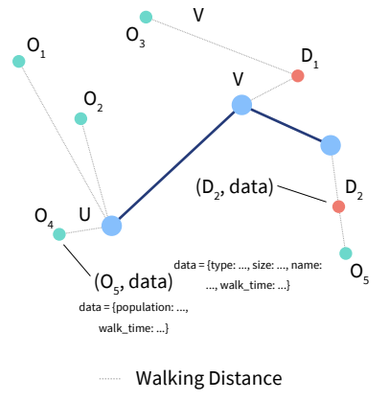
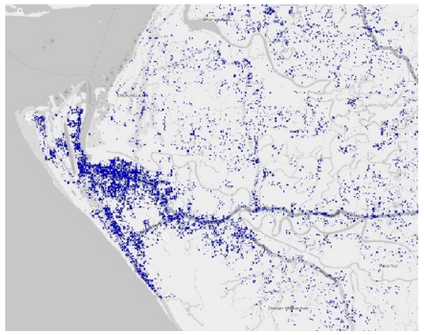


Figure A2-6: Populated places / origins (in blue) around Cox's Bazar town (HRSL 2018)



Note: not the full extent of the analysis.

We analyzed the accessibility of each origin to a variety of destinations: health centers, different types of schools, different types of markets, and key places of employment like the Martarbari port. Each destination was represented as a point, as in Figure A2 7, where a red point represents each health center.

In a few cases, it was faster to walk directly to a destination from an origin than to travel over the network – for instance, students walking across a field to a nearby school. Our analysis considers this possibility and assigns direct walking speeds to origins where direct walking times are lower than walk-to-network + on-network times, as with O_3 - D_1 and O_5 - D_2 in Figure A2-5.

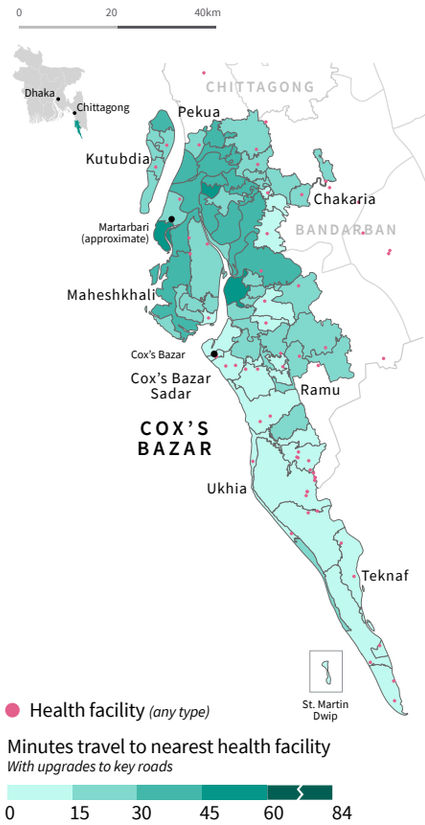
Speeds

Road travel times were adapted from a similar analysis by Blankespoor and Yoshida (2010), with a 10 km/h downward adjustment to account for traffic density and poor road conditions in Cox's Bazar. Ferry times were estimated conservatively to account for probable delays. All speeds are summarized in Table A2-1 below.

Table A2-1: Network segment speeds

Road class *(from OpenStreetMap)*	**Speed (km/h)**
Trunk	55
Primary	55
Secondary	40
Tertiary	30
Residential / Unclassified (small paved roads)	20
Tracks (unpaved), Service roads	15
Ferry	15
Pier	4.5
Walking	4.5
Link roads (e.g. primary_link, secondary_link)	-5

Figure A2-7: Health center destinations in Cox's Bazar



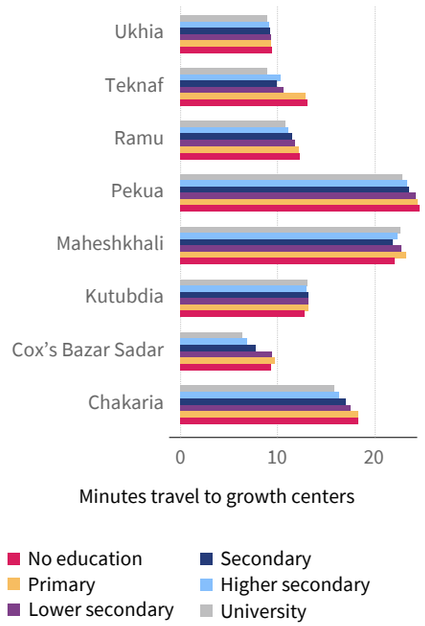
The 4.5 km/h walking speed is a slight reduction from Tobler's (1993) recommended 5.06 km/h speed over flat terrain; this accounts for non-linearity in routes to roads (around paddy fields, etc.) and is consistent with the literature on walking speeds used by transport geographers (Munoz-Raskin 2010, Mathon et al. 2018, Delmelle and Casas 2012).

We routed populated places within Cox's Bazar to seven (types of) destinations:

- Downtown Cox's Bazar
- Downtown Chittagong
- The proposed deep sea port in Matarbari
- The nearest health facility (of any type)
- The nearest educational facility (primary, secondary, and tertiary separately)
- Growth centers
- Markets of all sizes

Facilities in neighboring Bandarban and Chittagong districts were included in the analysis to ensure accuracy in border areas. The final products were packaged into maps, as shown in Figure A2-1, Figure A2-7, and Figure A2-9, and charts, as in Figure A2- 8.

Figure A2-8: Accessibility statistics were aggregated at various levels, and occasionally further subdivided by demographic indicators within them



The resulting access statistics were calculated per populated place (30 m^2) and then aggregated up to the union, upazila, and district (zila) levels for analysis and visualization. All aggregated results were population weighted, e.g., if half the HRSL origin points in a union contained 2x the population, their average travel times would be weighted double in the mean union / upazila value.

Investment scenarios

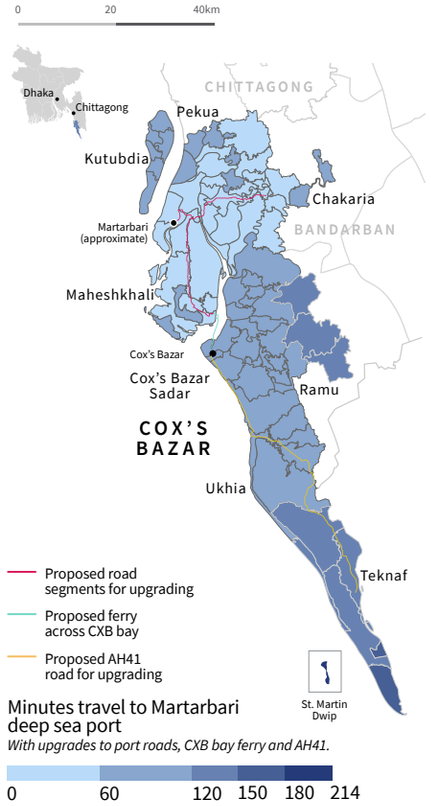
All of this analysis was first prepared for the current transportation network setup, then replicated for three additional transportation investment scenarios, taking into account improved speeds over the key roads being upgraded. This permitted comparisons between different investment options and opens the door for future analyses comparing the cost-effectiveness of these investments in accessibility terms, or the incorporation of travel-time savings into formal cost-benefit analysis.

The scenarios and their corresponding speed upgrades are described north-to-south in Table 2 and visualized (in reference to accessibility to Martarbari) in Figure A2-9.

Table A2-2: Investment scenarios

Scenario	Upgrade
Major upgrades to the main roads servicing the Martarbari port and the adjoining Maheshkhali upazila	Upgrade port roads to primary, Maheshkhali road to secondary
The above roads are upgraded, and a dedicated ferry line Is set up connecting Maheshkhali and Cox's Bazar city across the boy	Upgrade ferry to tertiary speed
The above investments are made, and upgrades are made to the principle southern highway (the AH41 N1) connecting Ukhia and Teknaf to Cox's Bazar Sadar.	Upgrade AH41 to secondary speed

Figure A2-9: Proposed transport investments in Cox's Bazar



Potential accessibility and gravity models

We prepared a further analysis of *potential accessibility* to growth centers using these OD matrices, in recognition of growth centers' central role in propelling economic growth. Potential accessibility considers each origin's accessibility to all destinations instead of just the nearest one. This is useful where access is cumulative and multiple destinations are important, as with markets, as compared to single-use destinations like schools. Transportation geographers have developed several mathematical models of potential accessibility, the literature and theoretical basis for which are well reviewed by Geurs and van Wee (2004) and Paez et al. (2012).

Gravity models are a variant of potential accessibility models that increase the attractiveness of a destination according to a given attribute (population size, market importance, etc.) and decrease it inverse to the distance (measured in meters, travel time, etc.). There are several mathematical variants of gravity models:

we followed the standard practice in economic development literature of employing the negative exponential model,[1] which balances well the decay in attraction over a distance. Major publications describing this approach in the economic development context come from Deichmann (1997) and Deichmann and Yoshida (2009), with relevant recent applications by Blankespoor and Yoshida (2010) and Blankespoor et al. (2018).

The negative exponential model is summarized in Equation A2-1.

Equation A2-1: The negative exponential model

$$I_i^{ne} = \sum_j S_j * e^{-d_{ij}^b / 2a^2}$$

Where

I_i^{ne}	The negative exponential accessibility index for origin *i*
S_j	Destination *j*
d_{ij}	Travel time from origin *i* to destination *j*
b	Distance decay function *b*
a	Relative attractiveness of the destination (e.g., number of high-quality jobs)

We employ gravity models to prepare four different indices of accessibility to growth centers:

1. Market accessibility index
2. Firms (all sizes) accessibility index
3. Large firms accessibility index
4. High-quality jobs accessibility index.

The former is an unweighted negative exponential model. The latter three weight the attractiveness of the market by relevant economic census data for the union containing the growth center. We employed a distance decay which halved the attractiveness of a growth center over 60 minutes travel. Thus, a growth center with 5,000 high quality jobs 0 minutes away would be equally as attractive as a growth center with 10,000 such jobs 60 minutes away. Other distance decays were considered for different variables that ultimately were not included in the growth diagnostic – for instance, "bad-quality jobs" were given a distance decay of only 30 minutes to reflect their lower attractiveness.

[1] There are many other models for calculating potential accessibility, which are beyond the scope of this paper to review. The negative exponential model is often preferred because it degrades attractiveness proportionally to travel times.

We employed growth centers as proxies for major economic centers. Growth centers are markets designated by Bangladesh's government for investment based on their high importance for growth potential. In some cases, this proxy relationship may be imperfect, as when jobs are in fact based far from a growth center; locations of major employers would improve the analysis in such cases.

An important note is that the coarser spatial resolution of unions presents unavoidable error when, for instance, a growth center lies at the border of two unions but is only assigned firms from one.

Data sources

All geospatial population data was sourced from the High Resolution Satellite Layer (HRSL) released by Facebook and CIESIN for Bangladesh in 2018. The HRSL uses deep learning to categorize populated vs. unpopulated places (principally by recognizing building roofs) in a 30 m2 grid for each country. Populations for the most detailed available administrative level from the latest census are then distributed to these populated grid cells and adjusted to the year in question (2018) using a country-specific scalar from the UN Population Division.

The transport network data is all sourced from OpenStreetMap, a "Wikipedia of maps" platform commonly used by geographers. OSM's quality in Cox's Bazar is overall very high, as volunteers have created lots of data to assist with the humanitarian response. All health-facilities data comes from OpenStreetMap and Bangladesh's Local Government Engineering Department (LGED). All educational facilities and markets come from the LGED. Downtown Chittagong, Cox's Bazar, and the approximate port location were manually located by the analyst using OpenStreetMap as a reference layer.

A full list of data layers is provided in Table A2-3.

Table A2-3: Data sources

Data type	Source	Aggregation Level	Notes
Roads	OpenStreetMap	Lines	
Health facilities	LGED / OpenStreetMap / UN Inter-Sector Coordination Group (merge)	Points	Observed gaps and inconsistencies
Educational facilities, Growth Centers, Markets	LGED	Points	

Data type	Source	Aggregation Level	Notes
Population (2018) (origins and totals)	High Resolution Satellite Layer (CISEIN and Facebook)	30 m2 grid	Derives population figures from 2011 census, adjusted via a scalar to 2018
Employment category breakdowns (1)	2013 Economic Census (BBS)	Union (admin 4)	Does not include agricultural workers, has lower aggregate figures than census
Employment category breakdowns (2)	2011 Census (BBS)	Upazila (admin 3)	Has higher aggregate figures than census
Educational attainment breakdowns	2011 Census (BBS)	Upazila (admin 3)	

Data quality

All transport network segments are roads aside from three critical ferry routes linking Kutubdia, southern Maheshkhali, and St. Martin Dwip to the main network. Based on our review, in the vast majority of the study area the roads data seemed adequately dense and correctly classified. In remote rural areas, the network was at times underdeveloped or classified incorrectly (e.g., as a rough track instead of a paved road). We manually cleaned up roads in important areas, but a full cleaning was beyond the scope of this assignment; therefore, the network may give erroneous readings in some remote areas. These errors seem to occur most often in unpopulated areas far away from the Rohingya camps area so reflect least on the host communities most affected by the Rohingya influx.

We believe the margin of error within the analysis is acceptable. Based on personal experience in the area, the times returned approximate realistic optimal travel conditions (e.g., 45 minutes from Ukhia to downtown Cox's Bazaar). Official LGED roads data was actually less complete than OSM data and thus wasn't employed.

The health and educational datasets are from shapefiles provided by the LGED office.

A breakdown of the definitions used within the Economic Census for service and industrial work is provided in Table A2-4 below.

Table A2-4: Categorizing service vs. industrial workers

Industry	Mining and Quarrying
	Manufacturing just Garment
	Manufacturing excluding Garment
	Electricity, Gas and Water Supply
	Construction
Services	Wholesale and Retail Trade, Repair of Motor Vehicles and Motor Cycles
	Accommodation and Food Service Activities (Hotel and Restaurants)
	Transport, Storage and Communications
	Financial and Insurance Activities
	Real Estate Activities
	Public Administration and Defense, Compulsory Social Security
	Education
	Human Health and Social Work Activities
	Community, Social and Personal Services

Caveats and limitations

The model outputs should be seen as travel under reasonably optimum conditions, i.e., normal amounts of traffic. However, roads conditions in the study area are occasionally far from optimal, with many delays, heavy traffic, and detours. We attempted to gather traffic data from Mapbox to calibrate travel speeds, but it was not suitably comprehensive in this area.

A major limitation of this analysis is that it provides no insights into *qualitative* access to health and education because of incomplete attributes in the source data. In reality, different facilities provide different services to different populations, with different levels of quality – think maternal health facilities vs. hospitals, or well-resourced schools vs. poorly resourced schools. With better source data, a future analysis could assess these qualitative aspects of access.

Tools employed

All of the analysis was performed in Python, specifically leveraging the GOSTNets package developed by the World Bank's Geospatial Operations Support Team (GOST). Additional roads data was created in OpenStreetMap using its standard Java OpenStreetMap Editor (JOSM) tool. Data quality spot checks were performed in QGIS.

All maps were created using a combination of QGIS and Adobe Illustrator: a rough cut of each map was prepared in QGIS and then exported as a PDF for refinement in Adobe Illustrator. Chart visualization exclusively took place in Python, to allow bulk production of charts.

ANNEX 3

Nighttime light data and economic activity

Using nighttime lights (NTL) data, we provide evidence of higher economic activity in markets run by the host population near the Rohingya camp, suggesting that the host communities near camps have seen more economic activity after the influx of the Rohingya. The hypothesis explored is that the sudden influx of people brings new resources to the region, especially by the expansion in humanitarian aid. The aid provides means to increase the demand and activity in local markets. In Cox's Bazar, the international assistance that the Rohingya received includes in-kind and e-voucher transfers, plus different cash-for-work programs.

The effects of refugee influxes on the welfare of host populations are complex. Alix-Garcia et al. (2017) suggest a framework separating effects via market mechanisms and outside market mechanisms. Within the market, there are effects via demand and supply in goods, services, and labor. The changes in demand and supply impact the prices and incomes of host populations, thus affecting their welfare. In this case, we focus on effects via a market mechanism. Principally, we argue that more economic activity after the influx might have increased the income of hosts.

To estimate the relationship between Rohingya camp populations and local economic activity, we follow Alix-Garcia et al. (2018). Similar regressions were run to test the relationship between refugee populations and economic growth in markets near Rohingya camps.

$$Lights_{it} = \alpha + \beta Rohingya_t * f_d\ (km\ from\ camp_i) + \gamma Conectivity_{iy} + \phi Host\ popution_{iy} + \theta_i + \mu_t + \epsilon_{it}$$

where $Lights_{it}$ is the inverse hyperbolic sine (IHS) of the sum of the VIIRS luminosity within a 500 m buffer around growth center i in month t, $Rohingya_t$ is the monthly Rohingya population reconstructed using UNHCR and IOM publicly available data,[2] $Conectivity$ is the travel time from growth center to Cox's Bazar Sadar (the district capital) interacted with a year γ fixed effect, $Host\ popution$ is the IHS of the host population living in a 5 km radius of growth center i interacted with a year fixed effect γ, θ_i is a growth center fix effect, μ_t is a time fixed effect, and ϵ_{it} is an error term.

As in Alix-Garcia et al. (2018), both parametric and semi-parametric measures of distance are used to identify the effect of displaced population on economic activity. The monthly Rohingya population is interacted with measures of distance of growth centers from camps, denoted as $f_d(km\ from\ camp_i)$. The latter takes three different forms, two of which are parametric: first, the IHS of the distance from growth center i to the closest camp; and second, the inverse of distance to the closest camp. The semi-parametric specification is a series of dummy variables representing a distance range. In this case, the following ranges are used: 0 to 5 km, 5 to 10 km, 10 to 15 km, 15 to 25 km, and 25 to 80 km. Two different specifications of $Rohingya_t * f_d\ (km\ from\ camp_i)$ are used for robustness. The process first follows a basic difference-in-difference approach using the major 2017 influx of Rohingya as an identification strategy, using $August\ 2017\ dummy\ 0\ to\ 5km\ dummy_i$. $0\ to\ 5km\ dummy_i$ is a dummy variable that takes value 1 if the growth center is within 5 km of a camp, and $August\ 2017\ dummy$ is a dummy that takes value 1 after the major Rohingya influx in August 2017. Identification follows, as the influx is uncorrelated with the location of growth centers. At a second stage, the process uses $Rohingya\ 5km_{it}$ which represents the IHS of the Rohingya population within a 5km radius of growth center i in month t.

Table A3-1 in the annex shows the results from estimation of the different specifications. Column 1 shows how economic activity at growth centers close to Rohingya camps grows after the influx. The coefficient of interest has a positive sign and is significant. Column 2 shows that, as distance from camps increases, economic activity decreases, and column 3 shows the same result using the inverse distance measure. More work is needed to explore the mechanisms operating. This analysis presents results suggestive of positive impacts of the Rohingya population on hosts, to the extent that nighttime lights provide an adequate proxy for economic activity.

[2] Where data gaps were identified in the monthly refugee population count at camp level, a linear interpolation between months was used to complete the series.

Table A3-1: Nightlight intensity regression results

	(1)	(2)	(3)	(4)	(5)
Variables	**IHS(Lights)**	**IHS(Lights)**	**IHS(Lights)**	**IHS(Lights)**	**IHS(Lights)**
0 to 5 km * Dummy August 2017	0.255***				
	(0.0409)				
IHS of distance to Camp * Rohingya population		-0.0226***			
		(0.00475)			
Inverse of distance to Camp * Rohingya population			0.205***		
			(0.0256)		
0 to 5 km * Rohingya population				0.120***	
				(0.0300)	
5 to 10 km * Rohingya population				-0.0545	
				(0.0440)	
15 to 25 km * Rohingya population				-0.0985***	
				(0.0329)	
25 to 80 km * Rohingya population				0.0276	
				(0.0263)	
IHS Total population Rohingya in a buffer of 5000 m around GC					0.0889***
					(0.0130)
Observations	2,448	2,448	2,448	2,448	2,448
R-squared	0.884	0.883	0.885	0.886	0.885
Time trend	YES	YES	YES	YES	YES
Accessibility control	YES	YES	YES	YES	YES
Host size population control	YES	YES	YES	YES	YES
Market FE	YES	YES	YES	YES	YES
Year Month FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ANNEX 4.

Pattern of employment in Cox 's Bazar: Economic Census 2013 and Population Census 2011

Chittagong division as a whole is rapidly urbanizing, with an economy oriented to manufacturing and export. In contrast, the latest reliable district-level estimates before the Rohingya influx show that Cox's Bazar at that time still depended heavily on agriculture.[3] The non-agricultural economy of Cox's Bazar is dominated by 1 and 2 person enterprises in the services sector. At the same time, Cox's Bazar has a significantly smaller share of employment in industry, when compared with national and division averages. This is driven by a lower presence of RMG industries in Cox's Bazar and, within industry, the high prevalence of 1-2 person enterprises engaged in RMG and salt extraction, relative to better-connected areas of Chittagong such as Chittagong zila or Feni.

[3] Considering the scarcity of pre-influx data bases representative at zila and upazila level, and given that employment shares at district level for Cox's Bazar using HIES 2016 had large standard errors, employment shares are calculated using the 2011 Population Census. However, recognizing that the population census is not ideal for this purpose, we revert to LFS and HIES for estimating employment at the national and division level. While agriculture's ranking holds across these sources, there are differences in point estimates.

Within Cox's Bazar, upazilas showed wide variation in their main sectors of employment. While in Pekua and Maheshkhali, 7 out of 10 individuals relied on agriculture in 2011, in Cox's Bazar Sadar, the service sector was dominant (Figure A4-1). Among the southern upazilas, Teknaf was relatively more diversified: two-thirds of households in Ukhia are classified as farm households, as opposed to a third in Teknaf. Teknaf was also more industrialized, with industry employing more than 15 percent of workers, as opposed to only 4 percent in Ukhia. On the other hand, in Ukhia, 55 percent of individuals were employed in the service sectors, compared to 33 percent in Teknaf.

While industry is the dominant employer of women outside agriculture in Bangladesh and Chittagong, in Cox's Bazar, services are a more important source of non-agricultural jobs for women. [4] Among women working outside of agriculture in 2013, two-thirds were working in industry in Bangladesh as a whole. In Chittagong division, the proportion of women working in industry was even higher, at three-quarters. In contrast, in Cox's Bazar, the main non-agricultural sector of employment for women was services, where more than half of working women were employed. Within services, tailoring, education, and retail trade were the main occupations for women in the district, representing 31, 23, and 18 percent of female service-sector employment. In industry, textile and RMG manufacturing were the main cluster for women's employment, accounting for more than half of women working in industry in Cox's Bazar. Manufacture of furniture and wood products represented roughly another 20 percent of women's industrial employment in the district.

Among men, non-agricultural employment is dominated by services, with a relatively small share of men relying on RMG and textile manufacturing in Cox's Bazar. Male employment was heavily dominated by service-sector activities at national, division, and district levels. Services accounted for 76, 77, and 86 percent of non-agricultural male employment in Bangladesh, Chittagong, and Cox's Bazar respectively. The main occupation among men employed in services was retail and wholesale trade, representing more than 50 percent of male service jobs in Cox's Bazar. The pattern of employment in the industry sector also differed by gender. While salt extraction and furniture manufacturing employed 30 and 20 percent of men in industry, respectively, the RMG and textile branches employed only 13 percent of Cox's Bazar's male industrial workers.

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[4] The Population Census underestimates female work (mainly in the agricultural sector) because it is not designed to capture unpaid and housework employment. For this reason, employment comparisons by gender cannot be done using Population Census data without presenting misleading information. For this reason, gender comparisons are based on non-agricultural employment using the Economic Census 2013. That being said, estimates at national and division level from different data sources suggest that agriculture and services are the main employers for females and males respectively.

Figure A4-1: Employment shares in Cox's Bazar, Chittagong, and Bangladesh, 2011

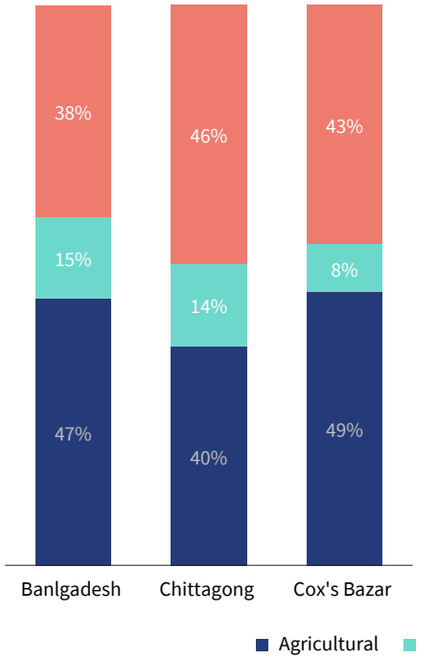
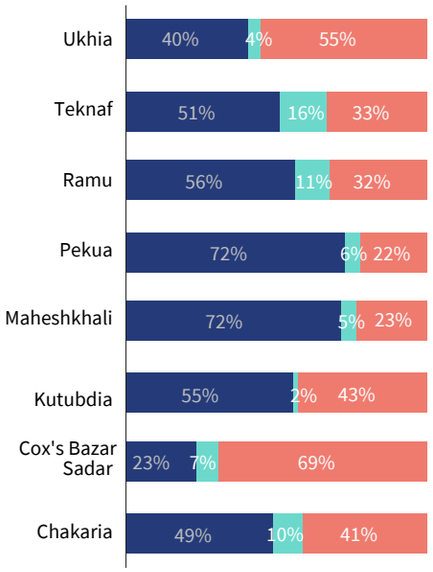


Figure A4-2: Employment shares by upazila, 2011



Source: Staff calculations, Population Census 2011.

Despite having a similar firm-size structure, the pattern of non-agricultural employment by firm size is different in Cox's Bazar compared with national and divisional levels. While in Cox's Bazar only 38 percent of industry employment is in firms hiring more than 5 individuals, in Bangladesh and Chittagong, 3 out of 4 workers are employed by non-micro enterprises in the industry sector. In the case of the service sector, on the other hand, Cox's Bazar reflects the national and division pattern of employment being concentrated in small firms, with roughly 2 out of 3 workers engaged in service activities being employed by firms with less than 5 employees (Table A4-1). The differences in employment shares by firm size across industry and services suggest that larger firms in Cox's Bazar have a lower employment capacity than those at national and division level. Furthermore, considering that 8 percent of firms with more than 100 employees are in the RMG industry (Farole and Cho 2017), the differences in employment pattern by firm size between Cox's Bazar and the national average highlight the importance of the RMG industry as an employer among larger firms for the country, but not to the same extent for the district.

Table A4-1: Number of non-agricultural workers and shares by firm size and sector

	Industry					
	Bangladesh		Chittagong		Cox's Bazar	
1 worker	277,182	4%	89,875	6%	13,329	31%
2 workers	104,962	1%	20,368	1%	2,636	6%
3-4 workers	1,548,556	21%	300,787	20%	10,688	25%
5-9 workers	640,722	9%	103,421	7%	6,652	16%
10-35 workers	567,392	8%	50,681	3%	2,608	6%
more than 35	4,185,988	57%	948,546	63%	6,854	16%
	7,324,802	100%	1,513,678	100%	42,767	100%
	Services					
	Bangladesh		Chittagong		Cox's Bazar	
1 worker	3,170,779	19%	391684	13%	27718	13%
2 workers	3,454,434	20%	635670	20%	31618	15%
3-4 workers	4,327,199	26%	992506	32%	76643	35%
5-9 workers	3,581,696	21%	698644	22%	60763	28%
10-35 workers	1,490,082	9%	272310	9%	15812	7%
more than 35	870,966	5%	126003	4%	4757	2%
	16,895,156	100%	3,116,817	100%	217,311	100%
	Total					
	Bangladesh		Chittagong		Cox's Bazar	
1 worker	3,447,961	14%	481,559	10%	41,047	15.8%
2 workers	3,559,396	15%	656,038	14%	34,254	13.2%
3-4 workers	5,875,755	24%	1,293,293	28%	87,331	33.6%
5-9 workers	4,222,418	17%	802,065	17%	67,415	25.9%
10-35 workers	2,057,474	8%	322,991	7%	18,420	7.1%
more than 35	5,056,954	21%	1,074,549	23%	11,611	4.5%
	24,219,958	1	4,630,495	1	260,078	1

Source: Staff calculations, 2013 Economic Census.

Non-agricultural employment in Cox's Bazar was mostly concentrated in Chakaria and Sadar upazilas. Half of individuals employed in non-agricultural activities are based in Chakaria and Cox's Bazar Sadar, which represent 22 and 26 percent of total non-agricultural employment in the district, respectively (Table A4-2). A second group comprised of Teknaf, Ramu, and Maheshkhali represent a third of the district's total non-agricultural jobs (accounting for 14, 11, and 10 percent of such jobs, respectively). The distribution of employees working in services and industries shows similar spatial patterns, but with a

peculiarity for Teknaf. While this upazila is home to 15 percent of service-sector workers, it only hosts 8 percent of individuals employed in industry. In terms of non-agricultural employment composition, Teknaf and Ukhia are the two least-industrialized upazilas, with services representing 90 and 92 percent of their total non-agricultural employment. On the other hand, the district's two most industrialized upazilas are Chakaria and Pekua, where industry represents 23 and 22 percent of total non-agricultural employment.

Table A4-2: Employment distribution and shares by sectors and upazilas

	Number of workers			Share of total workers by sector			Share of total upazila workers	
	Industry	Services	Total	Industry	Services	Total	Industry	Services
Chakaria	12,781	43,305	56,086	30%	20%	22%	23%	77%
CXB	10,811	55,807	66,618	25%	26%	26%	16%	84%
Kutubdia	1,790	10,974	12,764	4%	5%	5%	14%	86%
Maheshkhali	4,155	21,438	25,593	10%	10%	10%	16%	84%
Pekua	3,342	11,945	15,287	8%	5%	6%	22%	78%
Ramu	4,860	24,834	29,694	11%	11%	11%	16%	84%
Teknaf	3,602	31,719	35,321	8%	15%	14%	10%	90%
Ukhia	1,426	17,289	18,715	3%	8%	7%	8%	92%
Cox's Bazar district	42,767	217,311	260,078	100%	100%	100%	16%	84%

Source: Staff calculations, 2013 Economic Census.

Employment patterns within the service sector were relatively homogeneous across upazilas, dominated by wholesale and retail trade, with education services following a distant second. Wholesale and retail trade was the most important employer for males working in services, accounting for 62 percent of all men in the service sector, on average (Table A4-3). Teknaf and Maheshkhali are the upazilas with the largest share of service-sector workers involved in trading activities, roughly two-thirds. On the other hand, Sadar upazila has the lowest share, at 56 percent. The second-most-important activity within the tertiary sector is education, mainly primary-education-related activities. Unlike trade, education represents an important share of female employment. Thirty-five percent of non-agricultural female employment is in education services, compared to 7 percent of all non-agricultural employment for women and men. Ukhia has the largest share of non-agricultural employment in this sector, at 11 percent.

Accommodation and food and tailoring services are also important employers across upazilas. The former, mainly represented by "tea stall" activities, absorbed 9 percent of the labor force engaged in services, on average. In Cox's Bazar Sadar and Teknaf, short-term accommodation activities were also an important cluster of employment. These activities have an opposite gender intensity. While tea stalls constitute a slightly higher share of employment for males than females, short-term accommodation represents a larger share among women workers. Tailoring activities absorbed 5 percent of service workers across upazilas, representing only 4 percent of male service-sector jobs but a quarter of female employment in services. These activities are particularly important for women in some upazilas, representing roughly half of female service-sector employment in Teknaf and Ramu. In contrast, in Kutbudia and Ukhia, only 3 and 9 percent of women working in services were involved in tailoring activities.

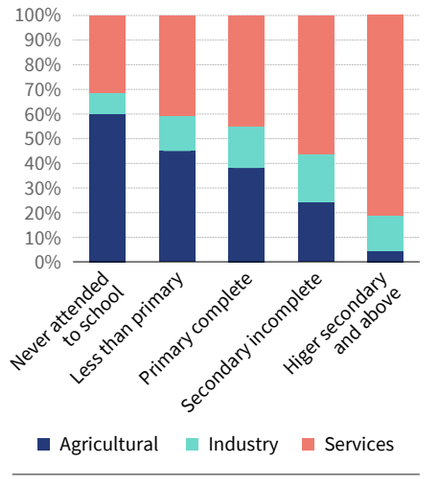
The employment composition within industry varies across upazilas, perhaps reflecting difference in underlying economic structure. Manufacture of textiles and RMG is particularly important in some upazilas. In Chakaria, Pekua, and Teknaf, this activity represented 54, 31, and 18 percent of total individuals engaged in industry. At the same time, in these upazilas, RMG was the most important female employment cluster, accounting for 82, 59, and 50 percent of female industrial workers. This sector is negligible in Kutubdia and Ukhia. Another important industrial sector in Cox's Bazar is the "extraction of salt" industry, which employed 24 percent of industrial workers in the district. Salt extraction was relatively more important for Kutubdia and Maheshkhali, where it represented 52 and 68 percent of all industrial workers, followed by Sadar, Teknaf, and Pekua, where it accounted for a third of industrial jobs. "Manufacture of furniture" is another important employment sector in Cox's Bazar, representing 18 percent of industrial workers. Within this industry, manufacture of wooden products is the main activity. Across upazilas, its importance is relatively higher in Ukhia, where it represented 46 percent of industrial employment.

Table A4-3: Shares of female, male, and total employment in industry and services, Cox's Bazar (main activities)

		% of female	% of male	% of total workers
Industry	Extraction of salt	4%	30%	24%
	Manufacture of textile and RMG	57%	13%	24%
	Manufacture of wood and products of wood	8%	5%	6%
	Manufacture of furniture	13%	20%	18%
	Manufacture of food (main rice milling)	4%	5%	5%
	Manufacture of other non-metallic (main brick block tiles)	4%	11%	9%
	Manufacture of jewelry	3%	4%	4%
	manufacture of fabricated metal product (mainly structural metal products)	4%	6%	5%
	Other Industries	3%	6%	5%
Services	Trade	18%	64%	61%
	Transport	0%	4%	4%
	Accommodation and food	9%	9%	9%
	Education	23%	6%	7%
	Tailoring	31%	4%	6%
	Public administration	3%	2%	2%
	Health	5%	1%	2%
	Other services	11%	10%	10%

Source: Staff calculations, 2013 Economic Census.

Figure A4-3: Education level and sector of employment, Cox's Bazar

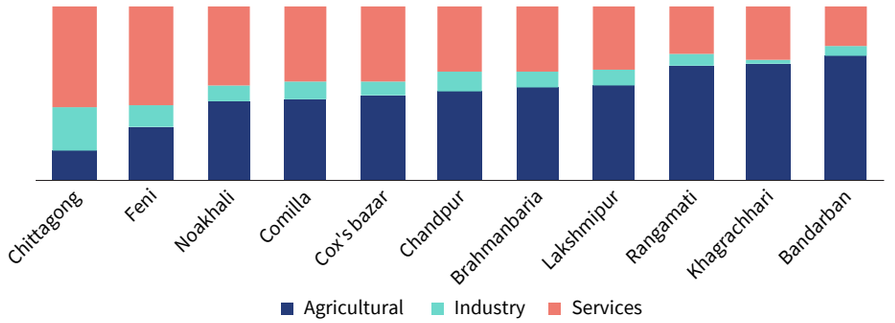


Source: Staff calculations, Population Census 2011.

Cox's Bazar had relatively low employment quality, when compared with Chittagong and Bangladesh as a whole. According to Farole and Cho (2017), as the Bangladeshi economy has experienced structural transformation, average job quality has improved. However, gains have been uneven across space and gender. Analysis of the 2013 Economic Census shows that workers in Cox's Bazar had an elevated probability of working in agriculture or holding lower-quality jobs such as day labor (Figure A4-3). This is due in part to the district's low average educational attainment. In general, the lower the education, the lower the quality of jobs and the higher the likelihood of workers' being involved in agriculture. Sixty-one percent of workers with no education worked in the primary sector. At the other end of the educational distribution, 90 percent of people with higher education5 worked in industry and services. The continued importance of agriculture as a source of livelihoods in the district likely reflects in part its lagging progress in human capital outcomes, described in Chapter 2.

Additional figures and detailed tables supporting Annex 4

Figure A4-4: Main sectors of employment by zilas in Chittagong Division



Source: WB staff elaboration, Population Census 2011.

[5] Individuals with higher education are those individuals who have completed higher secondary level or upper education level.

Table A4-4: Employment shares by sector, Bangladesh, Chittagong, and Cox's Bazar

Sectors	Bangladesh			Chittagong			Cox's Bazar		
	% of total	% of female	% of males	% of total	% of female	% of males	% of total	% of female	% of males
B Mining and quarrying	0.3%	0.4%	0.2%	0.3%	0.1%	0.3%	3.9%	1.6%	4.1%
C Manufacturing	29.5%	63.8%	22.7%	32.0%	74.8%	21.7%	12.2%	43.5%	9.1%
D Electricity, gas, steam and air conditioning supply	0.2%	0.3%	0.2%	0.2%	0.1%	0.2%	0.2%	0.1%	0.2%
E Water supply; sewerage, waste management and remediation activities	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
F Construction	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
Total Industry	**30.2%**	**64.7%**	**23.4%**	**32.7%**	**75.1%**	**22.4%**	**16.4%**	**45.3%**	**13.6%**
G Wholesale and retail trade; repair of motor vehicles and motorcycles	34.2%	6.0%	39.9%	34.4%	3.3%	42.0%	50.9%	9.7%	55.0%
H Transportation and storage	7.6%	2.5%	8.6%	3.5%	1.1%	4.1%	3.2%	0.2%	3.5%
I Accommodation and food service activities	5.0%	1.0%	5.8%	6.9%	0.9%	8.4%	7.8%	4.8%	8.0%
J Information and communication	0.4%	0.3%	0.4%	0.3%	0.2%	0.3%	0.4%	0.5%	0.3%
k Financial and insurance activities	1.9%	2.5%	1.8%	1.9%	1.9%	1.9%	1.6%	3.6%	1.4%
L Real estate activities	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.2%	0.1%	0.2%
M Professional, scientific and technical activities	0.7%	0.4%	0.7%	0.6%	0.1%	0.7%	0.4%	0.1%	0.5%
N Administrative and support service activities	0.6%	0.2%	0.7%	0.6%	0.1%	0.8%	0.7%	0.2%	0.8%
O Public administration and defense; compulsory social security	2.4%	1.6%	2.5%	2.4%	1.0%	2.7%	1.4%	1.8%	1.3%
P Education	6.0%	9.3%	5.4%	5.9%	7.0%	5.6%	5.8%	12.7%	5.1%
Q Human health and social work activities	1.7%	2.7%	1.5%	1.3%	1.6%	1.2%	1.4%	2.9%	1.2%
R Arts, entertainment and recreation	0.1%	0.0%	0.2%	0.1%	0.0%	0.2%	0.1%	0.1%	0.1%
S Other service activities	8.9%	8.6%	9.0%	9.1%	7.5%	9.5%	9.8%	18.1%	9.0%
Total Services	**69.8%**	**35.3%**	**76.6%**	**67.3%**	**24.9%**	**77.6%**	**83.6%**	**54.7%**	**86.4%**

Source: WB staff elaboration, Economic Census 2013.

Table A4-5: Number of workers and share of industry and services employment, Chakaria

		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Manufacture of textile and RMG	4,174	2,730	6,904	82%	36%	54%
	Extraction of salt	10	1,418	1,428	0%	18%	11%
	Manufacture of rice/rice milling	85	279	364	2%	4%	3%
	Manufacture of furniture	382	1,710	2,092	7%	22%	16%
	Manufacture of jewelry, bijouterie and related articles	70	320	390	1%	4%	3%
	Manufacture of wood and products of wood	208	348	556	4%	5%	4%
	Other industries	176	871	1,047	3%	11%	8%
	Total industry	5,105	7,676	12,781	100%	100%	100%
Services	Trade	497	25,861	26,358	24%	63%	61%
	Transport and communication	18	2,559	2,577	1%	6%	6%
	Accommodation and food	113	3,770	3,883	5%	9%	9%
	Financial service activities, except insurance and pension funding	125	476	601	6%	1%	1%
	Education	525	2,312	2,837	25%	6%	7%
	Tailoring services	536	1,680	2,216	26%	4%	5%
	Hairdressing and other beauty treatment	21	1,258	1,279	1%	3%	3%
	Other services	238	3,316	3,554	11%	8%	8%
	Total Services	2,073	41,232	43,305	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A4-6: Number of workers and share of industry and services employment, Cox's Bazar Sadar

		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Extraction of salt	271	3386	3657	13%	38%	34%
	Manufacture of Textiles and RMG	696	257	953	35%	3%	9%
	Manufacture of rice/rice milling	66	325	391	3%	4%	4%
	Manufacture of non-metallic mineral products n.e.c.	75	781	856	4%	9%	8%
	Manufacture of structural metal products	101	555	656	5%	6%	6%
	Manufacture of wood and products of wood	123	299	422	6%	3%	4%
	Manufacture of wooden furniture and fixture	370	1330	1700	18%	15%	16%
	Manufacture of jewellery and related articles	75	385	460	4%	4%	4%
	Electricity, gas, steam and air conditioning supply	23	374	397	1%	4%	4%
	Other industries	216	1103	1319	11%	13%	12%
	Total Industry	2016	8795	10811	100%	100%	100%
Services	Trade	857	30596	31453	17%	60%	56%
	Accommodation and food	681	6419	7100	13%	13%	13%
	Financial service activities, except insurance and pension funding	322	1158	1480	6%	2%	3%
	Education	958	2886	3844	19%	6%	7%
	Hospital activities	291	547	838	6%	1%	2%
	Public Administration	216	1231	1447	4%	2%	3%
	Tailoring services	1406	1677	3083	28%	3%	6%
	Other Services	336	6226	6562	7%	12%	12%
	Total Services	5067	50740	55807	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A4-7: Number of workers and share of industry and services employment, Kutubdia

Kutubdia		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Extraction of salt	1	934	935	0%	60%	52%
	Manufacture of rice/rice milling	22	67	89	9%	4%	5%
	Manufacture of brick / block, tiles	41	109	150	17%	7%	8%
	Manufacture of structural metal products	73	155	228	31%	10%	13%
	Manufacture of furniture	62	149	211	26%	10%	12%
	Manufacture of jewellery and related articles	13	43	56	5%	3%	3%
	Other industries	26	95	121	11%	6%	7%
	Total Industry	238	1552	1790	100%	100%	100%
Services	Trade	16	7148	7164	6%	67%	65%
	Accommodation and food	7	885	892	3%	8%	8%
	Financial service activities, except insurance and pension funding	34	119	153	13%	1%	1%
	Education	148	647	795	56%	6%	7%
	Public Administration	19	182	201	7%	2%	2%
	Hairdressing and other beauty treatment	3	433	436	1%	4%	4%
	Tailoring services	8	344	352	3%	3%	3%
	Other services	30	951	981	11%	9%	9%
	Total Services	265	10709	10974	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A4-8: Number of workers and share of industry and services employment, Maheshkhali

		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Extraction of salt	89	2744	2833	25%	72%	68%
	Manufacture of rice/rice milling	31	132	163	9%	3%	4%
	Manufacture of Textile and RMG	53	104	157	15%	3%	4%
	Manufacture of wood and products of wood	46	200	246	13%	5%	6%
	Manufacture of furniture	61	332	393	17%	9%	9%
	Other industries	75	288	363	21%	8%	9%
	Total Industry	355	3800	4155	100%	100%	100%
Services	Trade	126	14215	14341	18%	69%	67%
	Accommodation and food	47	1829	1876	7%	9%	9%
	Financial service activities, except insurance and pension funding	37	196	233	5%	1%	1%
	Public administration and defense; compulsory social security	55	197	252	8%	1%	1%
	Education	243	987	1230	35%	5%	6%
	Hairdressing and other beauty treatment	11	852	863	2%	4%	4%
	Tailoring services	133	866	999	19%	4%	5%
	Other Services	41	1603	1644	6%	8%	8%
	Total Services	693	20745	21438	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A4-9: Number of workers and share of industry and services employment, Pekua

		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Extraction of salt	0	511	511	0%	20%	15%
	Manufacture of textile and RMG	496	526	1022	59%	21%	31%
	Manufacture of wood and products of wood	99	149	248	12%	6%	7%
	Manufacture of brick / block, tiles	101	247	348	12%	10%	10%
	Manufacture of wooden furniture and fixture	109	755	864	13%	30%	26%
	Manufacture of jewellery and related articles	9	103	112	1%	4%	3%
	Other industries	29	208	237	3%	8%	7%
	Total Industry	843	2499	3342	100%	100%	100%
Services	Trade	102	7682	7784	35%	66%	65%
	Accomodation and Food	28	1218	1246	10%	10%	10%
	Financial service activities, except insurance and pension funding	11	46	57	4%	0%	0%
	Public administration and defense; compulsory social security	12	146	158	4%	1%	1%
	Education	77	589	666	26%	5%	6%
	Hairdressing and other beauty treatment	3	442	445	1%	4%	4%
	Tailoring services	51	482	533	17%	4%	4%
	Other services	10	1046	1056	3%	9%	9%
	Total Services	294	11651	11945	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A4-10: Number of workers and share of industry and services employment, Ramu

		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Manufacture of rice/rice milling	67	324	391	7%	8%	8%
	Manufacture of textiles and RMG	207	173	380	21%	4%	8%
	Manufacture of bamboo and cane products	347	401	748	34%	10%	15%
	Manufacture of brick / block, tiles	96	1444	1540	10%	37%	32%
	Manufacture of wooden furniture and fixture	205	1001	1206	20%	26%	25%
	Manufacture of jewellery and related articles	33	205	238	3%	5%	5%
	Other industries	53	304	357	5%	8%	7%
	Total Industry	1008	3852	4860	100%	100%	100%
Services	Trade	275	14084	14359	16%	61%	58%
	Transport and communication	8	2318	2326	0%	10%	9%
	Accommodation and food	30	1846	1876	2%	8%	8%
	Financial service activities, except insurance and pension funding	91	235	326	5%	1%	1%
	Education	333	1319	1652	19%	6%	7%
	Health	103	257	360	6%	1%	1%
	Hairdressing and other beauty treatment	7	629	636	0%	3%	3%
	Tailoring services	784	722	1506	45%	3%	6%
	Other Services	121	1672	1793	7%	7%	7%
	Total Services	1752	23082	24834	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.

Table A4-11: Number of workers and share of industry and services employment, Teknaf

		Female	Male	Total	% Female	% Male	% of Total workers
Industry	Extraction of salt	0	666	666	0%	23%	18%
	Manufacture of rice/rice milling	16	78	94	2%	3%	3%
	Manufacture of Textile and RMG	361	285	646	50%	10%	18%
	Manufacture of bamboo and cane products	34	141	175	5%	5%	5%
	Manufacture of brick / block, tiles	13	569	582	2%	20%	16%
	Manufacture of structural metal products	35	169	204	5%	6%	6%
	Manufacture of cutlery, hand tools and general hardware	48	92	140	7%	3%	4%
	Manufacture of wooden furniture and fixture	105	534	639	15%	19%	18%
	Manufacture of jewelry and related articles	45	193	238	6%	7%	7%
	Other Industries	65	153	218	9%	5%	6%
	Total Industry	722	2880	3602	100%	100%	100%
Services	Trade	323	20594	20917	17%	69%	66%
	Accommodation and food	193	2188	2381	10%	7%	8%
	Financial service activities, except insurance and pension funding	88	425	513	5%	1%	2%
	Education	289	1693	1982	15%	6%	6%
	Tailoring	904	1620	2524	48%	5%	8%
	Other Services	97	3305	3402	5%	11%	11%
	Total Services	1894	29825	31719	100%	100%	100%

Source: WB staff elaboration, Economic Census 2013.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