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CHAD POVERTY ASSESSMENT

Investing in rural income growth, human capital, and resilience to support sustainable poverty reduction

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

ACKNOWLEDGMENTS

This report has been prepared by Aboudrahyme Savadogo (Economist, EAWPV) and Aly Sanoh (Sr. Economist, EAWPV). The core team also included Clarence Tsimpo Nkengne (Sr. Economist, EAWPV), Aissatou Ouedraogo (Economist, EAWPV), Awa Sanou, Essama Nssah, Mohammed Coulibaly, Sidi Mohamed Sawadogo, Arnaud Gotoraye, Sean Lothrop, and Oscar Parlback (Consultants, EAWPV).

The team would like to thank constructive and detailed comments and suggestions from peer-reviewers Nadia Belhaj Hassine Belghith (Senior Economist, EEAPV), Nga Thi Viet Nguyen (Senior Economist, EECPV), Emmanuel Skoufias (Lead Economist, EAEPV), and Arthur Alik Lagrange (Senior Economist, EPVGE). The team also benefited from great comments and advices from Emmanuel Skoufias (Lead Economist, EA1PV), Theresa Osborne (Senior Economist, EA1PV), and Emilie Jourdan (Sr. Operations Officer, GTFOS) who peer-reviewed the Project Concept Note.

The team would like to extend its sincere thanks to Nicolas Rosemberg (Economist, HAWH2), Zacharie Ngueng (Education Specialist, HAWE2), Patrick Hoang-Vu Eozenou (Senior Economist, HAWH2), Loredana Luisa Horezeanu (consultant, HAWH2), Fulbert Tchana Tchana (Senior Economist, EAWM1) for their useful feedback and support through the preparation of the report.

The team gratefully acknowledges guidance from Johan A. Mistiaen (Practice Manager, EAWPV), Andrew Dabalen (Practice Manager ESAPV and former Practice Manager, EWWPV), Rasit Pertev (Country Manager, AWMTD), Francois Nankobogo (Manager AFWDE and former country Manager, AFMTD), Soukeyna Kane (Country Director, AWCW3), Kofi Nouve (Manager, operations, AWCW3), Abebe Adugna (Regional Director, EAWDR), Jean-Pierre Christophe Chauffour (Program Leader, EAWDR), and Christophe Rockmore (Program Leader, HAWDR).

The team thanks Santosh Kumar Sahoo (Program Assistant, EAWPV), Arlette Sourou (Sr. Program Assistant, EAWPV), Senait Kassa Yifru (Operation Analyst, EAWPV), Fatime Mahamat Adoum (Executive Assistant, AWMTD), Nicolas Amadai (Program Assistant, AWMTD), and Kochikpa Abdou Raman Olodo (Operations Officer, AWMTD) for their valuable assistance during the preparation of the report.

Finally, the team would like to thank Dr Baradine Zakaria Moursal, the General Director of the *Institut National de la Statistique, des Etudes Economiques et Demographiques* (INSEED), Ahmat Abderahim Abbo, the Director of Households survey of INSEED, and everyone at INSEED for the important support and critical feedback provided throughout the implementation of the survey and the preparation of the report.

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PREFACE

This poverty assessment was prepared during a period marked by extraordinary uncertainty around Chad's security situation and political future. As the report was being finalized, a coalition of rebel groups known as the Front for Change and Concord in Chad (***Front pour l'Alternance et la Concorde au Tchad***, FACT) began advancing toward N'Djamena, the capital. Chadian forces responded and the conflict escalated rapidly. On April 20 2021, Chad's president, Idriss Deby, was killed in action while overseeing the deployment of government troops. President Deby had led the country for more than three decades and his sudden death was an enormous shock. Shortly thereafter, General Mahamat Idriss Deby, was named interim president.

These additional shocks against the backdrop of the ongoing global Covid pandemic could jeopardize Chad's limited and extremely fragile gains in poverty reduction and shared prosperity. Since achieving its independence from France in 1960, Chad has suffered numerous outbreaks of both large- and small-scale violence, as well as spillovers from regional conflicts, and the country hosts thousands of refugees and internally displaced persons. Yet the country has also played a key role in advancing regional security as a member of the G5 Sahel. Sustainable poverty reduction underpinned by broad-based gains in education, health, and food security will be vital to ensure a lasting peace, and the World Bank will continue to work closely with Chad and its development partners to establish the foundation for robust and inclusive growth.

ABBREVIATIONS AND ACRONYMS

CAR	Central African Republic
CFAF	CFA francs
DHS	Demographic Heath survey
ECOSIT	*Enquête sur les Conditions de vie des Ménages et la Pauvreté au Tchad*
HCI	Human capital index
HDI	Human development index
EHCVM	Enquête harmonisée sur les conditions de vie des ménages
FAO	Food and agriculture organization
GII	Gender Inequality Index
HFPS	High frequency phone survey
KNOMAD	Global Knowledge Partnership on Migration and Development
MPI	Multidimensional poverty index
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
WAEMU	West African Economic and Monetary Union
WDI	World Development Indicators

GLOSSARY

Poverty headcount rate or monetary basic needs poverty rate: the percentage of the population living below the national poverty line of 242,094 CFA francs (CFAF) per year.

Extreme poverty headcount rate: the percentage of the population whose income is insufficient to meet the minimum nutritional requirement of 2,400 kilocalories (kcal) per adult per day.

Poverty gap or depth of poverty: the distance between the poverty line and the average consumption of people living below the poverty line.

Severity of poverty: a measure of inequality among people living below the poverty line.

International poverty rate: the percentage of the population whose daily consumption is below the international poverty line of US$1.90 per person per day in2011 purchasing-power-parity terms.

Dimension-specific deprivation: the percentage of households (or individuals) defined as being deprived in one of six dimensions of wellbeing: (i) education, (ii) health, (iii) childhood and youth, (iv) access to basic services, (v) housing conditions, or (vi) assets. For example, a household is defined as being deprived in electricity if it lacks access to an electricity grid, generator, solar panel, or other power source.

Multidimensional poverty or multidimensional poverty index (MPI): a measure of the different deprivations that an individual or household faces at one time. A person is considered to be multidimensionally poor if she/he is defined as being deprived in at least 30 percent of the indicators covering the six dimensions of wellbeing described above.

Human capital index (HCI) score: denotes the expected lifetime productivity of a child born today relative to what her lifetime productivity would have been had she enjoyed a complete education and full health.

Vulnerability to poverty: a measure of the likelihood that a nonpoor household will fall below the poverty line during a given period, reflecting both the probability of a negative shock and its potential impact on household welfare.

Poverty-induced vulnerability or structural poverty: describes persistently low levels of consumption due to low levels of physical and human capital accumulation.

Risk-induced vulnerability: describes the variability of consumption, which reflects household-level exposure to shocks.

EXECUTIVE SUMMARY

This Poverty Assessment aims to inform poverty-focused policymaking in Chad. The report examines recent trends in poverty, inequality and other social indicators and identifies key constraints on poverty reduction. Chad with a GDP per capita of US$ 709 in 2019 (a significant deterioration from US$ 1018 in 2014) is one of the poorest countries in the world. Overall, poverty remains prevalent in the country at above 42 percent and with demographic growth the number of poor Chadians is increasing by 200,000 people per annum. The country development pattern—in which an export-oriented extractive industry exists alongside an underdeveloped rural economy and an anemic manufacturing base—is associated with deeply negative long-term social and economic outcomes. The analysis finds that broad-based income growth will require sustained investment in health and education supported by increased productivity in the rural economy. Although agriculture, pastoralism, and related activities provide livelihoods for about 80 percent of the population, the capital-intensive oil sector drives macroeconomic growth, exports, and fiscal revenues. Eliminating poverty and boosting shared prosperity in Chad will require robust and sustained interventions along three strategic axes: (i) economic diversification, with a focus on the rural sector; (ii) building resilience to multidimensional shocks; and (iii) accelerating human capital formation. Chad faces enormous challenges, and the effectiveness of its poverty-reduction efforts will hinge on factors that extend beyond economic policy, including the reestablishment of peace and security through improved governance, as well as a comprehensive effort to address the country's profound gender disparities.

A PROFILE OF POVERTY AND INEQUALITY

Despite facing considerable structural obstacles, Chad has made significant progress in reducing poverty over the last 15 years. Between 2003 and 2018, the monetary poverty rate fell from 54 percent to 42 percent, and this decline in monetary poverty was accompanied by improvements in shared prosperity, as the growth of consumption among households in the bottom 40 percent of the population outpaced that of the top 60 percent. Meanwhile, Chad's Multidimensional Poverty Index (MPI) poverty rate fell from about 70 percent to 59 percent, and the share of the population identified as "deprived" in at least one-third of the 13 MPI indicators fell by about 9 percentage points. The observed improvement in multidimensional poverty reflects gains in housing conditions, asset ownership, nutrition, education quality, and access to basic services.

Nevertheless, Chad remains one of the poorest countries in the world. In the 2018 Human Development Index (HDI), Chad ranked 187th out of 189 countries and territories. With an HDI score of 0.401, Chad's performance was well below both the average for countries in the low human development group (0.507) and the average for Sub-Saharan Africa (0.541).

Poverty outcomes vary widely across regions, with a deep divide between rural and urban areas. Close to 89 percent of poor households are in rural areas, while only 3 percent are in the capital city of N'Djamena. The country's lowest MPI scores are in N'Djamena, followed by the Soudanian zone in the south, while the Saharan zone in the north has the highest average MPI scores. At the regional level, the highest MPI scores are in the Lac Region, which is experiencing widespread population displacement due to the Boko Haram insurgency coupled with accelerating environmental instability, followed by the Sila Region, which faces escalating tensions between farmers and pastoralists, spillover effects from the recurrent conflicts in neighboring Sudan, and a sharp decline in global prices for cotton, the region's chief export.

Due to the substantial differences in livelihood patterns within Chad, the analysis separately examines the Saharan, Soudanian, and Sahelian agro-ecological zones. Transhumance pastoralism is the dominant economic activity in much of the sparsely populated Saharan zone. Households in this zone are less likely to experience monetary poverty than households in other areas, but they are highly likely to experience multidimensional poverty. By contrast, monetary poverty is extremely pervasive in the densely populated Soudanian zone, where most households derive their income from smallholder farming and related activities. Agro-pastoralism is common in the semi-arid Sahelian zone, where a favorable climate for crops and livestock offers considerable potential for diversification, but environmental degradation is intensifying conflicts between farmers and herders. Each zone faces unique challenges, and addressing poverty will require solutions tailored to address the specific circumstances of Chad's diverse households.

CONSTRAINTS ON POVERTY REDUCTION

Numerous factors contribute to Chad's high levels of monetary and nonmonetary poverty. While the causes of poverty are complex and overlapping, four factors are especially relevant: (i) a lack of economic diversification; (ii) low productivity in the rural sector; (iii) exposure to shocks; and (iv) low levels of human capital. Insecurity and inadequate public investment drive all four factors, and sustainable progress on poverty reduction will require fully stabilizing the security situation, consolidating the rule of law, and investing in both the physical and institutional infrastructure necessary to support long-term productivity growth.

Lack of Economic Diversification

Chad's undiversified production structure severely limits livelihood opportunities while intensifying budgetary volatility and exacerbating household-level exposure to shocks. Oil represents about 94 percent of total exports, with cotton, livestock, and other agricultural products accounting for the remaining 6 percent. [1] Consequently, the government's budget and the macroeconomic balances are highly sensitive to oil prices. Agricultural exports consist largely of unprocessed commodities, and a combination of infrastructure deficiencies and fragile trade linkages limits the potential for domestic value addition. Many rural households are extremely vulnerable to fluctuating prices for a narrow range of agricultural commodities, especially cotton. The manufacturing sector accounts for only about 8 percent of GDP, and the share of services in total output is declining.

1 International Monetary Fund. 2019. Chad: Selected Issues. IMF Country Report No. 19/259. Washington, DC: IMF

Low Productivity in the Rural Sector

Smallholder agriculture and pastoralism are the main sources of livelihoods in Chad. Agriculture and pastoralism account for 73 percent of household income; nonfarm activities contribute just 22 percent; and remittances make up the remaining 5 percent. Despite its critical importance to household welfare, Chad's rural sector performs far below its potential. Only 6 percent of the country's arable land is cultivated, and more than 80 percent of farms cultivate fewer than two hectares. Just 9 percent of the country's available water resources are being used for irrigation, and irrigation networks cover less than 1 percent of agricultural land. Low productivity limits the scope for diversification into cash crops or activities that would generate income during the off season, aggravating the challenges posed by undiversified production and exposure to shocks. Six key constraints diminish the productivity of the agricultural sector: (i) general insecurity and the threat of conflict over natural resources; (ii) the risks posed by unpredictable weather patterns and climatic shocks; (iii) low levels of human capital; (iv) a severe infrastructure gap; (v) a lack of complementary services such as input supply, storage, transportation, and logistics; and (vi) deep gender disparities, which reduce women's access to land and productive resources.

Exposure to Climatic Shocks

Declining levels of rainfall and rising temperatures pose a severe risk to Chadian households, particularly in rural areas. In recent decades, a combination of unsustainable exploitation and the burgeoning effects of climate change has lowered the water level of rivers and lakes across the country, especially Lake Chad, which has shrunk by 90 percent since the 1960s. Persistent drought has accelerated desertification in the northern part of the country, reducing the size of agro-pastoral areas and spurring a southward shift in transhumance patterns, which has heightened tensions between farming and herding communities. Recurrent droughts and falling water levels are also having a direct negative impact on agricultural production, threatening the livelihoods of millions of people.

In addition to the covariate shocks induced by ecological pressure and security crises, Chadian households are exposed to a wide range of idiosyncratic shocks. The most severe idiosyncratic shocks arise from the severe illness, injury, or death of a household member. Because most smallholder farmers rely on family labor during planting, cultivation, and harvesting, the incapacitation of a single member can threaten the livelihood of the entire household. Moreover, many households operate nonfarm microenterprises that rely on family labor, including special skills possessed by individual members. Idiosyncratic and covariate shocks are related, as climate change may accelerate the spread of endemic diseases and provoke or exacerbate conflicts over resources, leading to increased illness, injury, and death at the household level.

The COVID-19 pandemic threatens to reverse the modest but important gains in poverty reduction achieved in Chad over the last decade. Disruptions in supply chains and commercial activities may adversely impact employment and income levels, and the government's fiscal policies and social protection systems have little capacity to offset these effects. While data constraints limit the scope for macroeconomic projections, the impact of the COVID-19 crisis on employment, remittances, and inflation could increase the national poverty rate by as much as 5.5 percentage points.

Low Levels of Human Capital

Chad's score on the World Bank's 2020 Human Capital Index (HCI) was the second lowest in the world at 0.30. This score implies that a child born today in Chad can expect to achieve only 30 percent of her lifetime productive potential due to inadequate education and adverse health outcomes. Chad's education system suffers from challenges in both access and quality. Enrollment, attendance, and completion rates are low; schools are not equitably distributed across the country; and there are large disparities in access to primary and secondary education by gender, area of residence, and household income level. While improvements have been observed in certain health indicators, such as maternal and under-five mortality rates, health outcomes remain generally poor, reflecting limited access to quality healthcare. Chad has just 0.4 doctors per 10,000 people, far below the World Health Organization standard of 1 doctor per 10,000 people. An estimated 80 percent of all newborn deaths could be prevented by the presence of a skilled healthcare provider.

Severe infrastructure Gap

Chad's poor state of infrastructure deters private investment, inhibits commercialization, and limits connectivity to input and output markets. Chad's vast land area and dispersed population raise the marginal cost of infrastructure. In 2018, the country's population density was estimated at just 12 people per square kilometer, compared to 18 in Niger and 72 in Burkina Faso. The difficulty of connecting small, remote communities limits market opportunities in agriculture and other sectors. Just 3.2 percent of households in Chad regularly use asphalt roads, and only 3.4 percent are within reach of a permanent market. In addition, lack of storage capacity and poor access to electricity limit the capacity for processing agricultural goods, forcing households to sell their crops and livestock with little or no value added.

Lack of complementary services

The ability of the Chadian population to access market opportunities and invest in productive activities is restricted due to limited insurance markets, inadequate public investment in information and communications technology (ICT) infrastructure, and weak land rights. The extension of mobile coverage has been shown to significantly reduce transaction costs and price dispersion in rural areas in low- and lower-middle-income countries. However, only about 58 percent of Chadians own a cellphone, and this share drops to 46 percent among poor households. Mobile-money services are also limited, with a penetration rate of only 16 percent, compared to 24 percent in Mali. In Chad, over 80 percent of NFEs use personal funds as startup capital, underscoring their limited access to credit.

The absence of crop or livestock insurance heightens the production uncertainty arising from weather-related shocks. The country's community-based land systems and overlapping land rights, weak tenure security, and costly land certification procedures create uncertainty around long-term ownership and access rights. In 2018, fewer than 3 percent of the country's cultivated plots had formal titles, and parallel customary and formal land-tenure systems exacerbate uncertainty and discourage investment in fixed capital. In rural areas, informal customary tenure systems, including Islamic land rights, are the dominant model, and obtaining formal land titles is often a lengthy, complex, and costly process. A new land code that would address land titling and property issues was drafted in 2014 but has yet to be adopted. Meanwhile, there are currently no laws governing the grazing rights of itinerant pastoralists or mechanisms for resolving land disputes involving them, which heightens tensions between livestock owners and farmers.

Deep Gender Disparities

Gender-related inequalities limit the opportunities to increase rural income sustainably. Chadian women have less access to human capital and productive assets, such as land and large livestock, due to social and structural barriers. Early marriage is among the most harmful social norms, as it keeps girls out of school and contributes to low levels of human capital among women. High fertility rates and low maternal health indicators limit women's livelihood options, increase their risk of poverty and vulnerability, and contribute to a range of deeply negative health consequences, including early death. In some communities, social norms limit the free movement of women, thereby constraining their access to economic opportunities. The gender-related inequalities also extend to access to tenure security, financial services, and knowledge. Only 11 percent and 5 percent of women over the age of 15 have a mobile-money account and a financial account, compared to 20 percent and 13 percent of men, respectively.

A WAY FORWARD

Eliminating extreme poverty and promoting shared prosperity in Chad will require concerted interventions by policymakers and their international partners. These efforts must strive to: (i) expand livelihoods opportunities through productivity growth and diversification; (ii) build resilience to both idiosyncratic and covariate shocks; and (iii) accelerate human capital formation by improving access to high-quality education and healthcare. Gender equity is a critical cross-cutting issue that should inform policies and programs in each of these areas.

Expanding Livelihood Opportunities through Productivity Growth and Diversification

Chad's unbalanced development model—in which a small, capital-intensive oil sector drives economic output while a vast, low-productivity rural economy provides the vast majority of employment—severely weakens the connection between growth and poverty reduction. A shift toward robust, broad-based growth will require a combination of increased productivity and diversified production. Diversification, in turn, will require a conducive business environment, especially in agriculture and related sectors. Chadian farmers and pastoralists have the potential to accelerate diversification both by expanding into new forms of production and by increasing value addition in existing production chains. Enhancing the productivity of smallholder farming, increasing market connectivity, and creating mechanisms to reduce vulnerability to shocks are crucial to support diversification in the rural economy. In addition to directly enhancing the welfare of rural households, the production of larger agricultural surpluses and a wider range of both food and nonfood commodities will create new opportunities in other sectors, including agro-processing, trade, and logistics.

Building Resilience to Shocks

Despite their extreme exposure to shocks, few Chadian households have access to effective coping mechanisms. To enable households to protect their physical, financial, and especially human capital, policymakers should develop adaptive social protection systems that are able to: (i) swiftly provide income support and essential information during shocks and crises; (ii) facilitate access to education, healthcare, nutrition, and other critical services; (iii) ensure equal access to productive resources and economic opportunities; (iv) support the development of skills that generate greater labor-market returns; and (v) build delivery platforms for coordinated multisectoral initiatives. Limited insurance markets, inadequate public investment in infrastructure, and weak land rights restrict the ability of the rural population to access market opportunities and invest in productive activities. Improved communication and transportation links could allow rural extension services and international partners to form farmer organizations capable of leveraging economies of scale in input supply and output marketing. Enhancing social protection through adaptive safety nets and creating a framework for index-based insurance can enable households to build resilience and transition out of poverty.

Investing in Human Capital

Economic diversification requires a healthy, educated workforce capable of seizing new opportunities. In Chad, limited educational attainment and adverse health outcomes diminish lifetime productivity and earnings potential, contributing to cycles of intergenerational poverty. To protect and develop human capital, policymakers must simultaneously improve the quantity and quality of education and health services. According to the World Bank's 2018 World Development Report, successful learning requires: (i) prepared students; (ii) effective teachers; (iii) appropriate inputs; and (iv) skilled school management and good governance across the educational system. Efforts to improve public health should focus on improving health coverage and quality among marginalized communities, enhancing nutrition, and expanding access to sanitation.

Addressing Gender Disparities

Gender is a critical cross-cutting issue in Chad and should be mainstreamed into all development efforts. Chad ranked 160th out of 162 countries and territories on the United Nations' 2018 Gender Inequality Index. Gender disparities in education and health indicators, land access, the use of financial services and technology, and the ability to participate in the full range of socioeconomic activities have profound consequences for household productivity, income diversification, and intergenerational economic mobility. Addressing the constraints to growth and poverty reduction identified in this report will require interventions that effectively: (i) address gender gaps in human capital accumulation; (ii) increase demand for female labor; and (iii) improve women's access to productive assets, including land, credit, and physical inputs. Prioritizing maternal health, encouraging girls to complete school before marriage, proactively recruiting women as agricultural extension workers and lead farmers, and implementing both legal and administrative reforms to equalize access to land and financial services could enable rural women to realize far more of their productive potential, with positive effects on their economic security, health, and education.

CHAPTER
01

UNDERSTANDING POVERTY IN CHAD

1.1. POVERTY AT THE NATIONAL AND SUBNATIONAL LEVELS

1.1.1 RATES AND TRENDS

Poverty in Chad is pervasive and severe. The Fourth Household Consumption and Informal Sector Survey (*Quatrième Enquête sur les Conditions de vie des Ménages et la Pauvreté au Tchad*, ECOSIT 4), conducted in 2018, found that 3.4 million women and 3.1 million men—representing about 42 percent of Chad's population—live below the national poverty line of 242,094 CFA francs (CFAF) per year. Approximately 15 percent of the population, or 2.4 million people, are unable to meet the basic nutritional requirement of 2400 kilocalories per day.[2]

Chad's poor population is concentrated in rural areas, and poverty rates vary widely by region.[3] Almost 89 percent of poor people are in rural areas, where low-productivity agriculture and livestock herding are the main livelihoods, while just 3 percent are located in the capital city, N'Djamena (Figure 1.2a). Poverty rates are highest in regions that border on the Central Africa Republic, Cameroon, Sudan, and Nigeria. These areas are affected by conflict and instability in neighboring countries, and they host thousands of refugees and internally displaced people. The regions of Mandoul and Logone Oriental, which border on the Central Africa Republic, are home to 8 percent and 9 percent of Chad's poor population, respectively, while Mayo-Kebbi Est and Mayo-Kebbi Ouest, on the border with Cameroon, are home to a combined 17 percent (Figure 1.2b). Due to the concentration of poverty in the rural Soudanian zone, policies designed to strengthen social protection systems, empower women and youth, and encourage

Table 1.1. Poverty Rates in Chad under National poverty line, 2018-2018

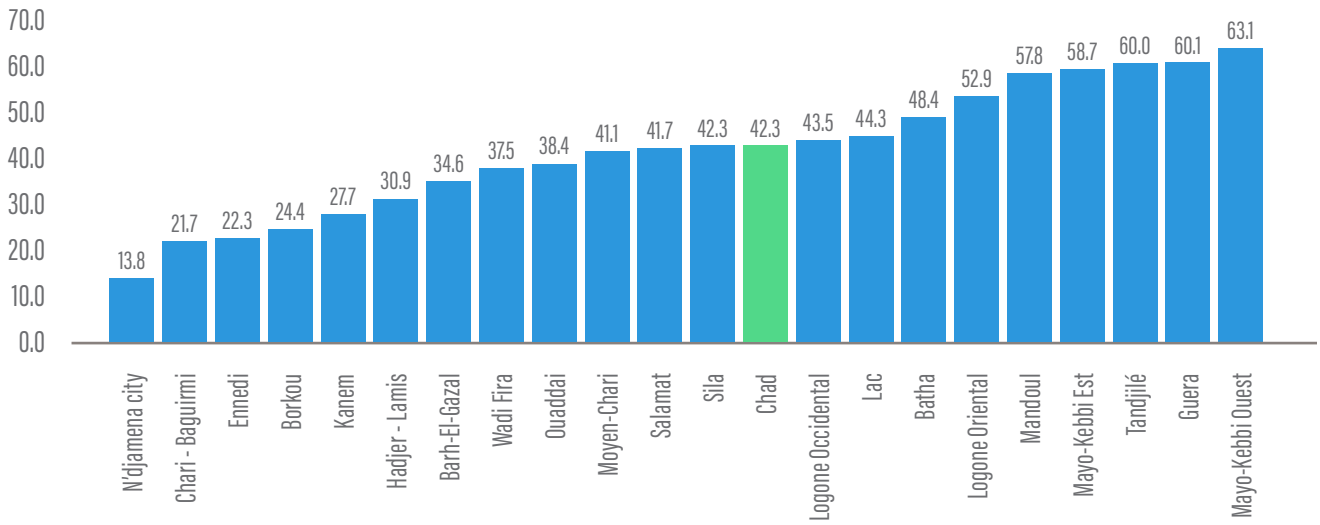
	Headcount	Depth	Severity
N'Djamena	13.8	2.9	0.9
Other urban	23.0	6.4	2.5
Urban	19.4	5.0	1.9
Rural	49.7	15.1	6.3
Chad	42.3	12.6	5.2

Source: World Bank staff calculation using data from ECOSIT 4

2 The poverty-measurement methodology is described in Annex A.

3 Chad is divided into 23 administrative regions (régions). Terms such as "regional level" therefore refer to subnational jurisdictions within Chad, not to the larger multi-country region in which Chad is located.

Figure 1.1 : Poverty Rates by regions in Chad



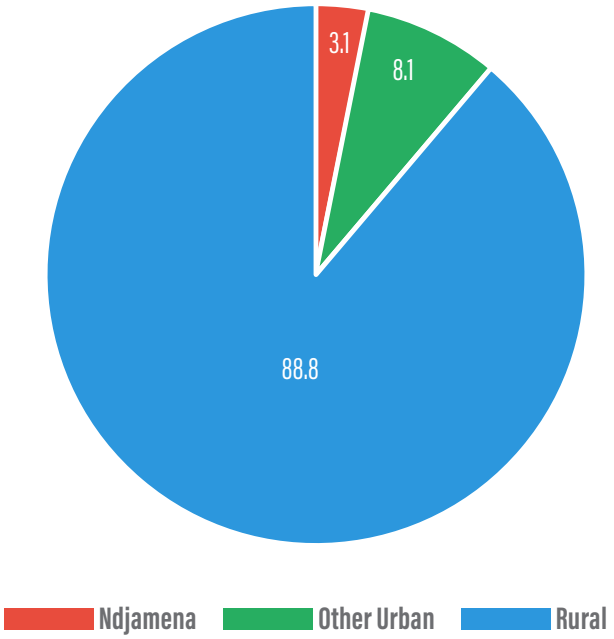
Source: WAEMU and World Bank staff calculation using data from ECOSIT 4

entrepreneurship should target the country's southern regions and reflect the unique needs of agricultural households (Figure 1.2c).

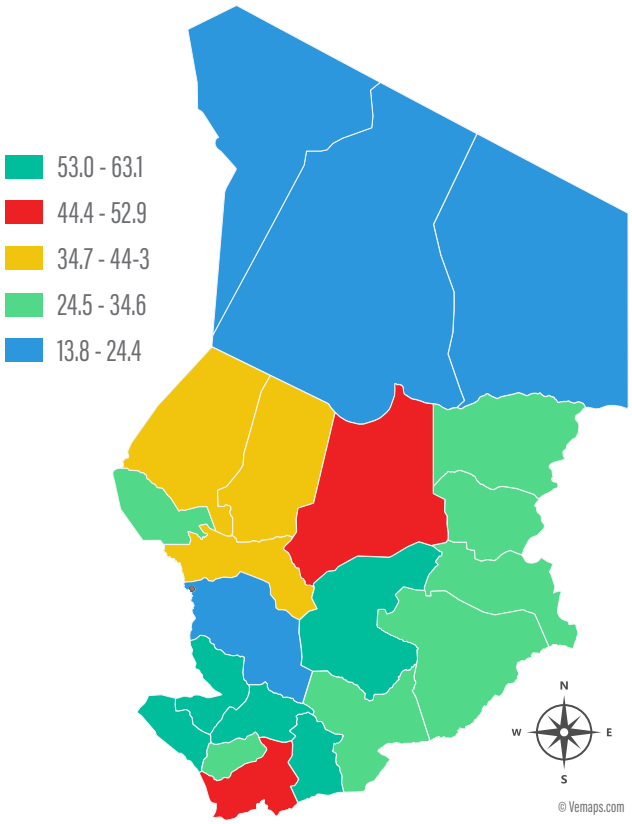
In recent years, multiple shocks have exacerbated poverty at the regional level. Falling international cotton prices have severely impacted household incomes in cotton-growing areas such as Tandjilé, Logone, and Sila, causing poverty rates to rise as high as 60 percent in Tandjilé. During the 2017/18 agricultural year, the Sahelian area experienced a late rainy season and low total rainfall, which caused agricultural production to drop by more than 20 percent in the regions of Kanem, Wadi Fira, and Bahr El Ghazal, increasing rates of poverty and vulnerability among rural households.

Figure 1.2: Distribution of the Poor Population by Area of Residence and Region

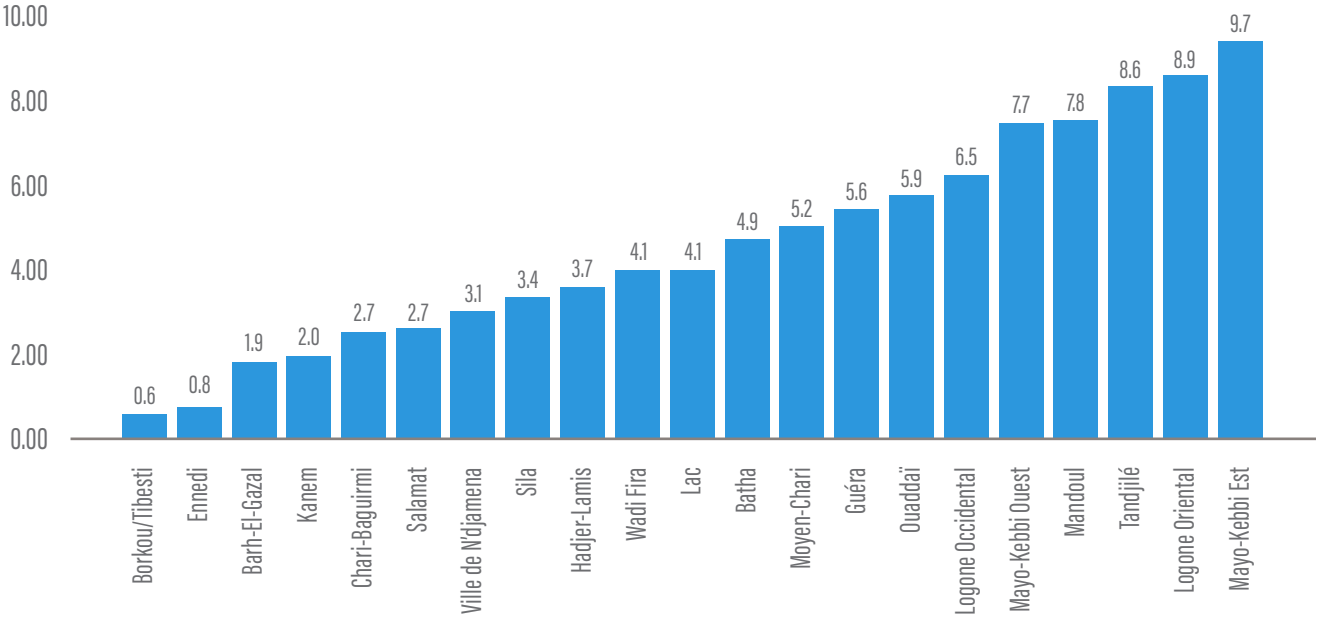
(a) Share of Poor Population by Area of Residence (%)



(b) Poverty Rates by Region (%)



(c) Share of Poor Population by Region (%)



Source: World Bank staff calculation using data from ECOSIT 4

1.1.2 GAINS IN POVERTY REDUCTION

Poverty rates at the national level have declined substantially over the last 15 years. [4] The share of Chadians living below the national poverty line fell by 12 percentage points between 2003 and 2018, with especially sharp declines observed during 2003-2011 and 2014-2018, when the poverty rate fell by an average of 1 percentage point and 0.8 percentage points per year, respectively (Figure 1.3). While poverty rates have declined in urban areas, most of the overall reduction in poverty has occurred in rural areas. In addition, rural poverty has become significantly less severe overall, with the measure of severity of poverty falling by an average of 6 percentage points percent between 2011 and 2018. By contrast, the severity of urban poverty declined by just 1 percentage point over the same period. Nevertheless, poor rural households experience greater consumption deprivation than do their urban counterparts.

The quality of poverty reduction is confirmed by the declining trend in the multidimensional[5] poverty rate. The national MPI score fell from 70.3 percent to 58.7 percent over the period, while the multdimensionnal poverty headcount rate declined by 8.7 percentage points (Table 1.2).

Figure 1.3: Poverty rate in Chad

Source: World Bank staff calculation using data from ECOSIT 4

4 The poverty-trend analysis presented in this section is based on consumption surveys conducted in 2003, 2011, and 2018 and on the 2014 Demographic and Household Survey. While the 2003 and 2011 consumption surveys are directly comparable to each other, they are not comparable to the 2018 Household Consumption and Informal Sector Survey. Data from the 2014 Demographic and Household Survey are utilized, via the survey-to-survey imputation methodology, to estimate the poverty rate in 2014 and identify trends between 2014 and 2018. The methodology is presented in Annex B.

5 More details on multidimensional poverty in Chad are presented in Annex C.

Table 1.2. Multidimensional Poverty in Chad in 2003, 2011 and 2018

	MPI	H	A
2003	70.3	97.5	72.1
2011	66.3	95.2	69.6
2018	58.7	88.8	66.1
Change 2003-2011 (in percentage points)	-4.0	-2.2	-2.5
Change 2011-2018 (in percentage points)	-7.7	-6.4	-3.6

Source: World Bank staff calculation using data from ECOSIT 4

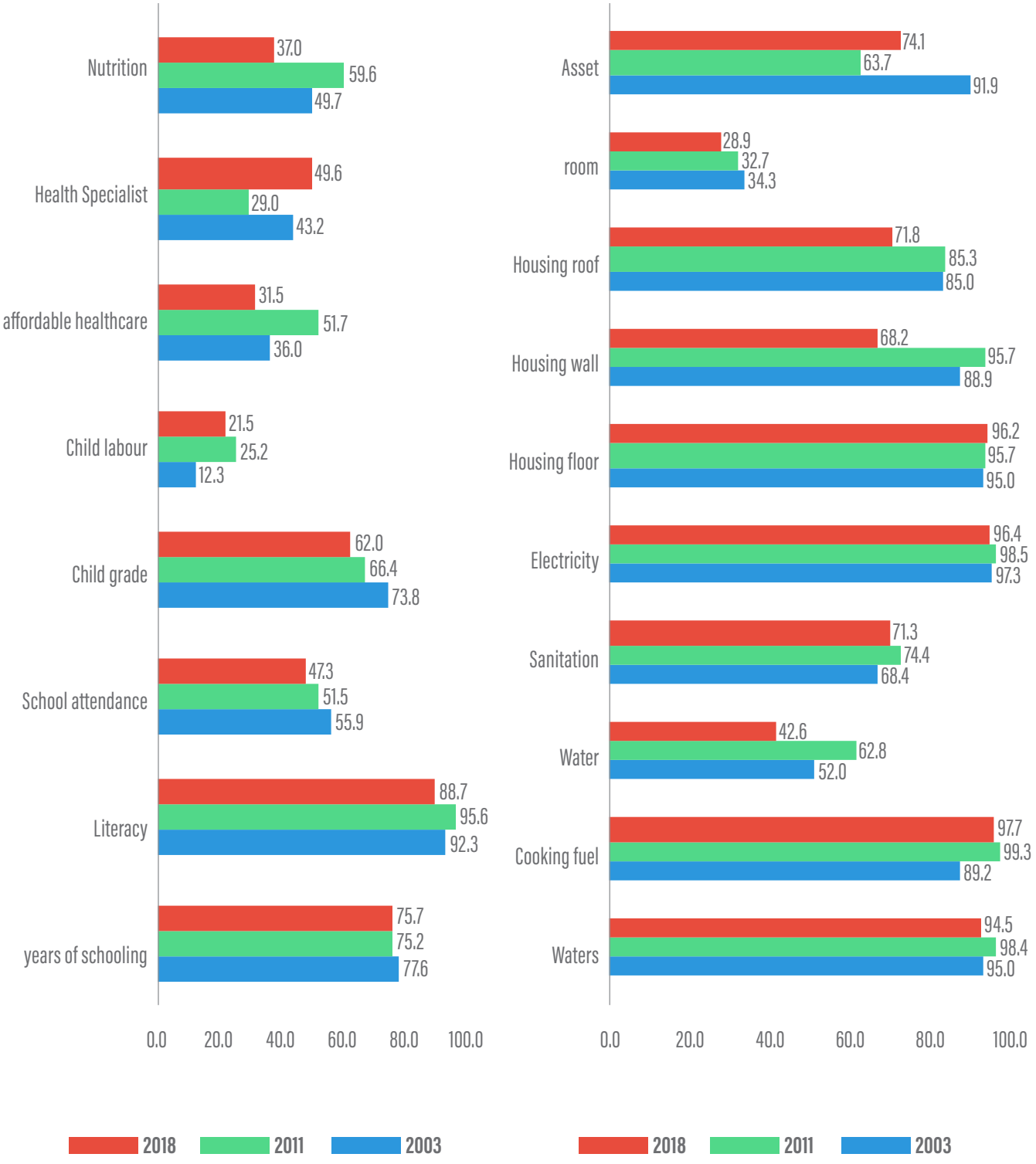
Meanwhile, the intensity of multidimensional poverty fell by 6 percentage points, from 72.1 percent in 2003 to 66.1 percent in 2018, indicating that living conditions improved among households experiencing multidimensional poverty. Multidimensional poverty reduction accelerated over the period, and the national MPI score fell faster between 2011 and 2018 than between 2003 and 2011. Moreover, the decline in MPI rates was significant at all poverty thresholds (see Figure C.4 in Annex C). While the incidence of multidimensional poverty declined between 2003 and 2018, much of the country continues to face severe deprivation.

The decline in MPI scores reflected significant progress in improving housing conditions and asset ownership among the country's poorest households. The material quality of housing and the rate of asset ownership are the two MPI indicators that experienced the largest gains over the last 15 years. Between 2003 and 2018, the share of multidimensionally poor households with low-quality walls and roofs declined by 20 percentage points and 13 percentage points, respectively, and the share that owned at least some modern assets increased by 17 percentage points (Figure 1.4).

Pro-poor nutrition and education policies also contributed to the decline in multidimensional poverty. The share of multidimensionally poor households suffering from challenges related to nutrition, school attendance, and grade repetition fell significantly between 2003 and 2018. While education indicators improved among multidimensionally poor households, Chad's poor population continued to face high levels of deprivation in terms of years of schooling (75.7 percent) and literacy rates (88.7 percent) in 2018.

Progress in improving access to basic services among multidimensionally poor households has been mixed. The deprivation rate for healthcare fell by 4.5 percentage points between 2003 and 2018, but this improvement was more than offset by a drop in access to health specialists, resulting in an overall deterioration in the health component of the MPI. While the deprivation rate for access to improved water fell by 9.3 percentage points, the deprivation rate for sanitation and cooking fuel increased. Finally, the deprivation rate for electricity declined by a mere 1 percentage point, highlighting the persistent structural constraints on electricity access in Chad.

Figure 1.4: Deprivation by indicator among Multidimentionally Poor Households, 2003, 2011, and 2018



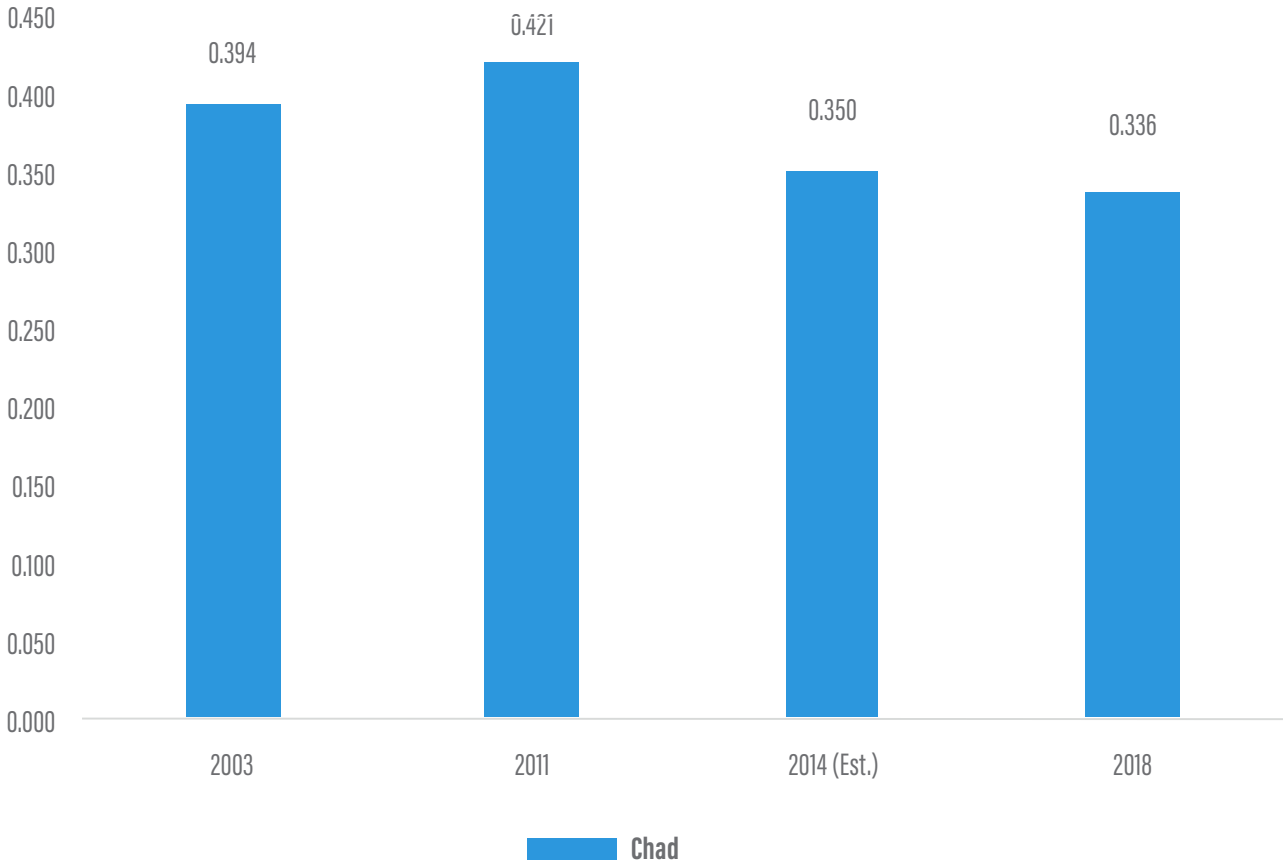
Source: World Bank staff calculation using data from ECOSIT 4

1.1.3 INEQUALITY AND SHARED PROSPERITY PATTERNS

Inequality increased between 2003 and 2011 but declined thereafter. From 2003 to 2011, as poverty rates fell, inequality in the consumption distribution widened from 39.4 percent to 42.1 percent (Figure 1.5). However, inequality narrowed to 35 percent in 2014 and 33.6 percent in 2018, with an especially significant decrease observed in urban areas. The urban Gini coefficient fell from 37.4 percent in 2014 to 33.7 percent in 2018.

During recent years, indicators of shared prosperity have improved. Consumption has increased faster among poor households than among their wealthier counterparts. Between 2014 and 2018, consumption grew at an average annual rate of 1.1 percent among households in the bottom 40 percent of the consumption distribution versus a rate of just 0.1 percent among households in the top 60 percent. In rural areas, the rate of consumption growth among households in the bottom 40 percent has been consistent with the national average at 1.1 percent, but consumption growth among households in the top 60 percent has averaged 1.5 percent. However, consumption among households at all income levels grew faster in 2003-2011 than in 2014-18.

Figure 1.5: Inequality trend

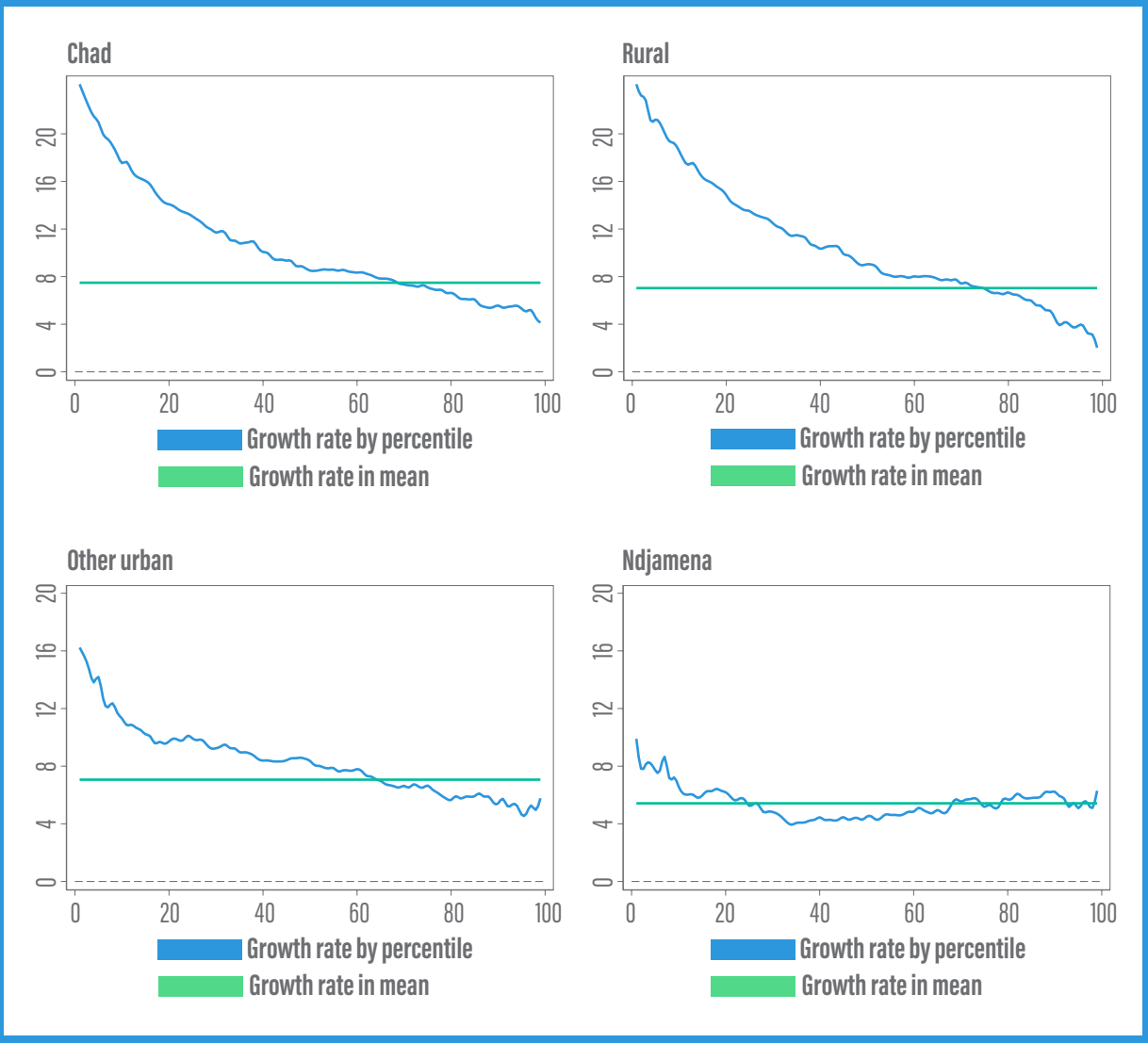


Source: World Bank staff calculation using data from ECOSIT 4

Box 1.1: Inequality and Pro-Poor Growth Patterns

Inequality appears to have declined between 2011 and 2018, and signs of pro-poor growth are emerging. The consumption-based Gini coefficient fell from 42.1 percent in 2011 to 33.4 percent in 2018. Inequality decreased across the board, but it fell fastest in rural areas, dropping from 41.6 percent to 30.3 percent, compared with a more modest decline in urban zones from 36.2 percent to 33.6 percent. The growth incidence curve for 2011–18, which shows the percentage change in average consumption for each percentile of the distribution, is downwardly sloped, indicating faster consumption growth among the poorest segments of the population (Figure 1.6). Again, rural areas drove the pro-poor pattern, while pro-poor growth was limited in urban areas, especially N'Djamena.

Figure 1.6 Growth Incidence Curves, 2011-18 (%)



Source: World Bank staffs calculation using data from ECOSIT3 and ECOSIT4.

Table 1.3 : Decomposition of Inequality by Household Attributes, 2011-18 (%)

	2011 Share of inequality explained by... (%)		2018 Share of inequality explained by... (%)	
	Theil-L	*Theil-T*	*Theil-L*	*Theil-T*
Education of household head	3.62***	4.0***	6.06***	6.59***
Gender of household head	0.17	0.164	0.01	0.01
Family type	6.03***	5.95***	17.8***	18.0***
Age of household head	1.45**	13.6**	0.75***	0.74**
Activity status of household head	0.14	0.131	0.15	0.15
Employment sector of household head	9.46***	9.34***	15.9***	15.6***
Urban/rural status	8.15***	8.75***	13.5***	13.6***
Regional location	10.1***	10.2***	10.1***	10.2***

Source: World Bank staffs calculation using data from ECOSIT3 and ECOSIT4.
Note: * Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Results are based on bootstrap 100 replications.

Survey-to-survey imputation based on the small-area estimation approach can assess changes in poverty in cases where the 2011 and 2018 survey designs and methodologies are incompatible. The results confirm the robustness of the finding that poverty rates fell over the period, consistent with the observed decline in multidimensional poverty. However, the Gini coefficient remained stable at a moderate level of 33 percent. Moreover, the imputed pro-poor growth pattern is less pronounced than that observed from actual data. The high level of inequality registered in 2011 is probably due to noise in the 2011 survey, which seems to have affected the measurement of inequality but not of poverty. Consumption-based estimates of inequality tend to change slowly, and the rapid decline in inequality observed between 2011 and 2018, particularly in rural areas, appears to be unrealistic given the absence of redistribution programs or structural economic transformation. Moreover, the decomposition of inequality between and within population subgroups reveals significantly smaller between-group shares in 2011 than in 2018, which cannot be explained by structural changes in the socio-demographic characteristics of the population.

Large inequalities between households are based on their demographic composition and the sector of employment of household heads, suggesting that poverty reduction could be accelerated through a faster demographic transition and economic transformation. In 2018, differences in the number of children per household accounted for about 18 percent of total inequality (Table 1.3). The per capita consumption level of households with fewer than three children below age 15 was, on average, 1.8 times higher than that of households with five or more children below age 15. This finding suggests that efforts to reduce the fertility rate and catalyze the demographic transition could accelerate poverty reduction. Similarly, differences in the employment sector of the household head account for about 16 percent of overall inequality. Households headed by a worker in the services and industrial sectors have average consumption levels about 1.7 times and 15 times higher than those headed by an agricultural worker, respectively. Consequently, speeding the reallocation of labor to more-productive sectors could foster income growth and poverty reduction.

Inequality between geographic regions is also relatively high. Differences between urban and rural areas explain about 14 percent of total inequality, while differences between geographic locations explain about 10 percent. The persistence of large spatial inequalities can exacerbate social tensions and intensify fragility, hindering inclusive growth and shared prosperity.

1.1.4 DRIVERS OF POVERTY REDUCTION

Chad's recent decline in poverty rates has been driven by improvements in both asset endowments and returns among poor households. Changes in consumption reflect gains in human and physical capital, access to basic services, and employment opportunities, as well as the returns to education, employment, and physical capital. The technical decomposition of these changes is presented in Annex D.

Improved access to employment has bolstered the living standards of Chadian households. Recent poverty reduction has been partially explained by the rising shares of households headed by an employed worker and by a worker with a secondary job (Table 1.4). Slight increases in nonfarm self-employment and in the average share of working household members have also contributed to positive changes in consumption. However, rising employment rates have not been accompanied by a shift to more-productive sectors, and almost 70 percent of households continue to earn their livelihood from agriculture. Between 2011 and 2018, a modest increase in the share of households headed by a service worker had a limited but positive impact on the poverty rate.

Persistently low levels of human capital among household heads has slowed the reallocation of labor to more-productive sectors. Between 2011 and 2018, the share of household heads with education beyond the primary level rose by 3 percentage points, while the share of household heads with no formal education decreased by 4 percentage points. Gains in educational attainment were concentrated in rural areas and among younger household heads. Meanwhile, some of the poorest households, including those headed by older workers, have been least able to invest in education and remained confined to low-productivity sectors, have experienced a decline in the returns to years of schooling. To accelerate poverty reduction, investment in human capital must be accompanied by the creation of higher-value-added jobs in the industrial and services sector.

Increased returns to the ownership of physical assets, especially cellphones, have also contributed to welfare improvements and poverty reduction. Expanded cellphone ownership and increased economic returns to the productive use of cellphones have generated positive changes in consumption. Rates of cellphone ownership have risen fastest among poorer and rural households, yielding a significant impact on poverty reduction. Wealthy and middle-class households have also experienced gains in the returns to motor-vehicle ownership, but this seems to have had only a limited impact on poverty reduction.

Improvements in access to electricity and improved drinking water also contributed to poverty reduction, albeit to a lesser extent. While rates of electricity access remain low nationwide, rapid gains in N'Djamena have slightly reduced urban poverty. Broader progress in rates of access to improved water sources, which rose from 35 percent in 2011 to 55 percent in 2018, appears to have enabled women to spend less time on domestic activities and increase their engagement in nonfarm economic activities, contributing to a modest improvement in living standards among poor households.

Table 1.4 : Determinants of Changes in Consumption at the National Level, 2011-18

	Extreme poor	Poor	Middle class	Richest
Total	**0.808*** **	**0.480*** **	**0.408*** **	**0.271*** **
Endowments	0.117	0.269**	0.230**	0.196
Head employed	0.012*	0.007	0.009*	0.007
Head second job	0.022***	0.017***	0.006	0.008
Head self employed	0.032**	0.015	0.004	0.009
Head farm employment	-0.039***	-0.026***	-0.027***	-0.026**
Livestock	0.008***	0.007***	0.005***	0.007***
Head nonfarm employment	-0.004	0.003	0.004*	0.003
Head education	0.001	0.003*	-0.003	0.005***
Own mobile phone	0.143***	0.135***	0.096***	0.102***
Own car/motorcycle	0	0.001	0.001*	0.007*
Access to electricity	0.001	0.005**	0.006***	0.023***
Access to improved water	0.002*	0.003***	0.004*	0.006***
Share of workers in the HH	0.007***	0.008***	0.004**	0.010***
Returns	0.692***	0.212*	0.178	0.075
Head employed	-0.039	0.016	0.001	-0.089
Head second job	0.002	0.028**	-0.012	-0.007
Head self employed	0.028	-0.023	-0.024	-0.035
Head farm employment	-0.025	-0.025	-0.018	0.046
Livestock	0.001	0.003*	0	0.005***
Head nonfarm employment	-0.037**	-0.016	-0.001	0.054***
Head education	-0.086***	-0.040***	-0.012	0.005*
Own mobile phone	0.018***	0.012***	0.001	-0.002
Own car/motorcycle	-0.001	0.003	0.011**	0.024***
Access to electricity	0.006	0.003	0.002	0.004
Access to improved water	0.009	0.002	0.001	0.023***
Share of workers in the HH	0.042*	0.058***	0.053***	0.070***

Source: World Bank staff calculation using data from ECOSIT 3 and Ecosit 4
Note: Extreme poor denotes households in the bottom two deciles of the distribution; poor denotes households in the third and fourth decile; middle class denotes those in the fifth decile; and richest denotes those in the top decile.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

1.2. POVERTY PROFILE

1.2.1 SOCIAL AND DEMOGRAPHIC CHARACTERISTICS OF POOR HOUSEHOLDS

In Chad, poor households tend to have many children, and heads of poor households are likely to be self-employed and less educated than average. Across the country, having a large number of children in the household is strongly associated with poverty status. Poor households have an average of 1.5 more children under the age of 17 than do their nonpoor counterparts. Poor households also have an average of 1.7 more total household members than do nonpoor households. In N'Djamena, the average poor household has 7.7 members, more the average for poor households in rural and other urban areas. Polygamy is more prevalent among poor households, which contributes to their high average fertility rates (Table 1.5). The international experience shows that poor households often regard a large number of children as a form of insurance against infant mortality and as means of ensuring support for the parents in old age. Household poverty status is also associated with early marriage, limited access to contraception, inadequate health information, a lack of family-planning services, and other factors that tend to increase the number of children per household. Moreover, large numbers of children also contribute to intergenerational poverty, as the increased demand for food and care strains the resources of poor households and limits their ability to invest in the human capital of each child. Chad's score on the 2020 Human Capital Index was the second lowest in the world, underscoring the severely constrained opportunities for productive employment and upward economic mobility facing Chadian children.

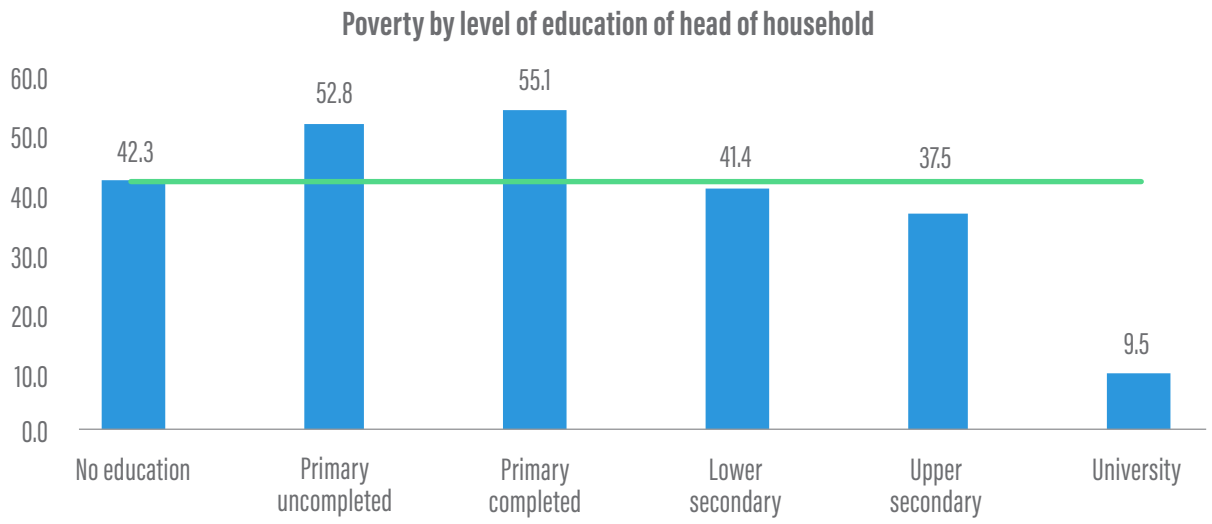
Table 1.5: Social and Demographics Characteristics of Poverty in Chad

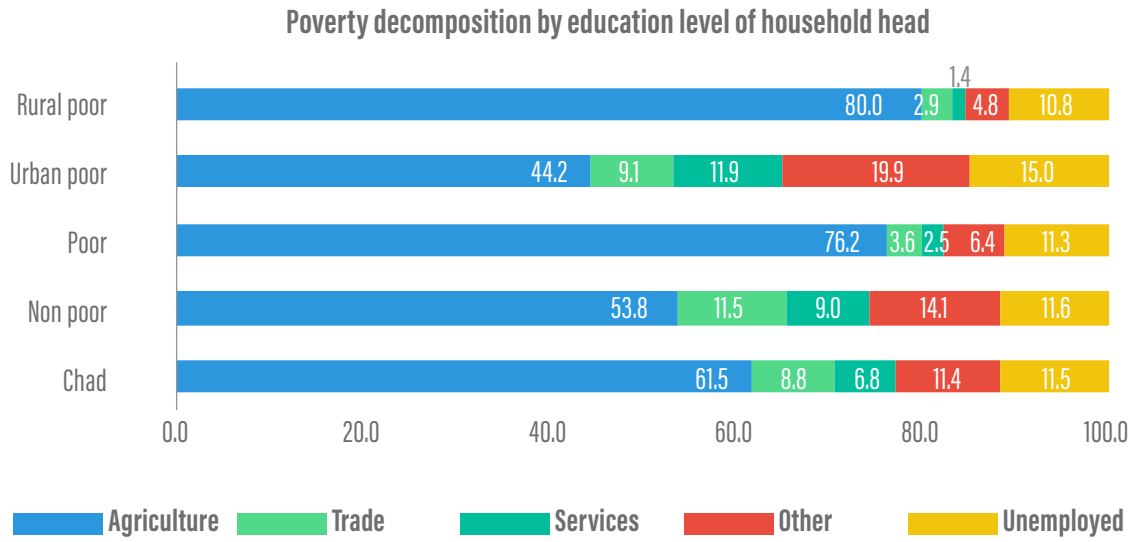
	Chad	Non-poor	Poor				
			Poor	N'Djamena	Other Urban	Urban	Rural
Household Size	5.3	4.7	6.4	7.7	6.5	6.8	6.3
Children under 5	1.1	0.9	1.4	1.4	1.4	1.4	1.4
Children Ages 5-17	2.0	1.7	2.7	3.5	2.9	3.0	2.7
Adults Ages 18-64	2.0	2.0	2.1	2.5	2.2	2.2	2.1
Elders over 64	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Dependency Ratio	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Age of Household Head	42.7	42.4	43.2	48.2	44.1	44.9	43.0
Male Household Head	74.9	74.8	75.1	71.1	67.6	68.3	75.9
Polygamous Household	14.5	12.8	17.5	18.8	9.0	11.0	18.2

Source: World Bank staff calculations using data from ECOSIT 4

The level of education of the household head is also correlated with poverty status. Households headed by a person with tertiary or upper-secondary education have the lowest poverty rate at 9.5 percent (Figure 1.7a). Poverty rates are far higher for households headed by a person with upper secondary education (37.5 percent) and higher still for those headed by a person with lower secondary education (41.4 percent). Poverty rates are highest among households headed by a person with complete or incomplete primary education (55.1 and 52.8 percent, respectively) and marginally lower among households headed by a person with no education (42 percent). While education levels are correlated with other factors that influence poverty status, the low overall quality of education in Chad limits the impact of educational attainment on employment opportunities, income, and poverty.

Figure 1.7 : Poverty Rates and Education Levels of Household Heads



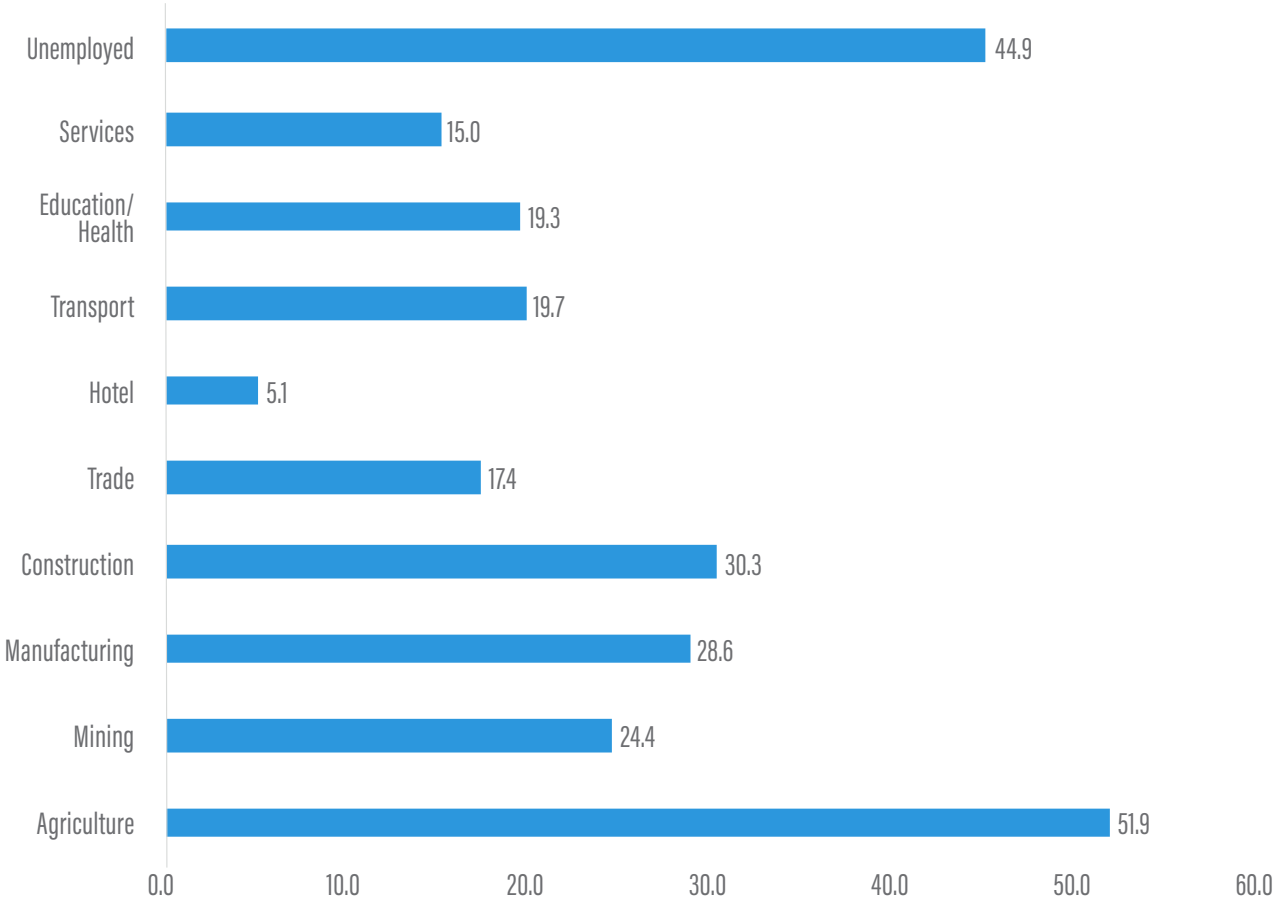


Source: World Bank staff calculations using data from ECOSIT 4

Over half of households headed by agricultural workers are poor. The Chadian agricultural sector suffers from low productivity and a high degree of exposure to shocks, and 52 percent of households headed by an agricultural worker are poor. Employment in the construction sector is also associated with higher poverty rates, and three out of 10 Chadians residing in a household headed by a construction worker are below the poverty line (Figure 1.8a). Self-employed and unskilled construction workers with low-paying, short-term contracts are especially vulnerable to poverty. The poverty rate among households headed by domestic workers is the highest in the country at 48 percent, even exceeding the poverty rate of 45 percent among households headed by the unemployed (Figure 1.8b). By contrast, poverty rates are lowest among households headed by salaried staff members at less than 7 percent, followed by households headed by skilled workers at 12 percent (Figure 1.8c). The low poverty rate among households headed by service workers suggests that employment in services may be a viable means to escape poverty.

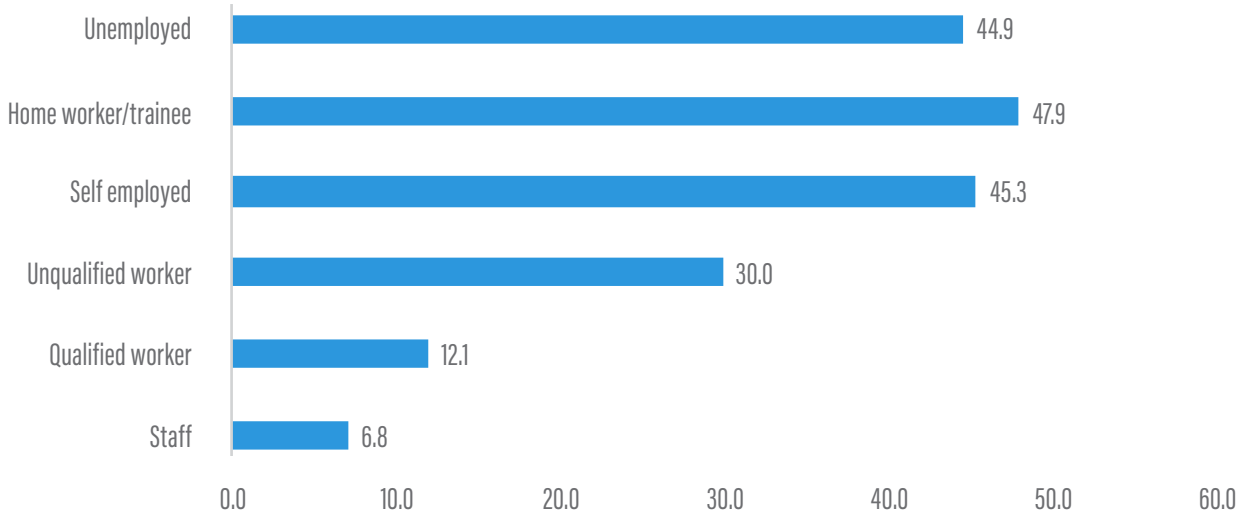
Figure 1.8: Poverty and Employment Status by Characteristics of Households Heads (% of population)

(a) Poverty rates by sector of employment of the household head



Source: World Bank staff calculations using data from ECOSIT 4

(b) Poverty rates by employment status of the household head



(c) Total population by employment status of the household head

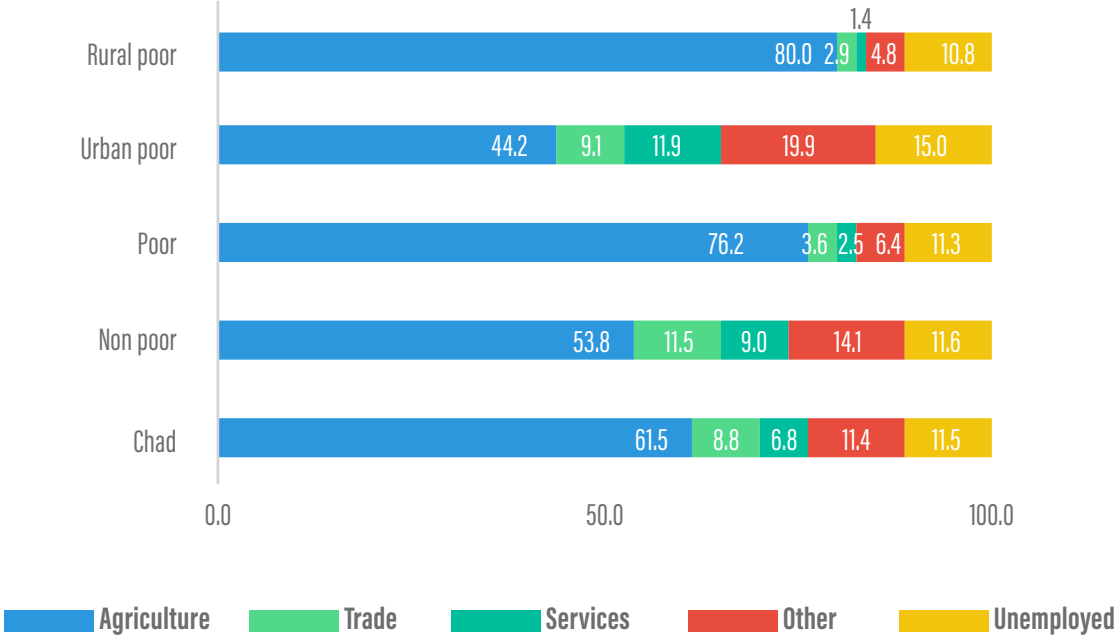
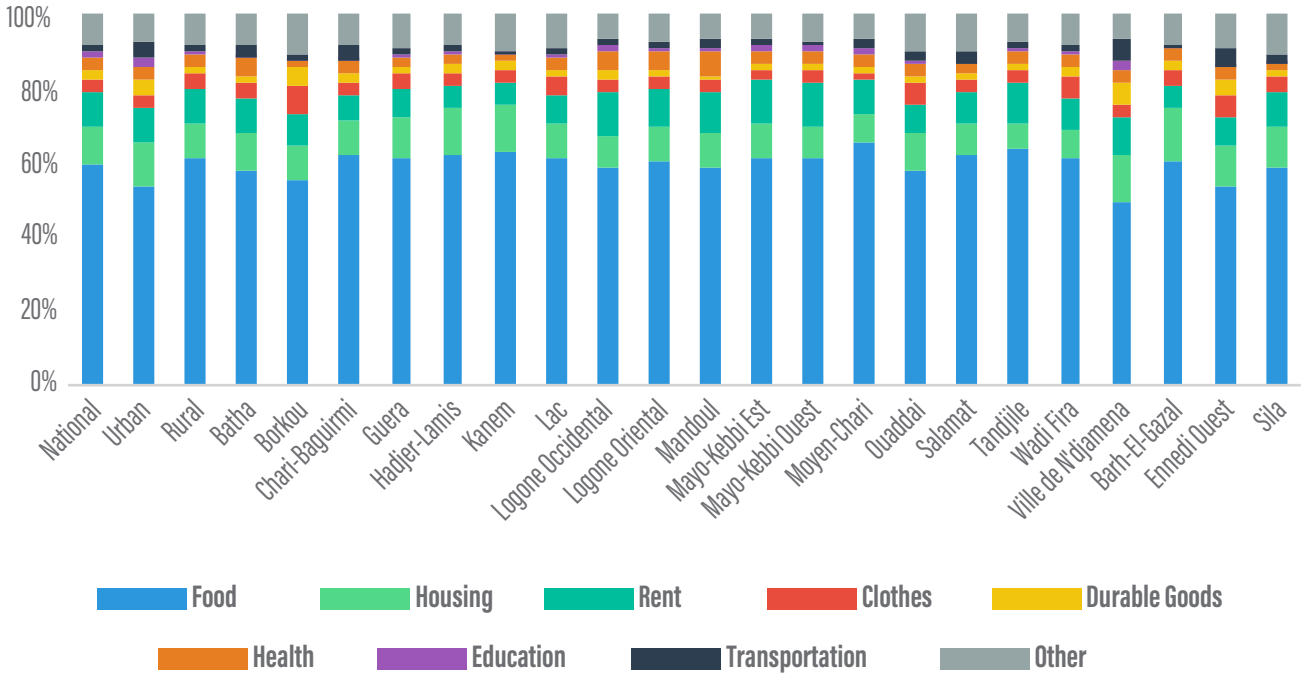


Figure 1.9: Distribution of Consumption Shared by Region

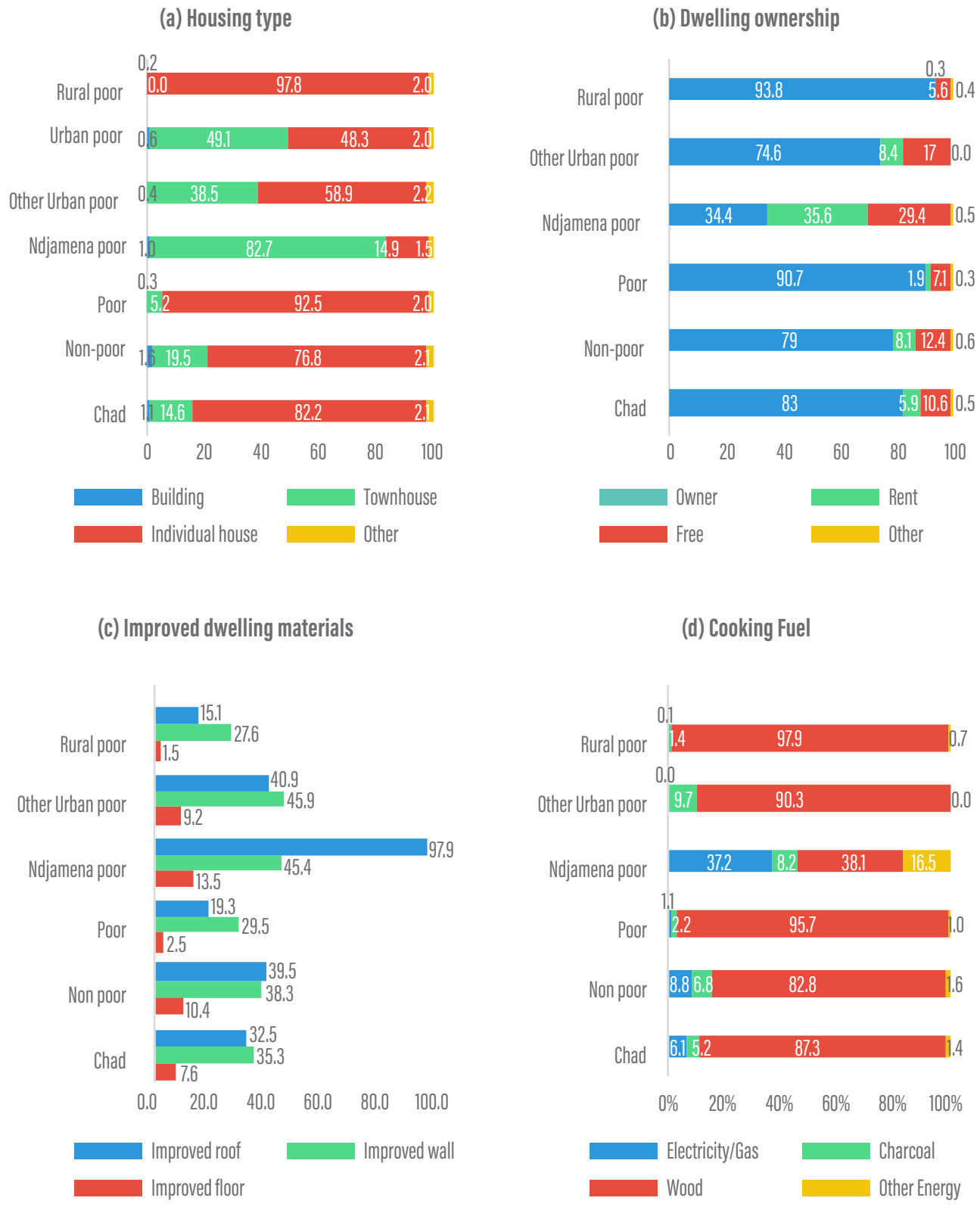


1.2.2 FOOD SECURITY, LIVING CONDITIONS AND ASSET OWNERSHIP

Chad's high monetary poverty rates are coupled with pervasive food poverty, particularly in rural areas. Approximately 15 percent of the population, or 2.4 million people, are estimated to be "food poor," which is defined as being unable to meet a basic nutritional requirement of 2,300 kilocalories per day. Rates of food poverty range from 18.5 percent in rural areas to 2.5 percent in N'Djamena and 6.9 percent in other urban areas. Chadian households dedicate an average of about 60 percent of their budgets to food, versus just 3.4 percent to healthcare and 1.1 percent to education, yet many remain unable to satisfy their essential nutritional needs (Figure 1.9). In addition, an average of 19 percent of food consumption comes from households' own production (23 percent in rural areas), and household agriculture relies on rudimentary productive practices and is highly vulnerable to shocks. The combination of self-produced and purchased food is not enough to meet the basic needs of much of Chad's population, and inadequate nutrition prevents the food poor from escaping poverty.

Poor households tend to live in houses made of low-quality materials, and housing conditions in N'Djamena differ greatly from those in rural areas and other urban centers. Most poor households own their own homes, and renting is common only among poor households in N'Djamena. Almost nine out of ten poor households own their own homes, versus just seven out of ten nonpoor households (Figure 1.10). Housing costs are relatively high in N'Djamena, and poor households are often unable to afford their own homes. One-third of poor households in N'Djamena are renters, and they often rent low-quality houses that lack utilities such as piped water and electricity. Poor households in N'Djamena that own their homes primarily live in peri-urban areas, many of which are marked by limited access to utilities and a high risk of insecurity. The outskirts of N'Djamena have recently experienced flooding,

Figure 1.10: Housing Conditions



Source: World Bank staff calculations using data from ECOSIT 4

which destroyed houses and left thousands of people without shelter or food. Due to these circumstances, poor households in N'Djamena are more likely to experience nonmonetary poverty than are their counterparts in rural areas or other urban centers.

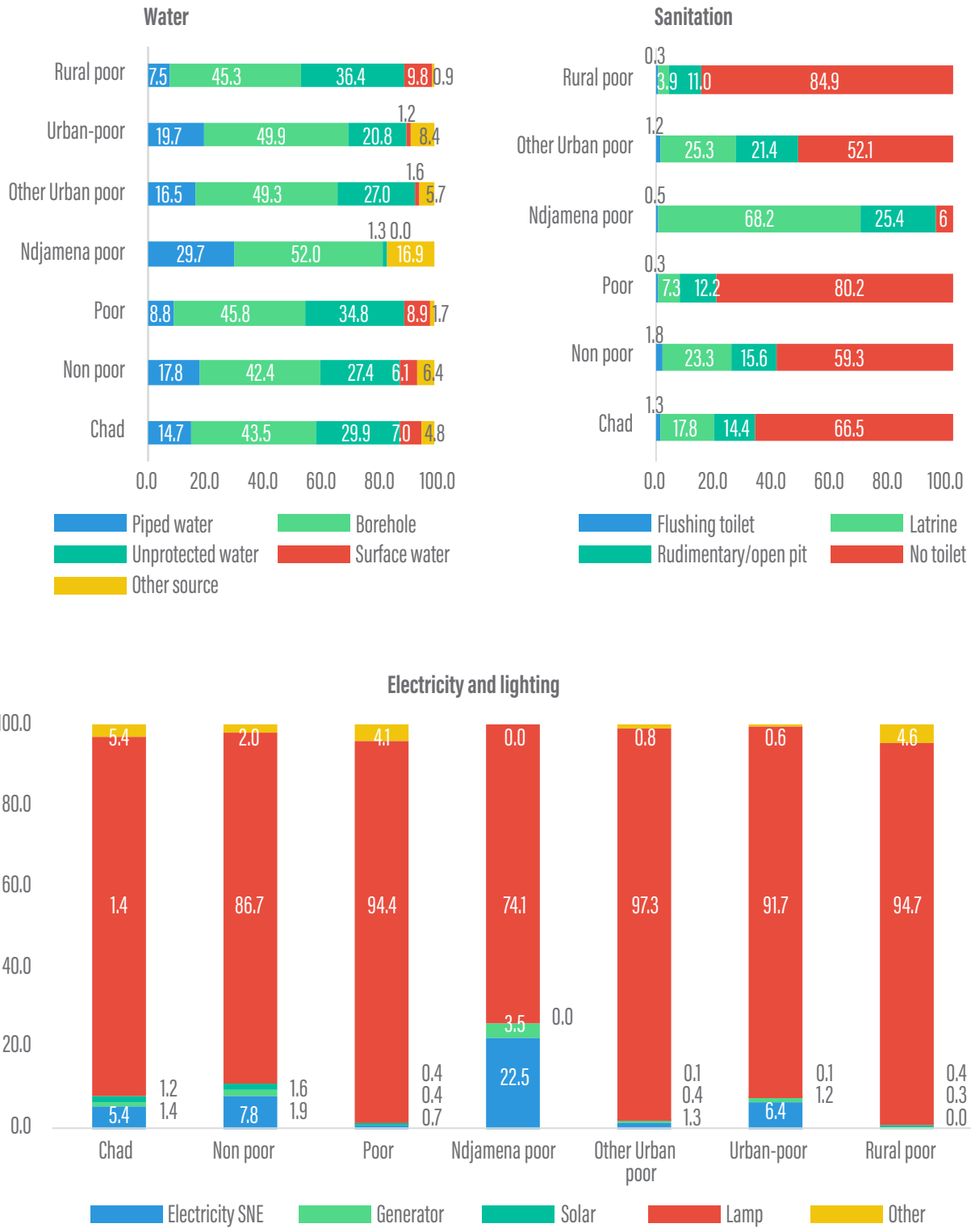
Poor Chadians tend to live in homes made of wood, straw, sand, mud wattle, and metal sheets. At the national level, only 7 percent of Chadians live in a house with an improved floor, 35 percent live in a house with improved walls, and 33 percent live in a house with an improved roof. Among poor households, these shares fall to 3 percent, 30 percent, and 19 percent, respectively. Poor households in N'Djamena have higher-quality housing than their counterparts in rural areas and other urban centers: almost 98 percent and 45 percent of poor households in N'Djamena have improved roofs and walls, respectively, versus just 15 percent and 28 percent of poor rural households. Poor households are also frequently overcrowded, with an average of 3.4 persons per room, well above the national average of 2.8. Overcrowding is especially common among poor households in N'Djamena, which average 4.5 persons per room.

Poor households have limited access to safe drinking water. Only 55 percent of the poor population has access to water from an improved source. Of these, 9 percent have access to piped water, and 46 percent use boreholes (Figure 1.11a). Access to improved water sources is particularly limited among the rural poor, and one in ten poor rural households relies on surface water. The use of unsafe water sources increases exposure to water-related diseases such as cholera and diarrhea. In addition, many poor people, particularly in the Saharan and Sahelian zones, spend substantial time and energy retrieving water from distant sources. Despite the government's efforts to expand the water supply and improve water quality in N'Djamena, only 3 out of 10 poor households have access to the capital city's water grid, and even those poor households that have access to the grid often cannot afford the cost of piped water and instead rely on boreholes.

The vast majority of Chadian households lack access to adequate sanitation services. More than two-thirds of households do not have a toilet, and 14 percent use rudimentary latrines or open pits, which increase the risk of disease. While most poor households in N'Djamena have access to improved sanitation, the same is true for just 4 percent of their rural counterparts (Figure 1.11b). The government's efforts to expand sanitation access must consider rural/urban and regional disparities, as well as the needs of remote communities and vulnerable groups such as women and people with disabilities.

Few poor households have access to electricity. The national electrification rate is 11.8 percent among nonpoor households and just 1.4 percent among poor households (Figure 1.11c). While 22.5 percent of poor households in N'Djamena are connected to the electricity grid, power outages are common: in nationwide surveys, about 75.5 percent of households with electricity access report experiencing a power outage during the previous seven days. Nationwide, the average duration of a power outage is 4.5 days, and an average of 1.89 outages occur each day. The electricity supply is particularly unreliable in urban areas outside the capital, where all poor households report experiencing power outages. Unreliable power access limits income-generating opportunities, compels households to use hazardous cooking fuels, and hinders efforts to improve living conditions.

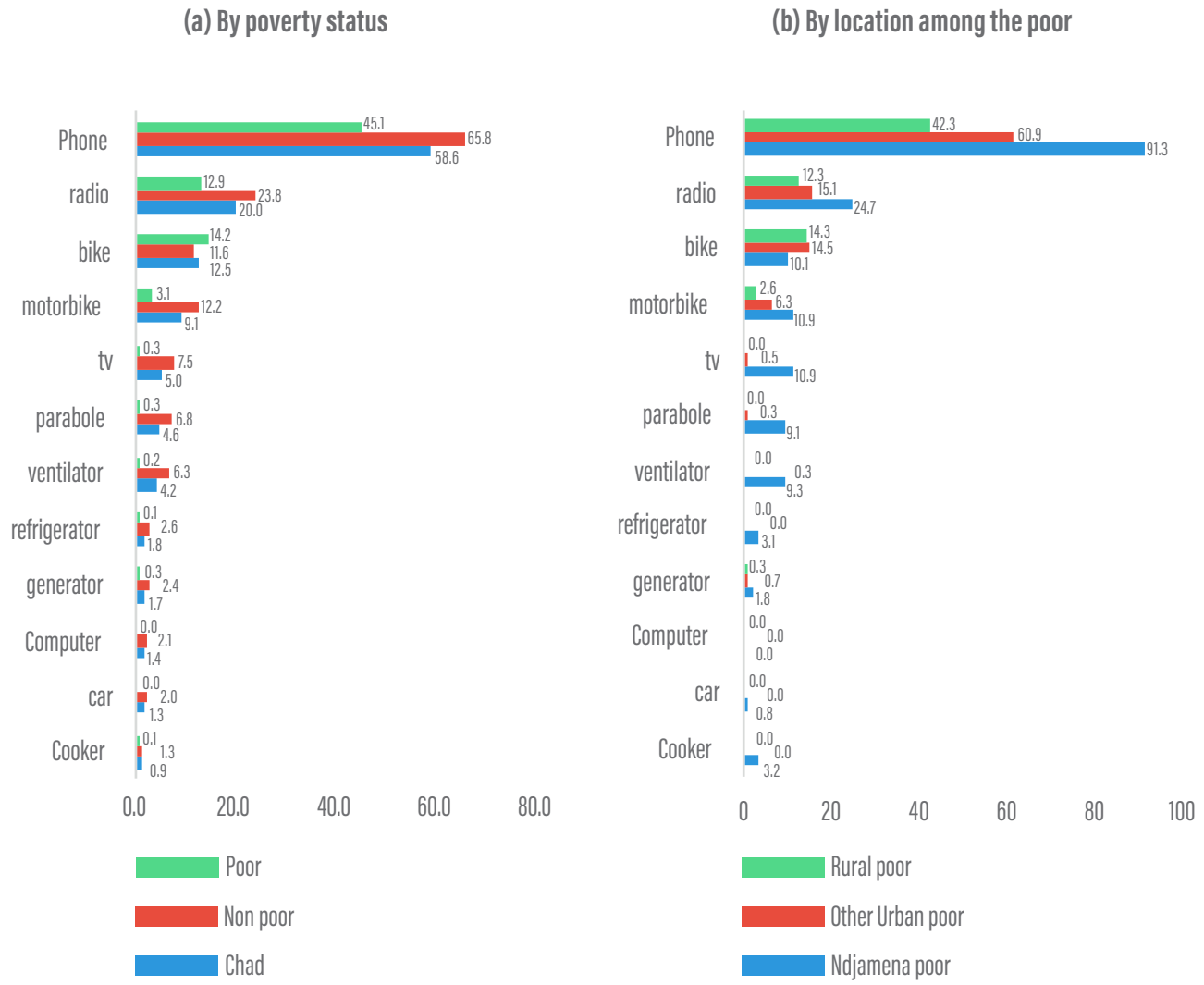
Figure 1.11: Access to Basic Services at the Household Level



Source: World Bank staff calculations using data from ECOSIT 4

Poor and nonpoor households differ greatly in terms of modern asset ownership. The ownership rate for modern assets, including computers, generators, refrigerators, fans, and televisions, is extremely low among poor households. Asset-ownership rates among poor households are higher in N'Djamena than in rural areas or other urban centers, which is unsurprising given poor households' low rates of access to electricity outside the capital (Figure 1.12). In terms of transportation assets, poor households are more likely to own bicycles, and nonpoor households are more likely to own motorbikes. Mobile phones are among the most popular household assets: 42 percent of poor households in rural areas and 91 percent of poor households in N'Djamena report owning a mobile phone.

Figure 1.12: Access to Basic Services at the Household Level



Source: World Bank staff calculations using data from ECOSIT 4

1.4 POVERTY-REDUCTION CHALLENGES

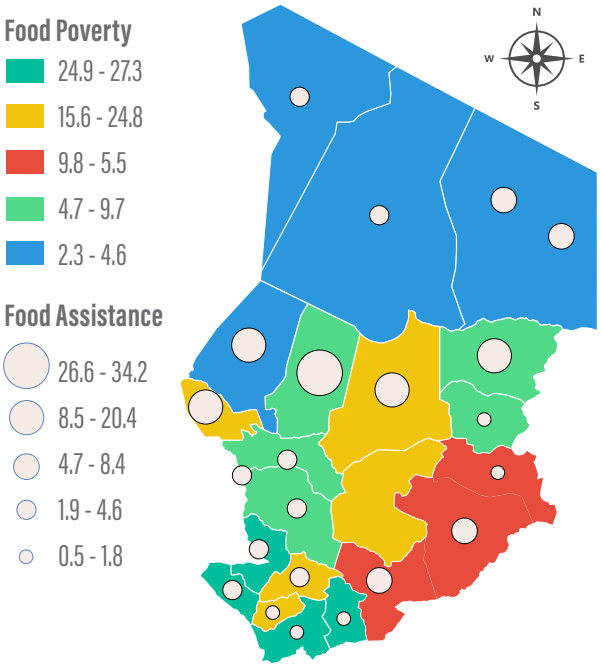
1.4.1 THE SOCIAL SAFETY NET

Chad's public social assistance programs are limited, and they often fail to reach the poorest households. For example, many regions with high levels of food poverty receive less public assistance than regions with greater food security (Figure 1.13a). While social assistance programs may have helped reinforce food security in the regions where they operate, the government should strengthen these programs and extend them to the poorest regions of the country, particularly Mayo-Kebbi Est, Mayo-Kebbi Ouest, Mandoul, Logone Oriental, Logone Occidental, and Tandjilé. Better targeting mechanisms could help improve the allocation of support delivered via existing safety-net systems.

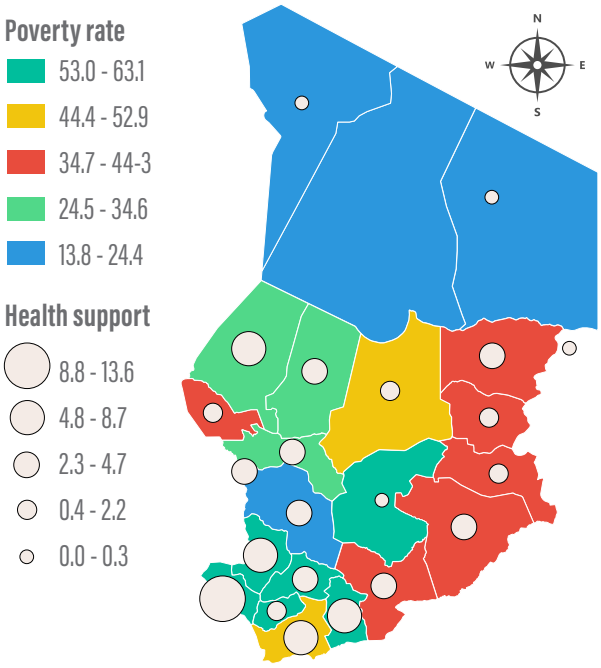
More effective targeting of social assistance programs is also necessary to address the country's weak health indicators. In the ECOSIT 4, households were asked if they participated in a healthcare program for pregnant women or in a program for children under five years old. While households in almost all regions are covered by these two programs, beneficiary status does not seem to be correlated with household poverty. For example, in the second-poorest region of Guéra, which has a poverty rate of 60 percent and is home to 5.6 percent of the country's poor, less than 1 percent of households reported receiving support from either program (Figure 1.13b). Moreover, to reduce the incidence of malaria, insecticide-treated mosquito nets have been distributed to households in all regions, but the allocation of these nets does not appear to correlate with poverty status (Figure 1.13c). For example, in Mandoul, where 58 percent of the population is poor, only 11 percent of households have received an insecticide-treated mosquito net, while 38 percent of households have received nets in Chari-Baguima, where the poverty rate is less than half the level in Mandoul.

Figure 1.13: Distribution of the Poor Population by Area of Residence and Region

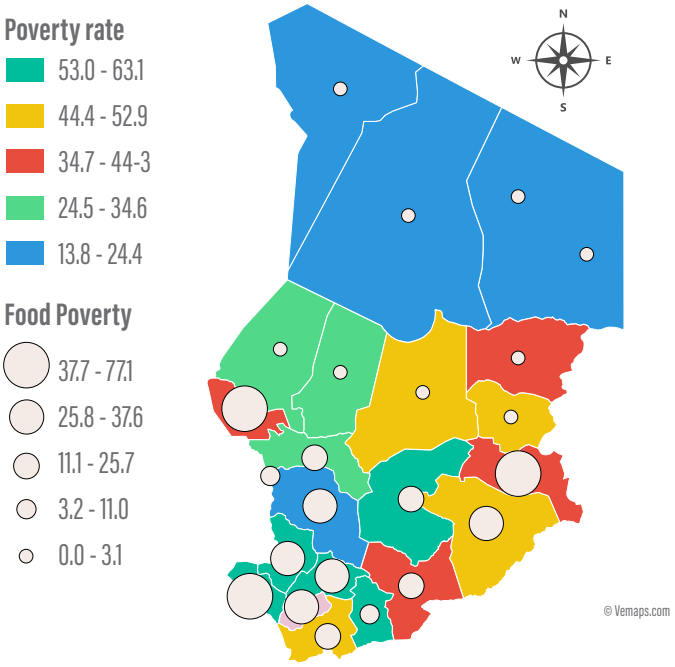
(a) Food Poverty and Food Assistance



(b) Poverty Rates and Health Support



(c) Poverty Rates and Mosquito Net Distribution



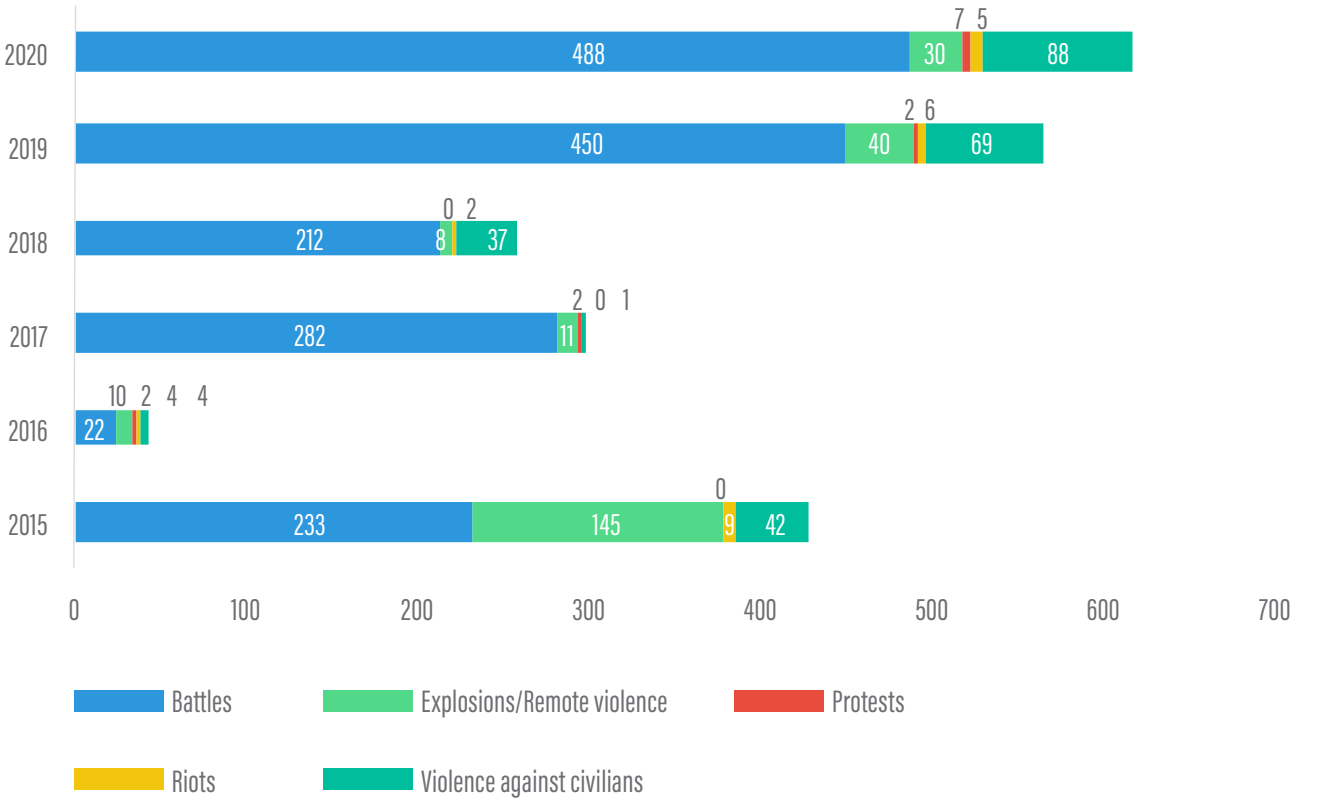
1.4.2 FRAGILITY, CONFLICT, AND VIOLENCE

Over the last five years, Chad has experienced numerous armed clashes, protests and riots, attacks against civilians, terrorist explosions, and other manifestations of fragility, conflict, and violence (FCV). The number of deaths from FCV-related causes increased from 259 in 2018 to 567 in 2019, most due to armed conflict. Another 618 Chadians are estimated to have died from FCV-related causes in 2020, representing a 9 percent year-on-year increase (1.14a).

While all regions of Chad suffer from FCV-related fatalities, some of the country's poorer regions have especially high fatality rates. Border regions tend to have both high poverty rates and a large number of FCV-related fatalities. For example, in the Lac Region, where 44 percent of the population is below the poverty line, about 385 FCV-related deaths were reported between 2018 and 2019 (Figure 1.14b). The Lac Region is part of the Lake Chad area, where attacks from extremist groups have resulted in the loss of lives, the destruction of property, and massive population displacement. The Ouaddaï Region, which borders Sudan, has a poverty rate of 38 percent and reported 119 FCV-related fatalities in 2018-19. Two of the country's poorest regions are Tandjilé and Mayo-Kebbi Ouest, near the border with Cameroon; they reported 63 and 15 FCV-related fatalities, respectively, during 2018-19.

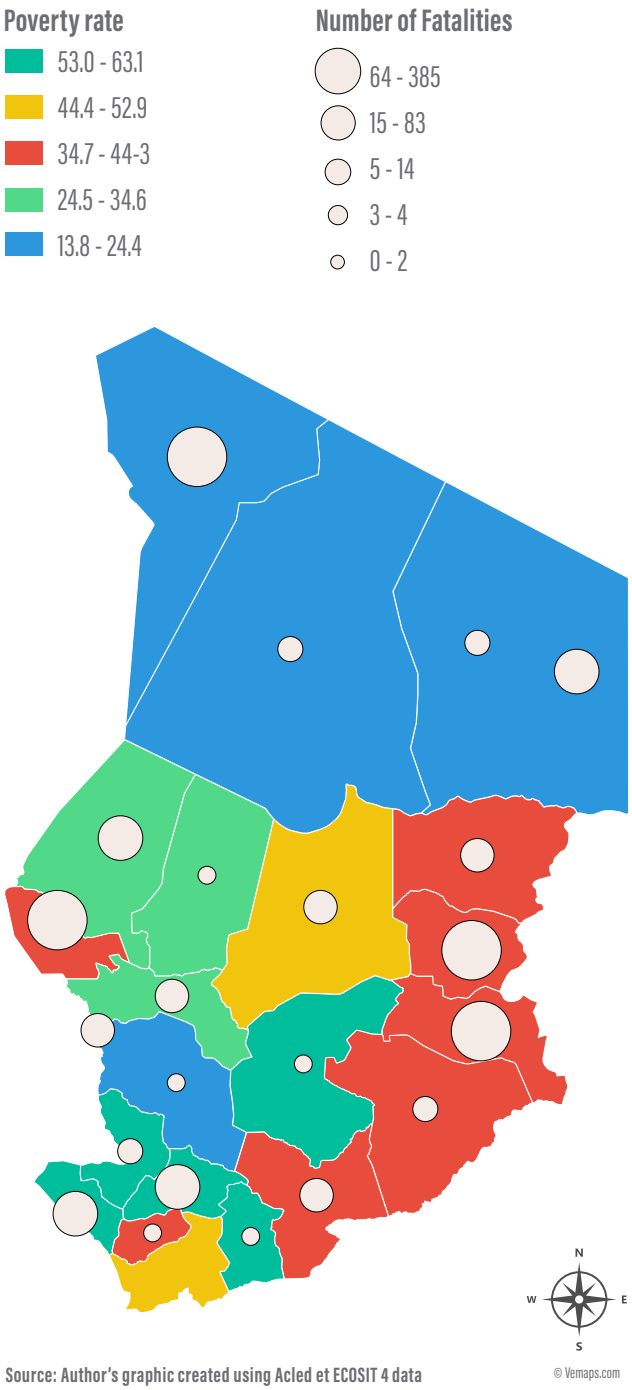
Figure 1.14: Poverty Rates and FCV-Related Fatalities in Chad

(a) Evolution of FCV-related fatalities



Source: Author's graphic created using Acled et ECOSIT 4 data

(b) Poverty Rates and Mosquito Net Distribution



Source: Author's graphic created using Acled et ECOSIT 4 data

1.4.3 FORCED DISPLACEMENT

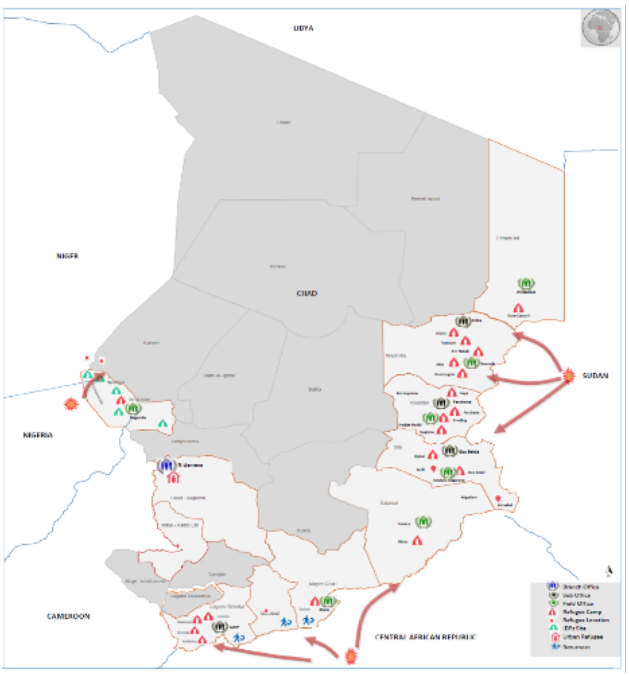
Chad has long been affected by forced displacement. The country currently hosts nearly 480,000 refugees and asylum seekers. Its largest refugee populations are from Sudan, Central African Republic (CAR), and Nigeria (UNHCR, 2020), and most have remained in Chad for over 15 years. In addition, there are an estimated 240,000 internally displaced persons in Chad, as well as more than 30,000 Chadian former refugees who have recently returned to Chad from neighboring countries. Forced displacement of this magnitude has put enormous pressure on the fragile Chadian economy, while intensifying risks related to violent conflict and environmental degradation. [6]

Most refugees reside in Chad's border areas, often in isolated and impoverished regions with little infrastructure and few social services. Approximately 95 percent of the refugee population consists of Sudanese refugees located along the eastern border and CAR refugees located along the southern border. In eastern Chad, poverty rates range from 38 percent in Wadi-Fira to 42 percent in Sila, while poverty rates in southern Chad range from 52 percent in Logone Oriental to 58 percent in Mandoul (Figure 1.15). High levels of community- and household-level fragility, a lack of local development initiatives under the national development plan, a steep decline in humanitarian assistance, and widespread vulnerability to sexual and gender-based violence create profound challenges for both displaced populations and host communities.

6 OCHA, 2019.

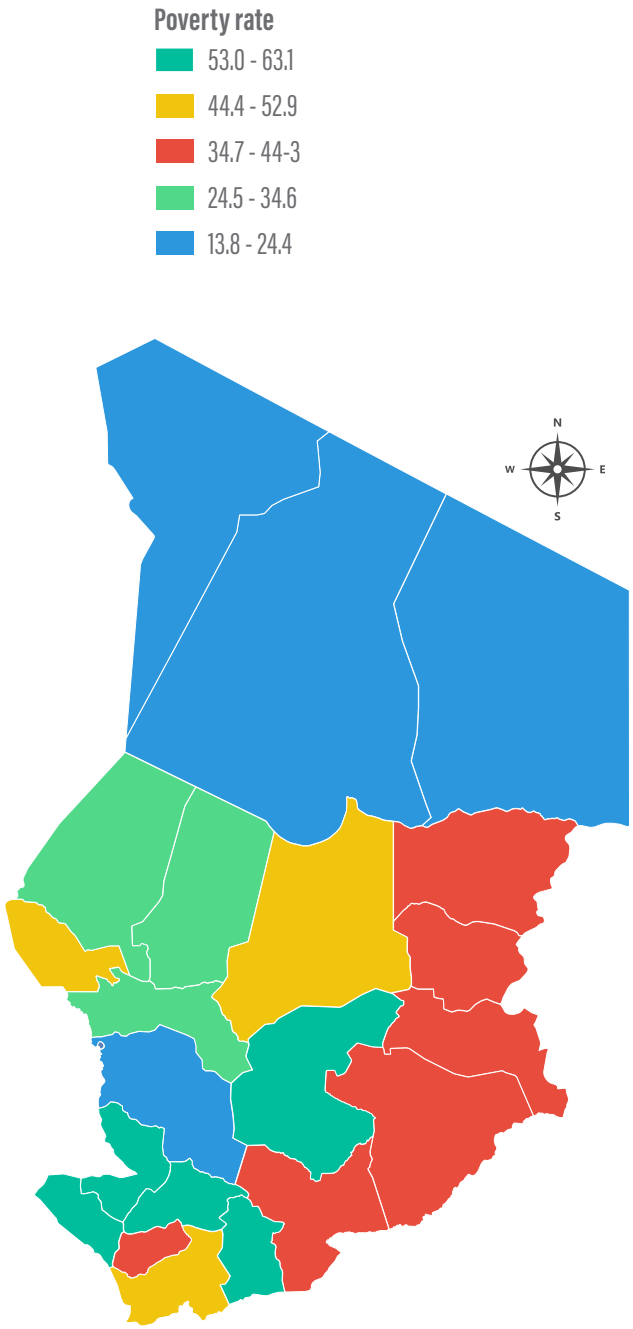
Figure 1.15 : Forced Displacement and Poverty Rates across Regions

(a) Refugee camps along the Eastern and Southern border



Source: UNHCR (2017)

(b) Poverty Rates by region (%)



Source: World Bank staff calculations using data from ECOSIT 4

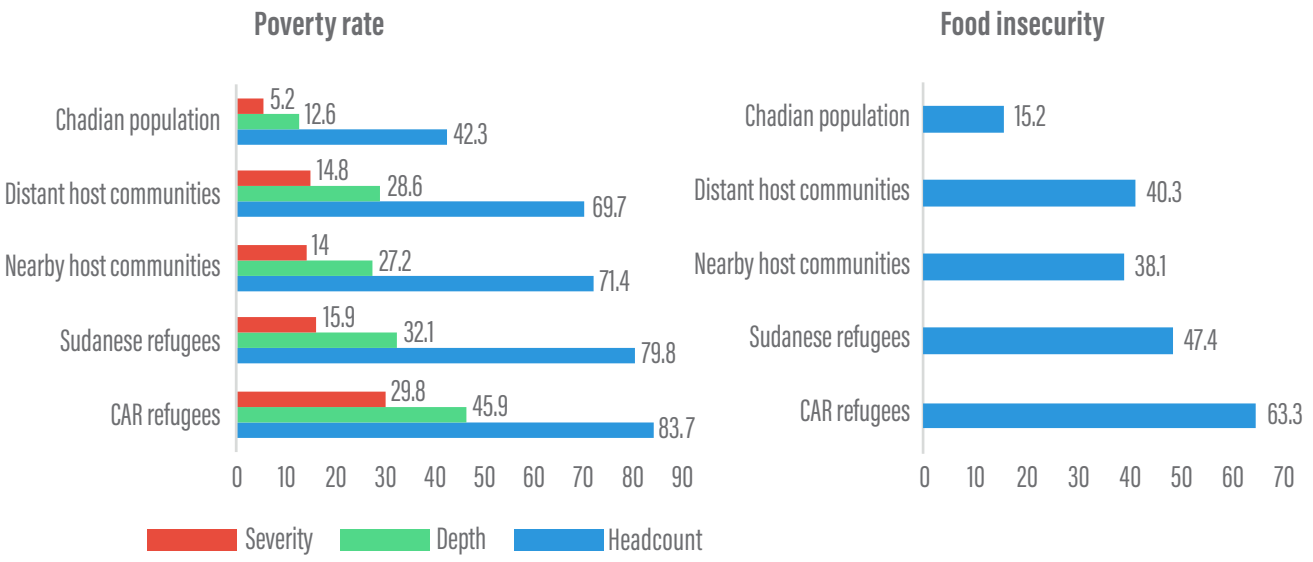
Understanding the unique challenges faced by refugees and host communities requires detailed data. Chad's ECOSIT 4 has been expanded to include a representative sample of Sudanese and CAR refugees and their host communities. ECOSIT 4 captures key information on household poverty, food security, asset ownership, and access to basic services.

ECOSIT 4 finds that roughly four out of five refugee households are below Chad's national poverty line, a far higher rate than those of either the host communities or the general population. The poverty headcount rates for Sudanese and CAR refugees are estimated at 79.8 percent and 83.7 percent, respectively. By contrast, the average poverty rate for host communities is about 70 percent, and the national poverty rate is 42.3 percent (Figure 1.16). The high poverty rates among host communities underscore the preexisting deprivation, fragility, and lack of opportunity that characterize the regions in which most refugee groups are located. The COVID-19 pandemic has increased the vulnerability of the refugee population, especially women, girls, and children, who are at high risk of sexual exploitation, and who may resort to prostitution or survival sex to cope with extreme poverty.

Food insecurity poses a major threat to refugees in Chad, especially those from CAR. In 2018, approximately half of Sudanese refugees and two-thirds of CAR refugees consumed fewer than 2,300 calories per day, the minimum threshold for food security. By contrast, just 15 percent of the Chadian population and about 40 percent of households in host communities are food insecure. Refugees also tend to have little dietary diversity, which reduces the nutritional quality of their already inadequate food intake. Persistent undernutrition poses serious risks to physical and cognitive development, particularly among children.

In addition to facing high levels of poverty and food insecurity, refugee households have limited access to productive assets. Fewer than 10 percent of CAR refugees own livestock, and only 35 percent have access to land. For Sudanese refugees, these figures are 30 percent and 50 percent, respectively. By contrast, over 60 percent of households in Chadian host communities own livestock, and 90 percent have access to land. Average herd sizes and cultivated areas are far larger among host communities than among refugees.

Figure 1.16 : Poverty and food insecurity of refugee households



Source: Author's graphic created using Acled et ECOSIT 4 data

1.4.4 THE CHALLENGES POSED BY THE COVID-19 PANDEMIC

The COVID-19 pandemic has adversely affected public health and living standards in Chad. As of November 23rd, the country had registered 1,642 COVID-19 cases and 101 deaths, but the extent of the pandemic's economic and social impact is unknown. The authorities undertook a high-frequency survey to better monitor the pandemic's effects on the Chadian population, and the results of the first two rounds show a loss of income, remittances, and jobs, as well as diminished access to basic services and an increase in the price of essential goods. The pandemic and the collapse of global oil prices have contributed to a recession, which has primarily affected households with members working in the rural agricultural sector (48 percent) and in the urban informal sector, including trade (18 percent), services (6 percent), and transportation (7 percent). In Chad, many informal workers are day laborers with highly uncertain income streams. Almost two-thirds of households have experienced a decline in their total income due to the pandemic, and seven out of ten rural households have lost all or part of their income, increasing poverty rates and intensifying food insecurity (Figure 1.17b).

Simulations using ECOSIT 4 high-frequency survey data and the consumer price index suggest that the pandemic has caused the headcount poverty rate to rise by 5.5 percentage points. This increase reflects an additional 849,574 people falling below the poverty line due to the cumulative effect of the loss of income, the decline in remittances, and the increase in prices associated with the pandemic. Household consumption has dropped by an average of 10 percent nationally and by more than 20 percent in N'Djamena, increasing the poverty rate in the capital by 11 percent (Table 1.6). Moreover, the intensity of poverty among the poorest households has increased, and many households in the intermediate deciles of the consumption distribution have fallen into poverty (Figure 1.17a).

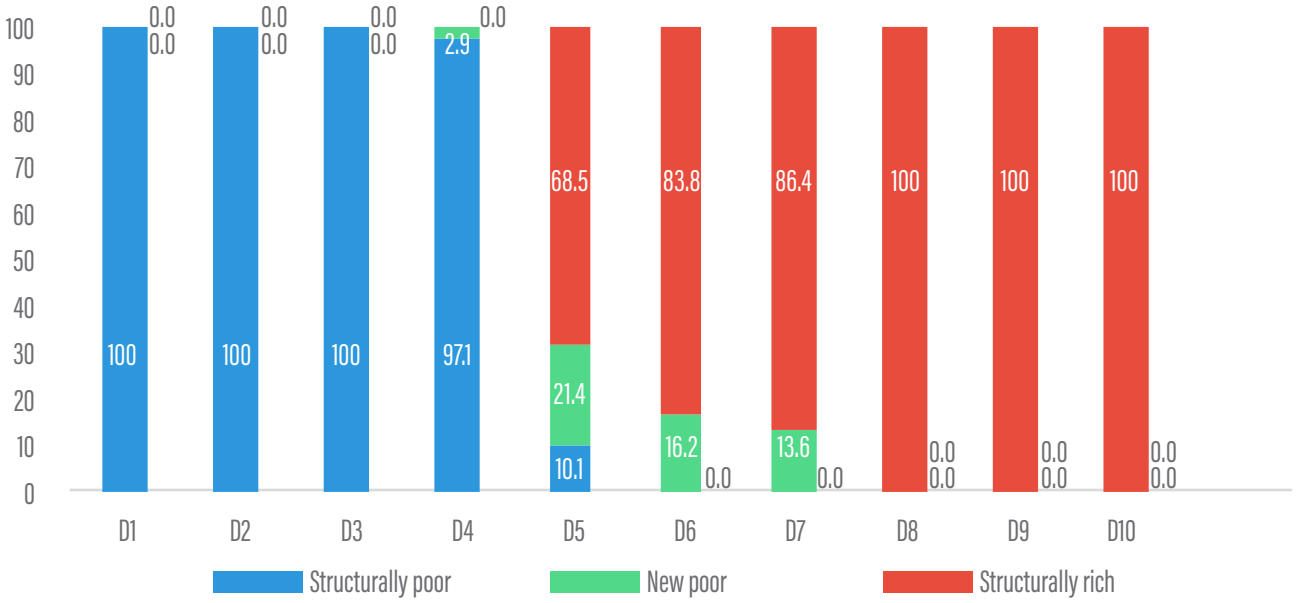
Table 1.6: Simulated Impact of COVID-19 at the Household Level

Ndjamena	Percentage Change in Consumption	Percentage Change in Poverty	Nominal Increase in the Poor Population
Impact of reported decline in household income			
Ndjamena	-18.9	9.63	143,321
Other urban	-10.1	4.89	112,134
Rural	-4.2	3.76	440,739
Chad	-7.3	4.41	683,690
Impact of reported decline in domestic remittances			
Ndjamena	-2.31	1.14	16,966
Other urban	-3.94	2.66	60,997
Rural	-0.32	0.48	56,265
Chad	-1.37	0.88	136,428
Impact of consumer price inflation			
Ndjamena	N/A	0.23	3,423
Other urban	N/A	0.43	9,860
Rural	N/A	0.74	86,741
Chad	N/A	0.65	100,771
Response for households to the combine impact of decline in income, reduction in remittances and increase in prices			
Ndjamena	-22.7	11.00	163,710
Other urban	-15.6	7.40	169,691
Rural	-6.1	4.50	527,480
National	-10.2	5.48	849,574

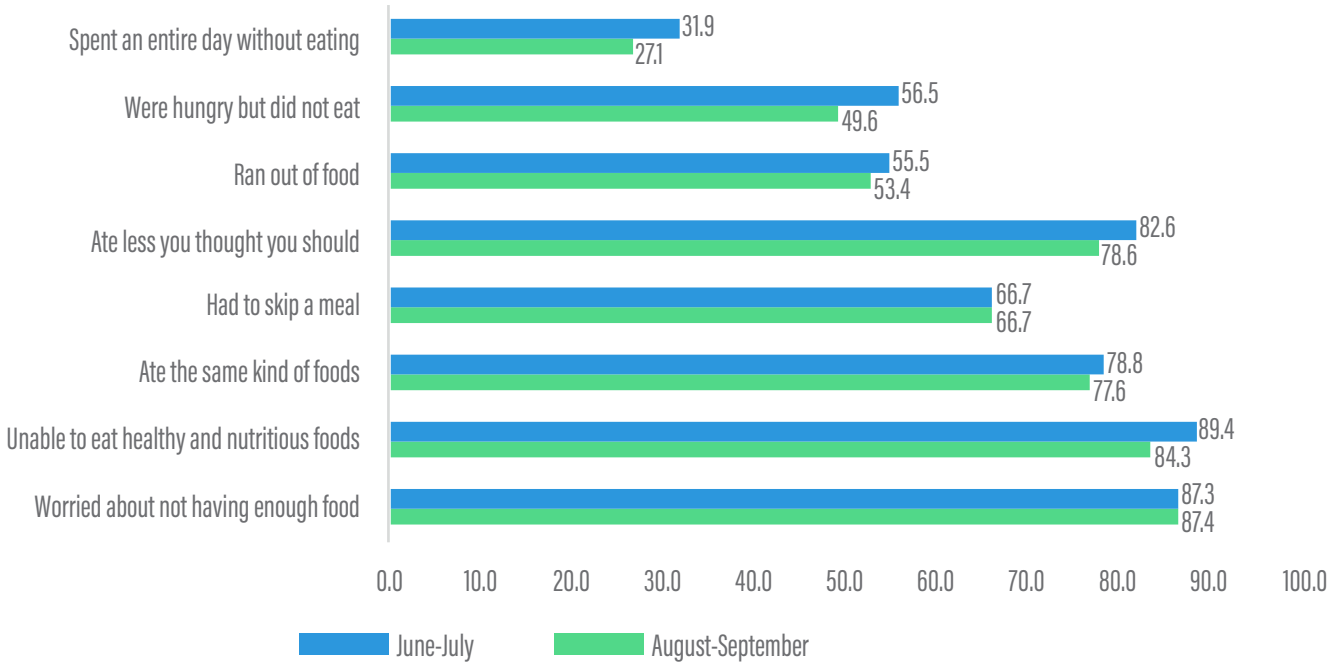
Source: World Bank staff calculations using data from ECOSIT 4

Figure 1.17: The Impact of COVID-19 on the Chadian Population

Distribution of the increase in the poor population caused by COVID-19



During the last 30 days, share of households reporting that they:



Source: World Bank staff calculations using data from ECOSIT 4

Of the increase in poverty rates attributable to the COVID-19 pandemic and concurrent recession, 4.4 percentage points is due to the loss of household income. This factor alone caused the poor population to increase by 683,690 people. Two-thirds of the newly poor live in rural areas, where households have experienced a 4 percent decline in total consumption. The loss of household income has been especially significant in N'Djamena, where the poverty rate rose by 9.6 percentage points as 143,321 people fell below the poverty line. Many vulnerable households in the capital city earn their livelihood from the informal sector, which has been disproportionately affected by the pandemic, and informal workers are especially vulnerable to poverty due to their lack of job security and limited savings.

The pandemic has reduced the amount and frequency of remittances in Chad. Data from the first round of the high-frequency survey implemented in June-July 2020 shows that the amount of transfers fell by 57 percent and the frequency of transfers dropped by 61 percent. In 2018, remittances averaged FCFA 37,122 for non-poor households and FCFA 14,516 for poor households. While remittances represent a mere 5 percent of the income of poor households in Chad, lower than 10 percent in Mali and 27 percent in Senegal, the decline in remittances has led to 1.4 percent decline in total consumption and a 0.8 increase in the poverty rate. This corresponds to an absolute number of 136,428 additional poor, 41 percent of whom live in rural areas.

Market disruptions due to COVID-19 increased prices, resulting in a 0.65-percentage-point increase in the poverty rate. This reflects an increase in the poor population of 100,771 people, of whom 86,741 live in rural areas. Government measures to limit the spread of the virus have led to shortages of essential goods and contributed to the increase in prices, negatively impacting poor and vulnerable households. Rising consumer prices have led to a 0.23-percentage-point increase in the poverty rate in N'Djamena, representing 3,423 additional poor people, and a 0.43-percentage-point increase in the poverty rate in other urban areas, representing 9,860 additional poor people.

1.5 CONCLUSION

In the last fifteen years, Chad has achieved significant progress in reducing poverty and raising living standards, yet it continues to face enormous challenges. Monetary and nonmonetary poverty rates have both declined substantially, with gains observed across almost all dimensions of the MPI. Meanwhile, Chad's score on the Human Development Index (HDI) increased by about 35 percent, from 0.298 in 2000 to 0.401 in 2018. Nevertheless, Chad remains among the poorest countries in the world. Despite considerable gains since 2000, Chad's 2018 HDI score was still well below both the average of 0.507 for low-income countries and 0.541 for Sub-Saharan Africa, and it ranked 187th out of 189 countries and territories worldwide.

The unequal distribution of economic welfare constrains progress on poverty reduction and shared prosperity. Almost 89 percent of Chad's poor population lives in rural areas, while just 11 percent of the poor live in N'Djamena and other urban centers. Heads of poor households tend to have little education, and most are farmers, unskilled workers, or self-employed in the informal sector. Poor households typically have little access to essential services, own few modern assets, and live in overcrowded housing made of low-quality materials. All of these dimensions of poverty are worse in rural areas, with the exception of overcrowding. The average monetary poverty rate in rural Chad is about 50 percent, and an estimated 15 percent of the rural population is food poor.

Regional disparities are coupled with a highly unequal distribution of economic welfare across households. The wealthiest 20 percent of the population accounts for about 40 percent of total consumption, while the bottom 20 percent accounts for just 8 percent. Gender inequality is especially acute, and female-headed households are more likely to be poor than their male counterparts. In 2018, Chad ranked 160th out of 162 countries and territories on the Gender Inequality Index (GII).

Inadequate health and education services are a major contributor to multidimensional poverty and pose a serious threat to long-term poverty reduction. Without substantial improvements in health and education, especially in rural areas, many households will remain locked in a cycle of intergenerational poverty, as high fertility rates and low levels of investment in human capital formation sharply limit the productive opportunities of future generations. By extending health and education services into impoverished areas, the authorities can alleviate two key causes of deprivation while encouraging poor households to invest in expanding their long-term productive potential. Strengthening social assistance programs can support this objective by lessening reliance on detrimental coping strategies—including child labor, the sale or consumption of productive assets in response to shocks, and the use of fertility as an insurance mechanism to compensate for child mortality and/or provide support in old age—enabling households to achieve the modicum of security necessary to invest in the future. While rural development offers a viable pathway to sustainable poverty reduction, policymakers must alleviate binding constraints on income growth, including: (i) low levels of human capital, (ii) a vast infrastructure deficit, (iii) a lack of basic services, (iv) deep gender disparities, and (v) fragility and exposure to shocks. These constraints, along with strategies for addressing them, are discussed in the following chapters.

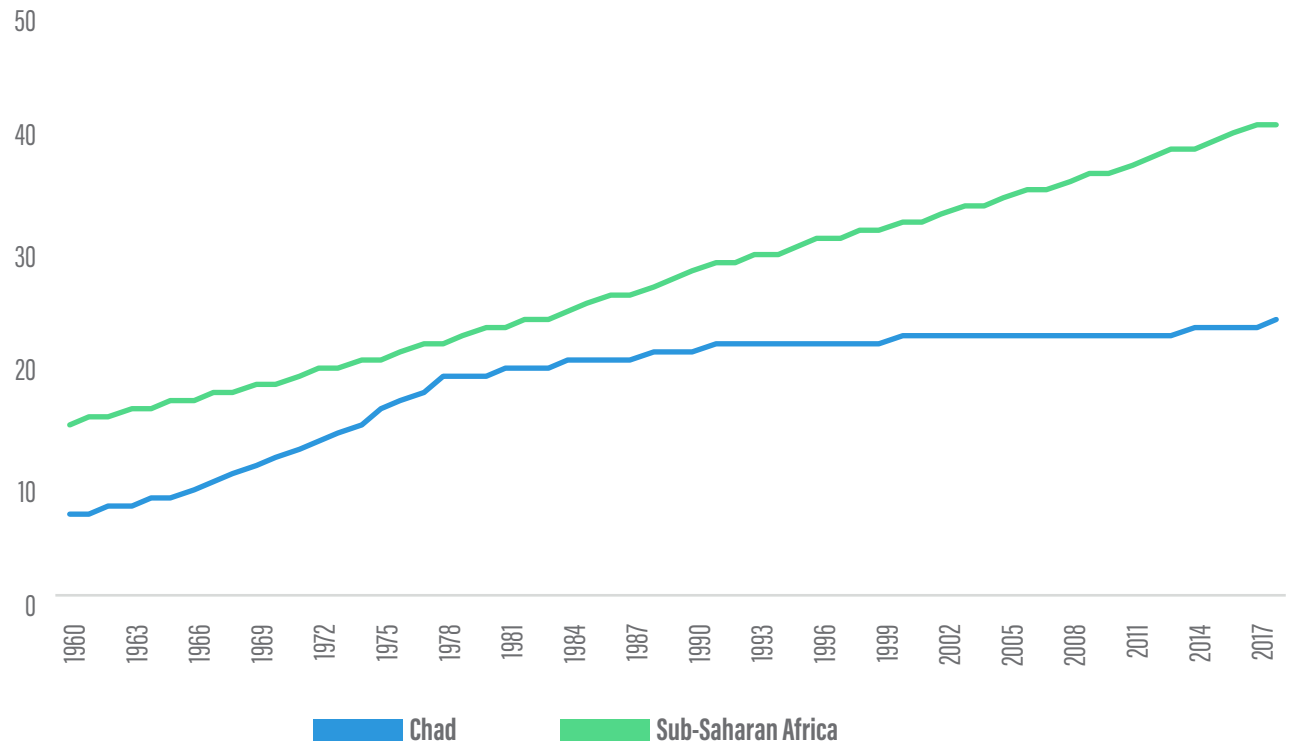
CHAPTER
02 RURAL INCOME ANALYSIS

Key Insights

- Poverty in Chad is overwhelmingly concentrated in rural areas, where 89 percent of poor households are located. The urbanization rate is low and stagnant.
- Most Chadian households rely on smallholder agriculture and pastoralism, activities that are marked by low productivity and extreme vulnerability to shocks.
- Poor households cultivate more land, on average, than nonpoor households, but due to the larger size of poor households, the cultivated area per capita is significantly smaller.
- Male- and female-headed households cultivate similar amounts of land per capita, but average livestock holdings are much larger among male-headed households.
- A pervasive lack of investment in improved inputs, mechanization, and infrastructure keeps marginal agricultural productivity low and variable, while the livestock sector suffers from ecological vulnerability, limited uptake of veterinary medicine, and low levels of value addition.
- Due to widespread food insecurity combined with inadequate physical and market infrastructure, commercial agriculture is extremely limited, and sales of crops and livestock account for only a small share of household income.
- Livestock herds are often used as a store of value, especially among poor households with little access to financial services, and livestock sales tend to occur in response to economic distress rather than as a routine means of generating income.
- Many households earn cash income by operating nonfarm enterprises, but these tend to be small, informal, and driven by necessity rather than opportunity.
- Expanding the use of fertilizer, drought-resistant seed varieties, and other improved inputs, and promoting the adoption of new water-management techniques and other productive technologies could strengthen food security and enable the commercialization of agriculture; however, deficiencies in infrastructure, inadequate startup capital, and high levels of insecurity sharply constrain access to inputs and technologies.
- Six key challenges inhibit rural income growth: (i) the infrastructure gap; (ii) low levels of human capital; (iii) lack of complementary services; (iv) the gender gap; and (vi) shocks and fragility.
- While the government continues to work closely with its international partners to address the Boko Haram conflict, easing the risks of conflict nationwide will require broader security support and large-scale investments in economic infrastructure and ecological restoration.
- Improving maternal health by reducing adolescent pregnancy and encouraging family planning could yield substantial benefits across generations, while expanding school feeding programs could boost educational attainment while improving nutrition indicators.
- Targeted investments in roads and digital infrastructure could enable the expansion of cash crop production while enhancing access to market information.
- Fostering the development of farmer organizations can leverage economies of scale in both input supply and output marketing while facilitating diversification and encouraging the adoption of new technologies and production methods.
- Gender is a vital cross-cutting issue. Prioritizing maternal health, encouraging girls to complete school before marriage, recruiting women into leadership roles, and equalizing access to land and financial services could greatly enhance the productive potential of women in rural Chad.

In Chad, poverty is heavily concentrated in rural areas. Rapid urbanization provides opportunities to accelerate agricultural transformation, increase value addition, and expand nonfarm income opportunities. However, Chad's urbanization rate is very low compared to the average for Sub-Saharan Africa (SSA) and has remained broadly unchanged for 25 years. In 2017, the share of households living in urban areas was about 23 percent, well below the SSA average of 40 percent (Figure 2.1). As an estimated 89 percent of Chad's poor population is located in rural areas, fostering rural income growth will be vital to reduce poverty and achieve shared prosperity. This chapter examines rural income sources, identifies opportunities for and constraints on accelerating rural income growth, and presents growth-oriented policy options. The analysis applies a version of the World Bank's rural income diagnostic framework modified to distinguish between agricultural and nonfarm labor income, as well as transfers.

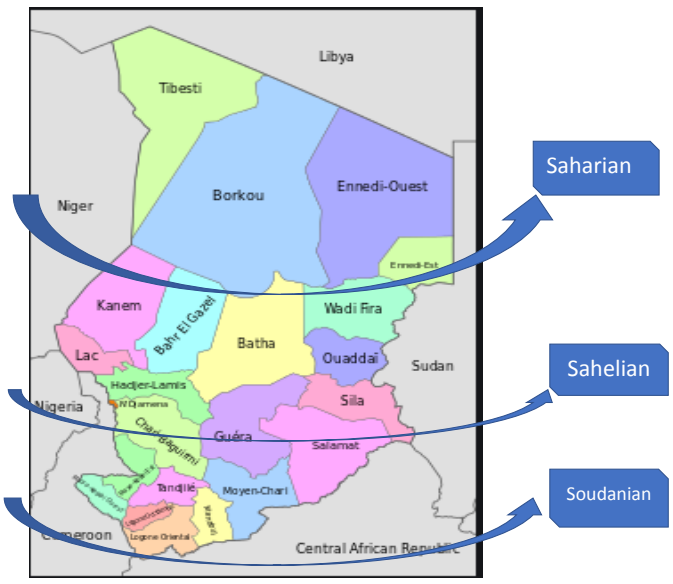
Figure 2.1. The Share of the Population Living in Urban Areas, Chad and SSA, 2017



Source: WDI and World Bank staff calculation

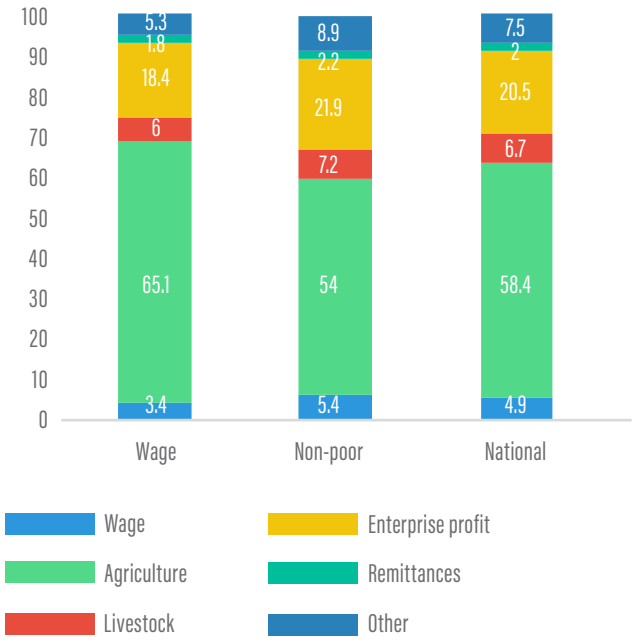
The analysis presented in this chapter explores differences in livelihoods across Chad's diverse agro-ecological zones (AEZs). Chad's three main AEZs are the Saharan, Sahelian, and Soudanian zones (Figure 2.2). Annual rainfall varies significantly across these zones, ranging from less than 200mm in the Saharan zone to up to 1,000mm in the Soudanian zone. There are also variations between the northern and southern areas of the Sahelian and Soudanian AEZs, especially in terms of crop cultivation and poverty rates (Figure 2.3). Therefore, the analysis identifies five AEZs: Saharan, North Sahelian, South Sahelian, North Soudanian, and South Soudanian.e also variations between the northern and southern areas of the Sahelian and Soudanian AEZs, especially in terms of crop cultivation and poverty rates (Figure 2.3). Therefore, the analysis identifies five AEZs: Saharan, North Sahelian, South Sahelian, North Soudanian, and South Soudanian.

Figure 2.2 Chad's Agro-Ecological Zones



Source: World Bank staff calculations using data from ECOSIT 4

Figure 2.3 Rural household Income Composition (%)



Source: World Bank staff calculations using data from ECOSIT 4

Table 2.1 Poverty, Agricultural, and Income Statistics by Agro-Ecological Zone

	Saharan	North Sahelian	South Sahelian	North Soudanian	South Soudanian
Poverty rates (national poverty line)	0.26	0.43	0.36	0.63	0.55
Total cultivated (ha)	0.72	1.30	1.79	1.72	2.13
Share of land cultivated to millet	0.56	0.82	0.51	0.22	0.18
Share of land cultivated to sorghum	0.00	0.12	0.21	0.32	0.31
Share of land cultivated to rice	0.00	0.00	0.00	0.16	0.07
Share of land cultivated to maize	0.00	0.03	0.06	0.07	0.04
Share of land cultivated to groundnut	0.00	0.01	0.13	0.13	0.22
Share of land cultivated to sesame	0.00	0.00	0.02	0.05	0.10
Share of land cultivated to cowpea	0.00	0.01	0.01	0.02	0.02
Share of land cultivated to other crops	0.44	0.01	0.04	0.05	0.06
Share of agricultural income in the total income	0.04	0.43	0.64	0.67	0.61
Share of livestock income in the total income	0.42	0.09	0.06	0.05	0.04
Share of wages in the total income	0.17	0.05	0.05	0.04	0.05
Share of enterprise income in the total income	0.16	0.24	0.17	0.17	0.24
Share of remittances in the total income	0.03	0.02	0.02	0.02	0.01
Share of other incomes in the total income	0.18	0.17	0.06	0.04	0.04
Median cash income from cash crops (FCFA)	NA[8]	18,667	40,000	39,000	33,750
Median cash income from cereal crops (FCFA)	NA	20,000	36,000	30,000	20,000
Median cash income from livestock	450,000	52,500	54,000	25,500	21,250
% of households with wage labor income	13.2	2.8	3.1	1.5	3.5
% of households at >=60 minutes to nearest permanent market	NA	54.0	92.1	19.1	78.0

Source: World Bank staff calculations using data from ECOSIT 4

8 Not computed due to no observations (zero plots), as crop cultivation is not widely practiced in the zone.

2.1 INCOME AND PRODUCTIVE RESOURCES

2.1.1 AGRICULTURE

Crops and livestock are the primary sources of income for rural households in Chad. The agricultural sector represents 65 percent of total income, of which crop production accounts for 58.4 percent, while livestock accounts for 6.7 percent (Figure 2.3). In Sub-Saharan Africa, the agricultural sector represents an average of 68 percent of rural income, only slightly higher than the sector's share in Chad's total income. Moreover, agriculture's contribution to rural income is much higher for households in the bottom 40 percent of the consumption distribution. Among these households, crops and livestock account for 71 percent of the total income, whereas they represent 61 percent of income among households in the top 60 percent of the consumption distribution.

More than eight out of ten households in rural Chad depend on agriculture and related activities. About 88 and 62 percent of rural households are engaged in crop and livestock production, respectively. Livestock herding is by far the most important economic activity in the Saharan zone, where only about 10 percent of households are engaged in crop production. [8]Agro-pastoralism is also important outside the Saharan zone: for example, more than 50 percent of households in the Soudanian zone engage in both crop and livestock production. While the combination of crop and livestock production provides opportunities for agricultural income diversification, households in the Soudanian zone are more likely to be poor than their counterparts in the Saharan zone—consistent with patterns observed in comparable areas such as the Sikasso region in Mali.[9]

Unequal land access between poor and nonpoor households reflect differences in average household size. On average, nonpoor households cultivate 0.56 hectares (ha) per household member, while poor households cultivate just 0.36 ha per household member despite having larger average landholdings. Although male-headed households cultivate much more land than female-headed households (an average of 2.23 ha versus 1.18 ha), female-headed households tend to be much small, and there is no significant difference in land cultivation on a per capita basis.

The livestock sector is characterized by small herd sizes. The national average herd size is just 2.4 tropical livestock units (TLUs), but the average herd size in the Saharan AEZ, where pastoralism is the main source of livelihoods, is close to 19 TLUs. Across regions, medium-size livestock such as goats and sheep are the most common. Broadly equal shares of poor and nonpoor households engage in livestock production, and their herd sizes are similar. However, there is a large gender gap in livestock holdings, as the average herd size for male-headed households is approximately 3.3 times larger than that of female-headed households. This difference is even larger than that observed in Mali, where the average herd size of male-head households is 3 times that of female-headed households.[10]

The allocation of farmland in Chad is driven by a focus on food security over revenue maximization. On average, Chadian farmers devote almost 70 percent of their land to cereal production. The staple crops millet and sorghum represent 32 percent and 25 percent of total cereal production, respectively, while groundnuts are the

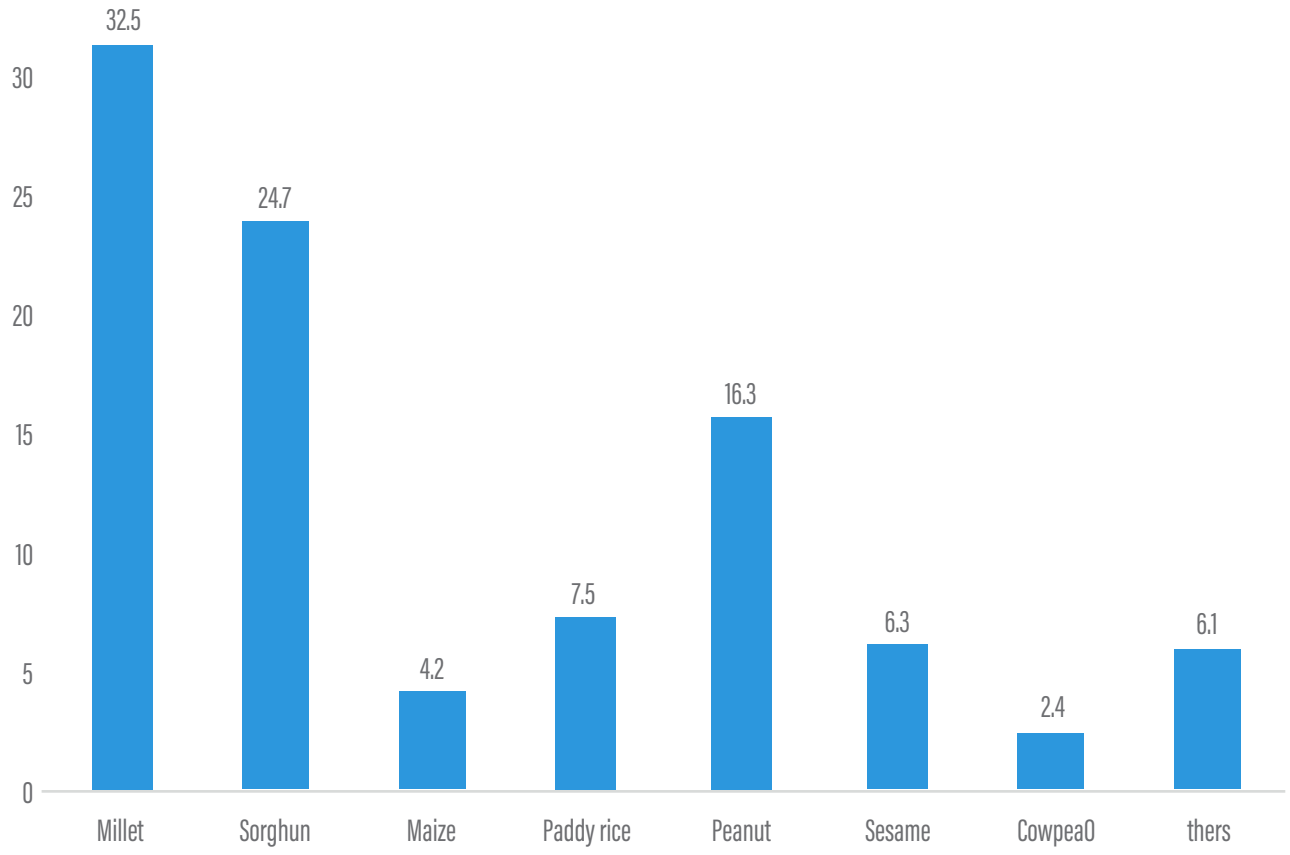
8 The Household Consumption and Informal Sector Survey in Chad (2018-2019) – ECOSIT4.

9 Beegle, K., & Christiaensen, L. (Eds.). (2019). Accelerating poverty reduction in Africa. World Bank Publications

10 Staff calculation using the ECOSIT4.

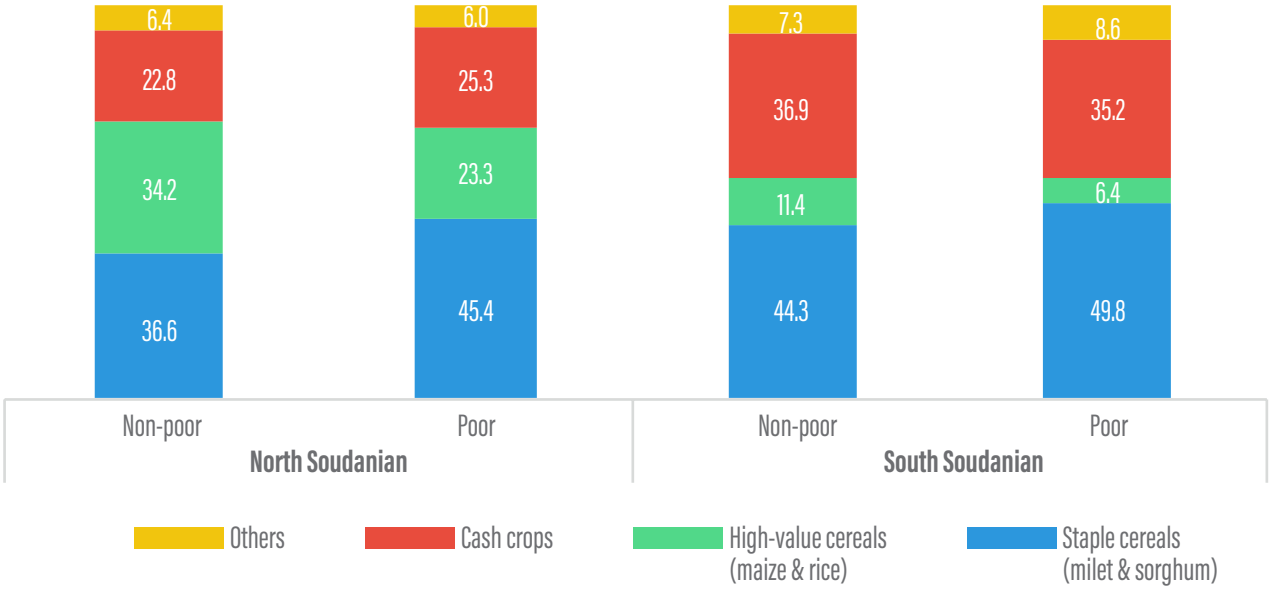
dominant cash crop, accounting for 16 percent of total cash-crop production (Figure 2.4). Cropping patterns among poor and nonpoor households are similar in the Saharan and Sahelian zones, but in the Soudanian zone nonpoor households are significantly more likely to cultivate higher-value crops. Likewise, both female- and male-headed households tend to have similar crop portfolios. However, the amounts of land allocated to producing the country's main crops vary widely across AEZs. The Saharan and north Sahelian zones are the least diversified, with 80 percent of land allocated to millet. The south Sahelian zone is somewhat more diversified, with about 70 percent of land allocated to millet and sorghum and 14 percent to peanuts. The Soudanian zone is the most diversified, and it is the only zone with significant differences between the types of crops cultivated by nonpoor and poor households. For example, high-value cereal crops such as maize and rice occupy a much larger share of land owned by nonpoor households, while poor households dedicate more land to low-value staple crops such as millet and sorghum (Figure 2.5).

Figure 2.4. Nationwide Allocation of Farmland by Crop Type



Source: World Bank staff calculations using data from ECOSIT 4

Figure 2.5. Allocation of Farmland in the Soudanian AEZ by Poverty Status



Source: World Bank staff calculations using data from ECOSIT 4

The limited use of improved inputs and production practices contributes to low levels of marginal productivity. Millet and sorghum, the main staple crops, have the lowest yields among cereal grains, while sesame and cowpeas are the cash crops with the lowest yields. Poor households have lower yields than their wealthier counterparts across all crop types, except millet and cowpeas (Figure 2.6). Millet and cowpeas are drought-resistant, which likely contributes to their popularity among poor households. [11]Low yields in the agriculture sector, especially for staple crops, intensifies food insecurity: about 75 percent of rural households reported having had to skip a meal at least once in 2018 due to a lack of food.

Farmers in Chad lack access to the necessary tools and inputs to increase productivity and crop yields. Crop production suffers from low rates of mechanization and the limited use of improved inputs. Less than 0.5 percent of households report owning a tractor, and about 3 percent report using one on their farm. [12]The average cultivated plot size is under 1 hectare, which, combined with the indivisibility of agricultural machinery and lack of developed agricultural equipment rental markets, limits mechanization. [13]The use of variable inputs such as fertilizer is also extremely low in Chad compared to its neighbor Mali. Between 1990 and 2014, the average amount of synthetic fertilizer used in Mali was approximately 80,640 metric tons, versus just 9,180 metric tons in Chad. [14]Inadequate infrastructure is also a major challenge, and low levels of rainfall in a context of very limited irrigation systems further reduced yields during the 2017-18 agricultural season.

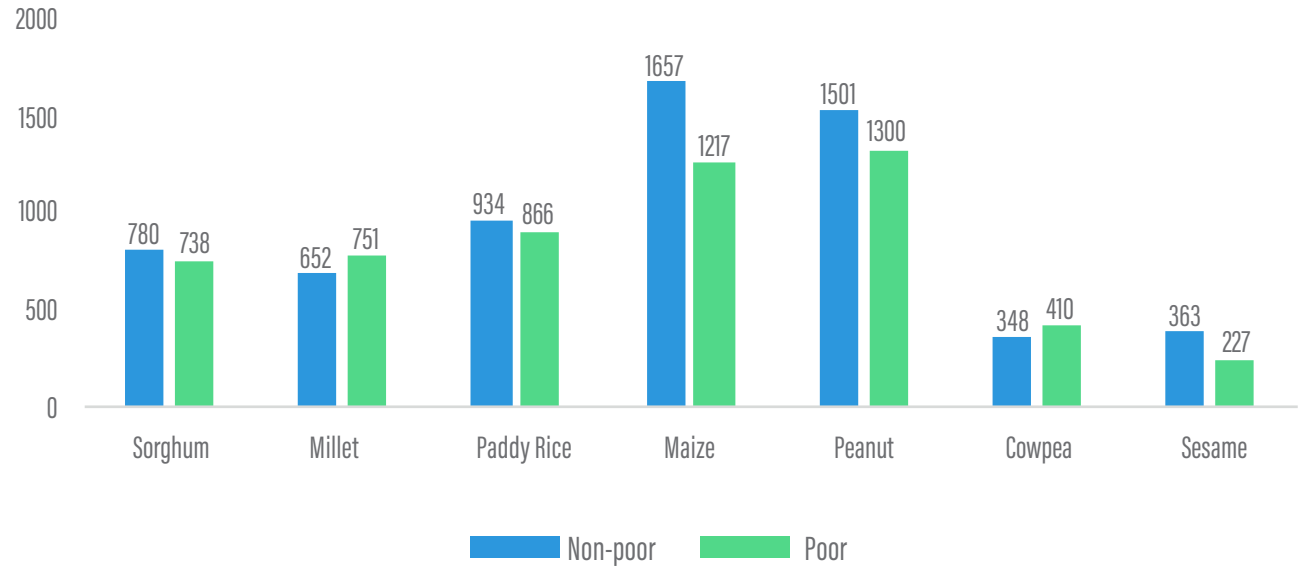
11 Fischer, H. W., Reddy, N. N., & Rao, M. S. (2016). Can more drought-resistant crops promote more climate secure agriculture? Prospects and challenges of millet cultivation in Ananthapur, Andhra Pradesh. World Development Perspectives, 2, 5-10.

12 This difference between ownership and use indicates some rental activities of agricultural equipment although such activities are limited.

13 Beegle, K., & Christiaensen, L. (Eds.). (2019). Accelerating poverty reduction in Africa. World Bank Publications

14 Fuglie, Keith O. 2015. "Accounting for Growth in Global Agriculture," Bio-based and Applied Economics 4(3): 221-54.

Figure 2.6. Differences in Crop Yields between Poor and Nonpoor Households



Source: World Bank staff calculations using data from ECOSIT 4

Like crop production, the livestock sector is dominated by traditional practices. Maintaining livestock requires access to natural resources such as pastureland and water, the availability of which varies during the year and across AEZs. Water sources are highly vulnerable to drought, and the limited availability of water restricts access to pastureland, especially during the dry season.[15] Pastureland is especially critical in Chad, where only 20 percent of households report buying animal fodder.[16] The transhumance corridor that stretches across the border into the Central African Republic is used to feed livestock during the dry season, but this area is becoming increasingly difficult to access due to mounting insecurity. [17]Uptake of veterinary medicine is limited, with only about 15 percent and 25 percent of households using deworming and vaccination services, respectively. [18]The livestock sector is also characterized by very little value addition, as most sales are of live animals rather than animal products.

15 Mahamat Guindé. 2018. Ouagal Mahamat Mahamat Abdallah. OIE – World Organization for Animal Health.

16 Staff calculations using ECOSIT4

17 FAO (2020). https://reliefweb.int/report/chad/strengthening-social-cohesion-among-communities-central-african-republic-and-chad

18 Author's calculations using ECOSIT4 data.

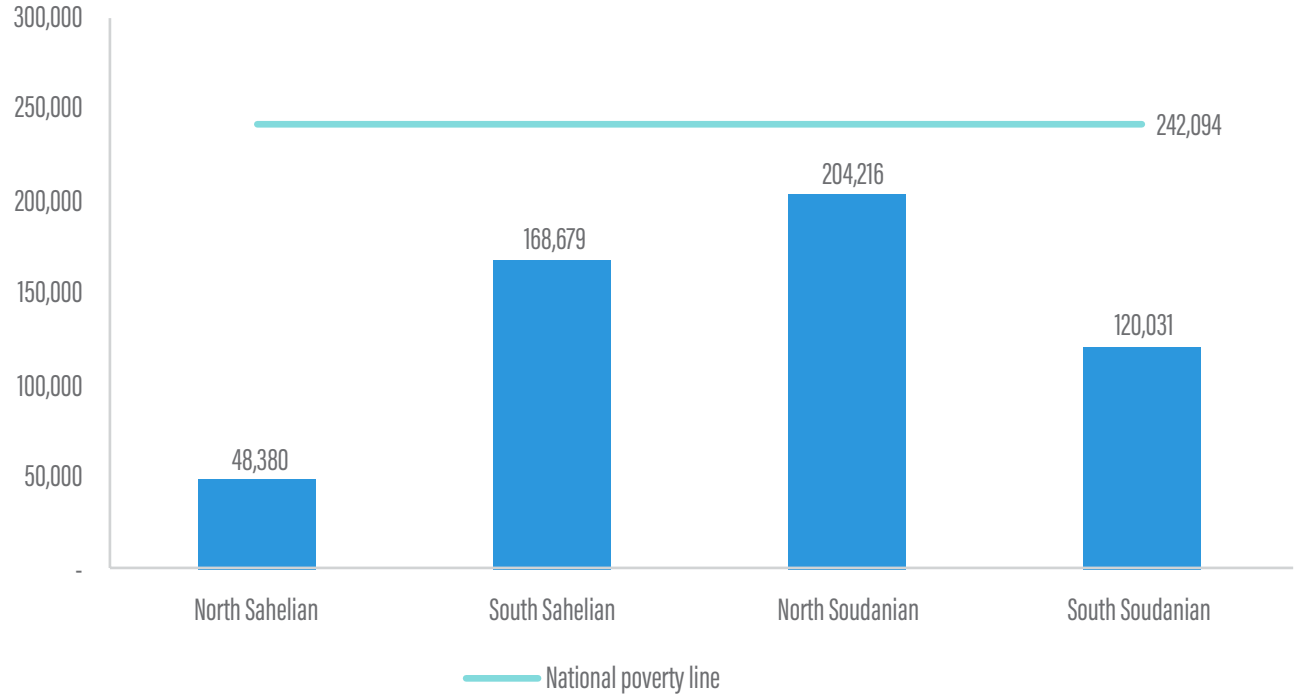
2.1.2 AGRICULTURAL MARKET PARTICIPATION

Rural households derive little cash income from agriculture. While the overwhelming majority of rural households engage in crop and livestock production, these activities generate only a small share of their cash income (Figure 2.7). Even in the north Soudanian AEZ, where households receive an especially large share of their income in cash, average total household income from crop sales averages just FCFA 204,216—well below the individual poverty line of FCFA 242,094.

Low marginal productivity, a focus on subsistence over commercialization, and undiversified production structures reduce the cash income of agricultural households. Over 80 percent of cereal output in Chad is for consumption by the households that produced it.[19] Even among the modest share of households that participate in commercial agriculture, only about half of their total production is sold, and the proportion of commercialized production is especially low for millet (35 percent) and sorghum (45 percent). The uni-seasonal nature of crop production in a context of limited irrigation prevents households from commercializing their agricultural activities. Fewer than 2 percent of the country's cultivated plots were irrigated in 2018, and irrigation levels are just 2.5 percent in the Hadjer Lamis and Lac Regions, despite their access to the Lake Chad Basin.

Income from selling livestock and animal products is similarly low. Approximately 28 percent of households receive income from the sale of livestock. In rural areas, livestock is usually used as both a productive asset and a store of value, especially among poor households, which often lack access to alternative savings options. Due to low livestock productivity, most livestock sales occur under distress rather than to generate cash income. Low urbanization rates and poor access to processing and cooling infrastructure also limit income opportunities from the sale of meat and dairy products.

Figure 2.7. Total Cash Income from Crop Sales (in FCFA)



Source: World Bank staff calculations using data from ECOSIT 4

19 This statistic includes households that do not sell any share of their output.

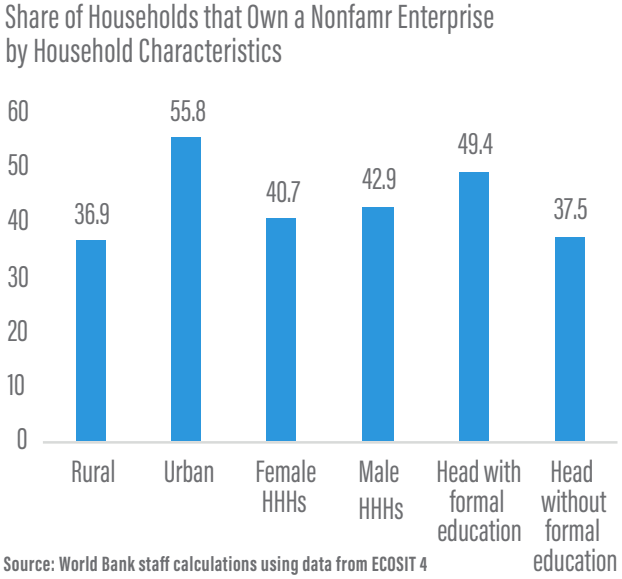
2.1.3 THE NONFARM SECTOR

Rural households derive about one-fifth of their total income from nonfarm enterprises. The contribution of nonfarm activities to total income ranges from 24 percent among rural households in the south Sahelian AEZ to just 15.6 percent among households in the Saharan AEZ. Though nonfarm activities are a substantial source of income in rural areas, the average urban household earns almost 40 percent of its total income from nonfarm activities. Nonfarm income represents 18 percent of total income among households in the bottom 40 percent of the consumption distribution and 21 percent among households in the top 60 percent.

About 36 percent of households in rural Chad own and operate at least one nonfarm enterprise (NFE). While similar shares of poor and nonpoor households own and operate NFEs, 45 percent of households in the top 20 percent of the consumption distribution derive income from an NFE, versus just 36 percent of households in the bottom 20 percent of the distribution (Figure 2.8). The education level of the household head is positively correlated with NFE ownership, and there is no difference in NFE ownership between male- and female-headed households.

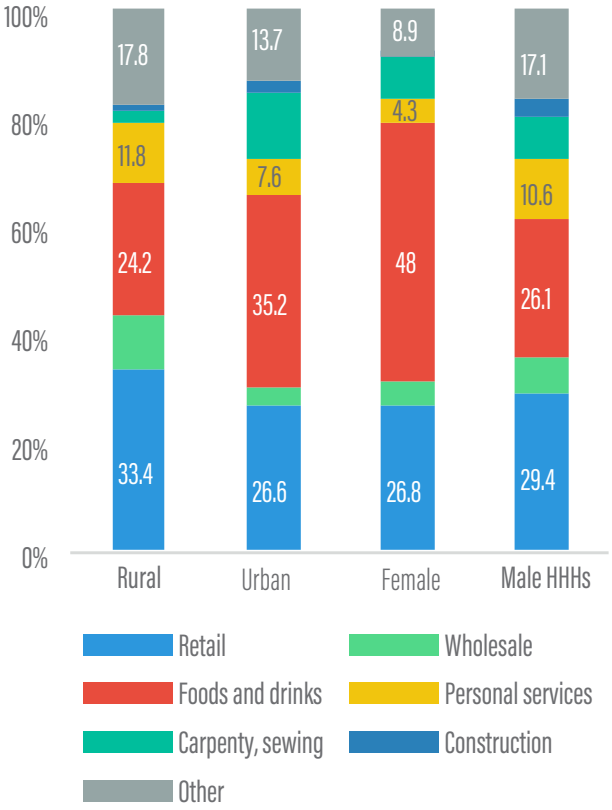
The most common NFEs in rural areas are focused on retail trade (33 percent), food production (24 percent), and personal services (12 percent) (Figure 2.9). The popularity of these activities likely reflects their low startup costs[20]. NFEs are mainly informal: nationwide, less than 6 percent are formally registered, and this share falls to less than 1 percent in rural areas. As in other low-income countries, many NFEs in Chad are started out of necessity rather than as a response to business opportunities, and they tend to contribute little to job creation.[21]

Figure 2.8 Share of Households that Own Nonfarm Enterprise by Household Characteristics



Source: World Bank staff calculations using data from ECOSIT 4

Figure 2.9 Nonfarm Enterprises by Location and Head of Household



Source: World Bank staff calculations using data from ECOSIT 4

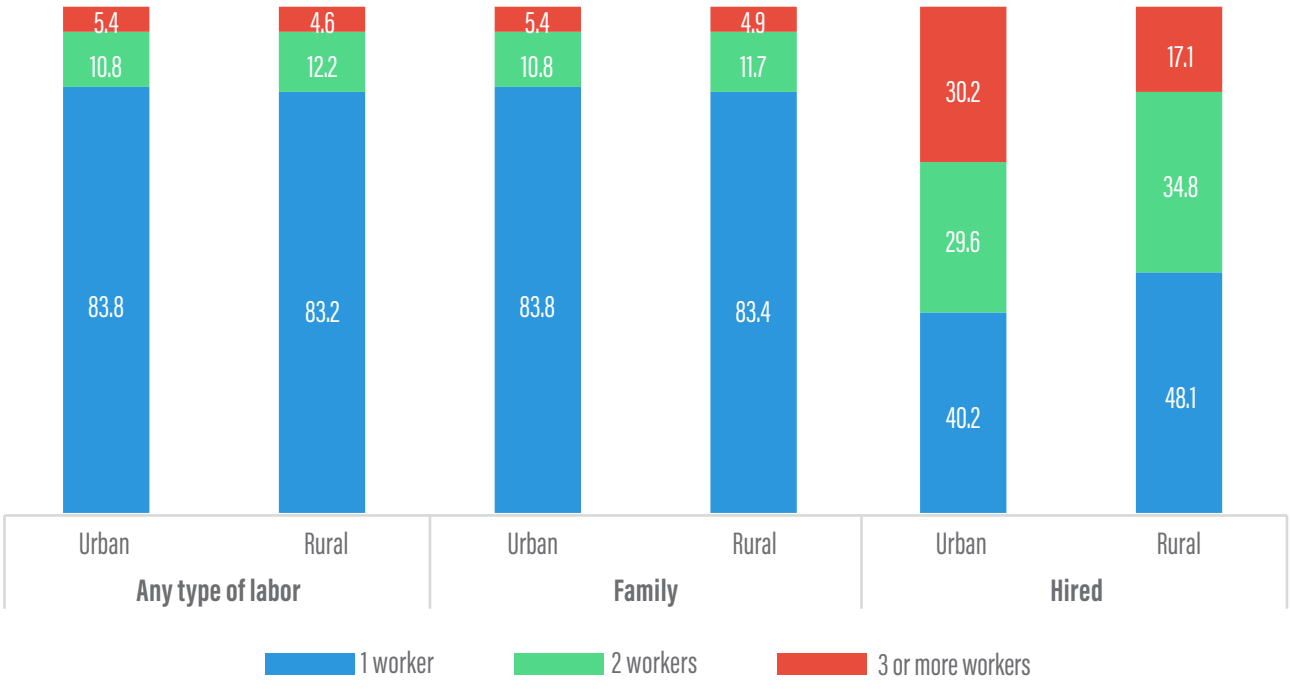
20 Nagler, P., & Naudé, W. (2017). Non-farm entrepreneurship in rural sub-Saharan Africa: New empirical evidence. *Food policy*, 67, 175-191.

21 Poschke, M. (2013). 'Entrepreneurs out of necessity': a snapshot. *Applied Economics Letters*, 20(7), 658-663. Beegle, K., & Christiaensen, L. (Eds.). (2019). Accelerating poverty reduction in Africa. World Bank Publications.

Over 90 percent of NFEs in Chad exclusively employ family labor, and most employ just one family member, though there are differences between rural and urban areas (Figure 2.10). Urban NFEs are more likely to hire non-family labor (16 percent) than their rural counterparts (7 percent). Firms that hire labor tend to employ more than one non-family worker. NFEs in the construction and personal services sectors are the most likely to hire non-family labor, while NFEs in sectors such as food and drinks and retail are the least likely to employ non-family labor. The lower rate of non-family workers in restaurants and retail stores may reflect the less skill-intensive nature of these businesses, as well as their small size and typically informal status (Figure 2.11).[22]

The concentration of NFEs in a narrow range of sectors with limited market opportunities leads to intense competition and high entry and exit rates. About half of NFEs report weak demand as a constraint on their operations that threatens their solvency,[23] and only about half of NFEs operate year-round. Over 40 percent of NFEs in the retail trade and food and drinks sectors in both rural and urban areas have been operating for fewer than five years, and their high entry and exit rates likely reflect a lack of profitability, financing, and mechanisms to cope with idiosyncratic shocks.[24] NFEs that rely on skilled or semiskilled labor tend to be more stable. For example, NFEs involved in carpentry and sewing tend to remain active for 12 years or more in both rural and urban areas, and urban NFEs in construction and personal services are also likely to remain in operation for 12 years or more.

Figure 2.10. Number of Workers in Nonfarm Enterprises by Type of Labor



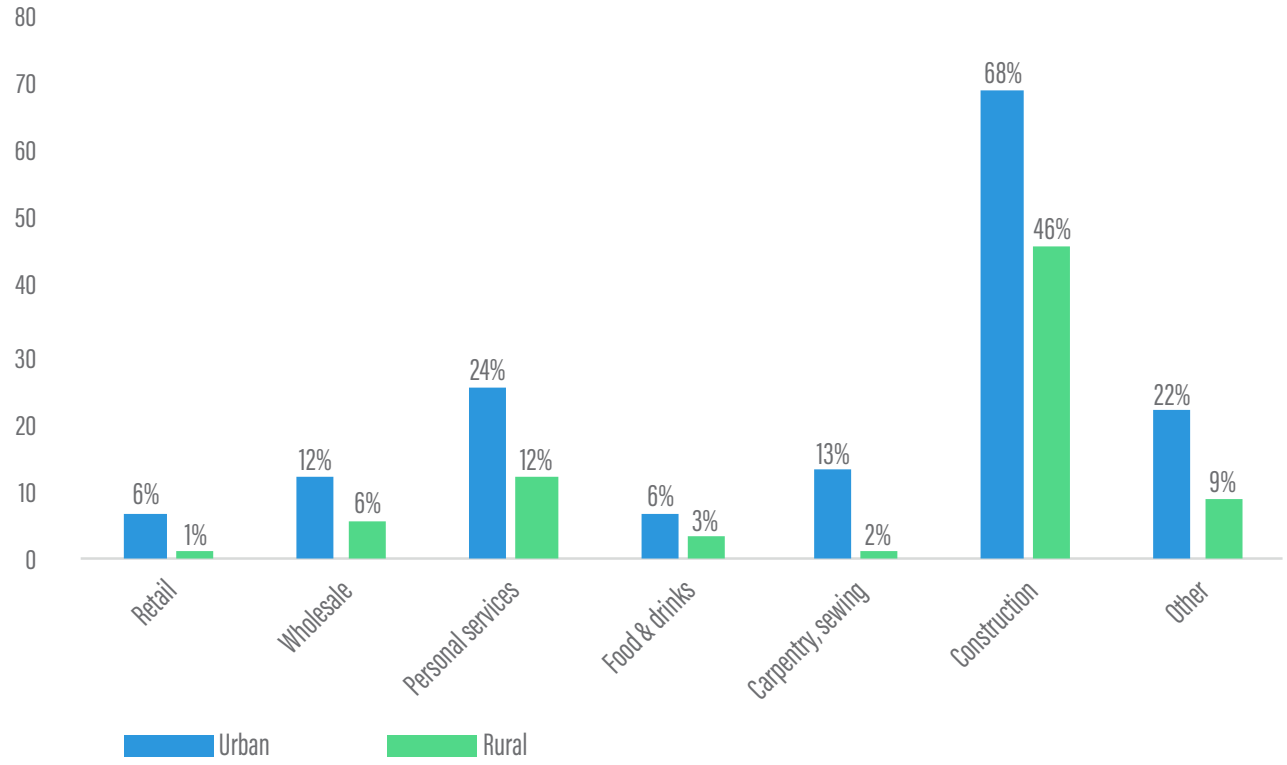
Source: World Bank staff calculations using data from ECOSIT 4

22 Nagler, P., & Naudé, W. (2017). Non-farm Entrepreneurship in Rural Sub-Saharan Africa: New Empirical Evidence. *Food Policy*, 67, 175-191.

23 ECOSIT4.

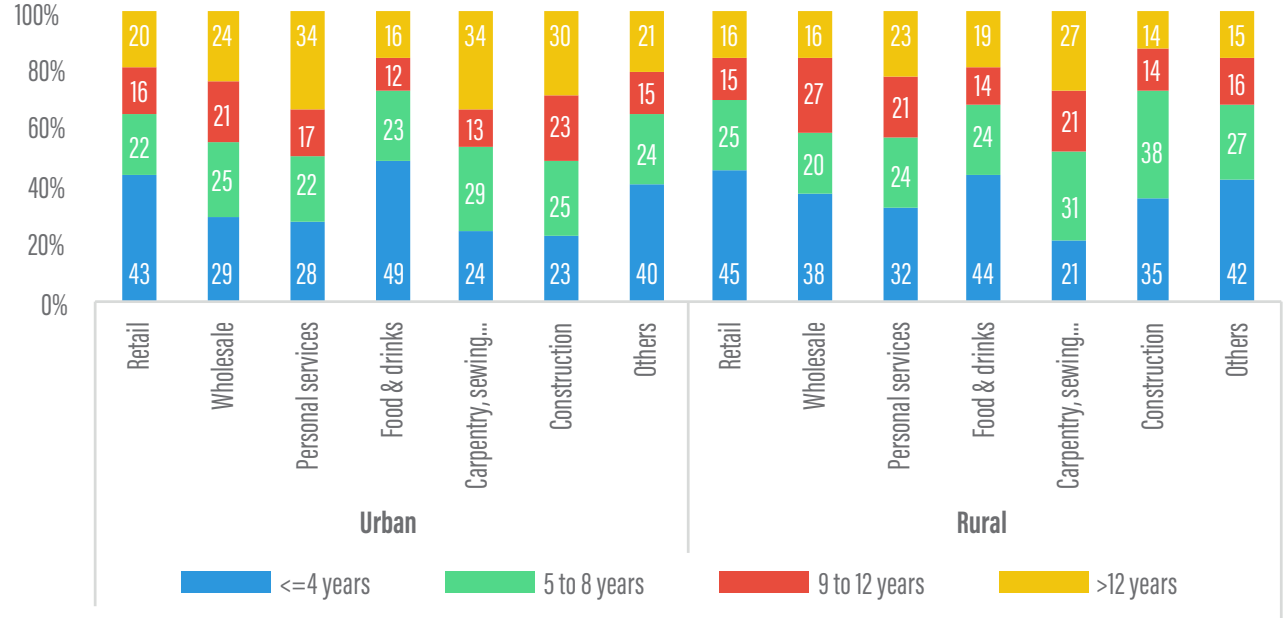
24 Nagler, P., & Naudé, W. (2017). Non-farm entrepreneurship in rural sub-Saharan Africa: New empirical evidence. Food policy, 67, 175-191.

Figure 2.11. Share of Nonfarm Enterprises that Employ Formal Workers by Sector



Source: World Bank staff calculations using data from ECOSIT 4

Figure 2.12. Age Distribution across Nonfarm Enterprises



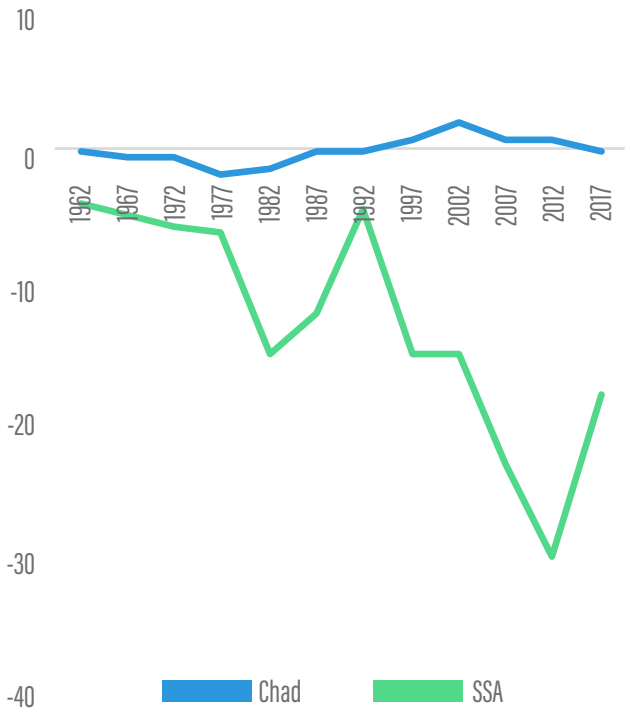
Source: World Bank staff calculations using data from ECOSIT 4

2.1.4 NONLABOR INCOME: REMITTANCES

Remittances play a limited role in rural household income. The contribution of remittances to total household income ranges from 2 percent in rural areas to 6.3 percent in urban centers. Chad's net migration rate has remained low and stable over time (Figure 2.13), and the population of Chadian migrants is much smaller than those of most regional peers (Figure 2.14). In Mali and Senegal, remittances finance a significant share of consumption, but in Chad they represent just 5 percent of household income. However, the share of remittances in household income varies widely in Chad, from 3 percent in the north and south Soudanian AEZs to 12 percent in the north Sahelian AEZ.

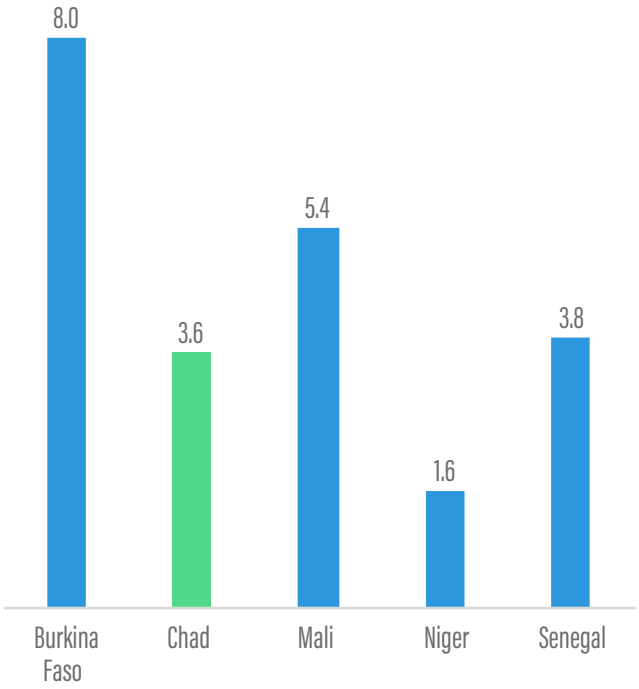
The average share of remittances in household income varies based on household poverty status and the gender of the household head. Remittances represent 3 percent of household income among poor households and 7 percent among nonpoor households. Female-headed households are almost twice as likely to receive remittances as male-headed households (34 percent versus 18 percent), and they receive about twice the level of remittances as their male counterparts (CFAF 45,125 versus CFAF 23,267). Chad's adoption of the Global Compact for Migration represents an opportunity to boost nonlabor income through remittances, which have been shown to increase the probability of small-scale self-employment and could catalyze the development of NFEs.

Figure 2.13. Age Distribution across Nonfarm Enterprises



Source: United Nations Population Division. World Population Prospects: 2019 Revision.

Figure 2.14 Migrants as a Share of the Population (%)



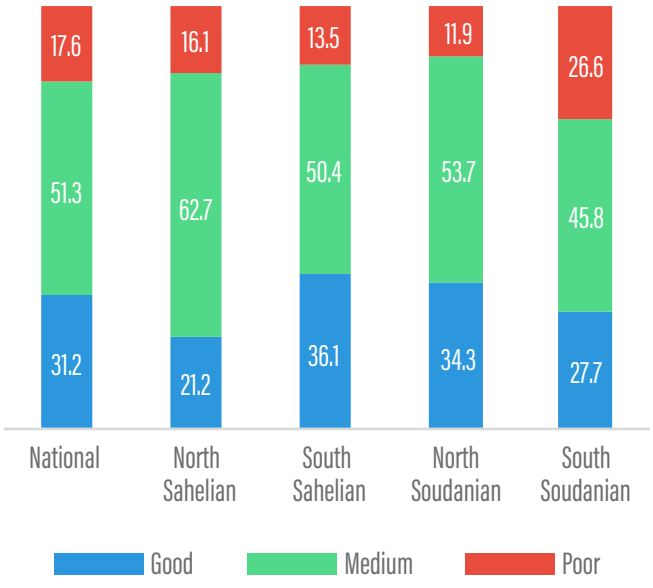
Source: KNOMAD 2019.

2.2 RURAL INCOME GROWTH: OPPORTUNITIES AND CONSTRAINTS

2.2.1 OPPORTUNITIES

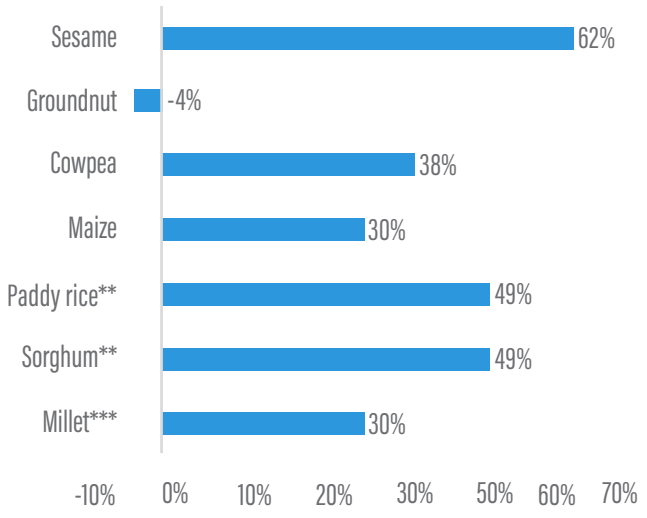
Efforts to increase the productivity of staple crops could enhance food security and facilitate commercialization. Measures to promote the use of improved inputs such as fertilizers and drought-resistant seeds and to encourage the adoption of new productive technologies could greatly increase marginal productivity. Households perceive about one-third of their plots to be of poor quality, with the largest share of poor-quality plots reported in the south Soudanian AEZ (Figure 2.15). Though subjective, these perceptions are correlated with differences in observed yields, especially for millet, sorghum, and paddy rice (Figure 2.16), and they may impact crop choices and investment decisions.[25] Marginal yields could be significantly increased by enhancing soil quality through improved water management, the adoption of soil-conservation techniques, the introduction of complementary inputs, and the use of climate-smart agricultural technologies to increase labor productivity. Greater productivity could generate a surplus of staple crops, which in turn could increase the rate of commercialization.

Figure 2.15 Perceived Soil Quality (% of plots)



Source: World Bank staff calculation using data from ECOSIT 4

Figure 2.16 Differences in Yield between Plots Rated "Good Quality" and "Poor Quality" (percentage points)



Source: World Bank staff calculation using data from ECOSIT 4
Note: ** and *** indicate statistical significance at the 5 percent and 1 percent confidence levels, respectively.

25 Yield differences between plots with "poor" and "good" soil quality are statistically different from zero.

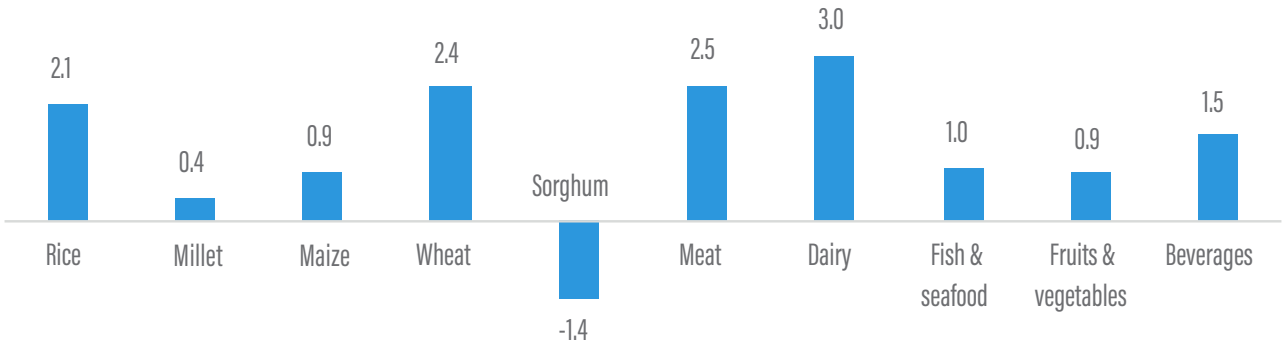
Increasing the area under cultivation could promote high-value crop production. Although Chad's total agricultural land area exceeds 49 million hectares, only about 6 percent of the country's arable land is cultivated, and more than 80 percent of farms cultivate fewer than 2 hectares.[26] Increased production through area expansion would need to be accompanied by sustainable cultivation practices and infrastructure development to enable access to land.

Expanding irrigation networks could help to mitigate vulnerability to drought, increase diversification into cash crops, and provide opportunities to generate income during the off season. Despite its considerable potential, irrigation in Chad remains underdeveloped and underutilized. Based on data from 2002, only 9 percent of the country's available water resources are being used, and less than 1 percent of its agricultural land is irrigated.[27]

Diversifying into cash crops and raising marginal productivity could increase the rate of commercialization. A full 80 percent of Chadian households cite the need to produce food for their own consumption as a key obstacle to commercialization. However, the high commercialization rate for sesame, over 50 percent of which is sold, combined with large yield gaps, underscores the agriculture sector's potential to generate income growth among poor households, especially in the Sahelian and Soudanian AEZs. In addition to boosting farm income, diversification into cash crops can also benefit the production of staple crops by easing liquidity constraints and allowing for greater investment in improved inputs and new technologies.[28] The resulting surpluses could encourage further commercialization, providing farmers with greater liquidity and enabling further investment in a virtuous cycle.

The prevalence of agro-pastoralism in the southern AEZs offers a unique opportunity to develop complementary and inclusive value chains for crops and livestock. For example, the low domestic production and high income elasticity of rice indicate that there is scope to increase productivity and promote inclusive value chains (Figure 2.17). Furthermore, the low use of both preventive and curative veterinary services indicates the potential to increase income from livestock by improving animal health. The development of agricultural value chains would also generate more NFE opportunities in areas where agricultural businesses are rare.

Figure 2.17. Income Elasticity of Food Demand in Urban Areas



Source: World Bank staff calculations using data from ECOSIT 4

26 Masters, W. A., Djurfeldt, A. A., De Haan, C., Hazell, P., Jayne, T., Jirström, M., & Reardon, T. (2013). Urbanization and farm size in Asia and Africa: Implications for food security and agricultural research. *Global Food Security*, 2(3), 156-165

27 FAO. AQUASTAT geospatial information. http://www.fao.org/aquastat/en/geospatial-information/global-maps-irrigated-areas/irrigation-by-country/country/TCD

28 Beegle, K., & Christiaensen, L. (Eds.). (2019). Accelerating poverty reduction in Africa. World Bank Publications. Govereh, J., & Jayne, T. S. (2003). Cash cropping and food crop productivity: synergies or trade-offs? *Agricultural economics*, 28(1), 39-50.

Emerging international demand for non-timber forest products (NTFPs) such as gum arabic, shea, and oasis tree fruits (e.g., dates) could accelerate rural income growth. Chad is the world's second-largest producer of gum arabic, which is the country's fourth largest export product. Gum arabic is mainly produced in the central part of the Sahelian AEZ and is the leading commodity in the NTFP sector and has been identified as a resilient income source for rural households along with other NTFPs such as shea, which is primarily produced in the Soudanian AEZ. The development of NTFP value chains could support inclusive income growth for vulnerable groups such as poor and female-headed households, which often have limited access to land.

The availability of date palms in the Saharan AEZ represents an important opportunity to accelerate income growth and poverty reduction. In 1990, 67 percent of the estimated 2,010,000 date palms in Sub-Sahelian countries were located in Chad, primarily in the Borkou, Ennedi, and Tibesti regions.[29] Dates are mainly grown for commercial sale and are highly marketable, both domestically and internationally. Date cultivation is viable in arid regions, where it offers households a valuable opportunity to generate cash income and exit poverty.

2.2.2 KEY CONSTRAINTS ON RURAL INCOME GROWTH

Six key challenges constrain rural income growth. These include: (i) the infrastructure gap; (ii) low levels of human capital; (iii) lack of complementary services; (iv) the gender gap; and (vi) shocks and fragility.

The Infrastructure Gap

The poor state of Chad's infrastructure deters private investment, inhibits commercialization, and limits connectivity to input and output markets. Chad's vast land area and dispersed population raise the marginal cost of infrastructure. In 2018, Chad's population density was estimated at just 12 people per square kilometer, compared to 18 in Niger and 72 in Burkina Faso. The difficulty of connecting small, remote communities limits market opportunities in agriculture and other sectors. Just 3.2 percent of households in Chad regularly use asphalt roads, and only 3.4 percent are within reach of a permanent market.[30] In addition, lack of storage capacity and poor access to electricity limit the capacity for processing agricultural goods, forcing households to sell their crops and livestock with little or no value added. Estimates based on ECOSIT 4 data indicate that 25 percent of households that sell livestock receive cash income from selling live animals, while less than 3 percent receive cash income from selling meat.

The authorities can address these infrastructure constraints by developing integrated input-output markets capable of connecting farmers to urban and peri-urban commercial centers while creating an enabling environment for the adoption of new technologies.[31] The expansion of contract farming could increase access to inputs while generating cash income. However, these arrangements can entail significant risks for farmers, especially for the country's poorest households, and a lack of technical knowledge might impede their ability to meet quality requirements. Furthermore, long distances between farming households increase transaction costs, including search costs, which complicates the development of value chains.

Low Levels of Human Capital

Low educational outcomes and a lack of technical knowledge discourage the uptake of new technologies and may limit the effectiveness of agricultural inputs and investments.[32] Approximately 57 percent of male plot managers and 81 percent of female plot managers have no formal education, and less than 2 percent of all plot managers have any education beyond the primary level. Low educational achievement contributes to poor technical expertise, which constrains technological adoption and

29 Salah, M. B. (2015). Date Palm Status and Perspective in Sub-Sahelian African Countries: Burkina Faso, Chad, Ethiopia, Mali, Senegal, and Somalia. In Date Palm genetic resources and utilization (pp. 369-386). Springer, Dordrecht.

30 Ecosit 4.

31 Ton, G., Desiere, S., Vellema, W., Weituschat, S., & D'haese, M. (2017). "The effectiveness of contract farming in improving smallholder income and food security in low- and middle-income countries: a mixed-method systematic review." 3ie Systematic Review.

32 Results from a random field experiment in Niger show that training farmers in water management and soil conservation techniques increased uptake by up to 60 percentage points.

diversification into high-value crops such as fruits and vegetables. Compared to traditional crops, high-value crops are often especially vulnerable to weather-related shocks, and managing those shocks requires technical knowledge that may not be present in local communities. Additionally, limited technical skills may prevent households from accessing income opportunities from NTFPs such as gum arabic and shea. In the gum arabic subsector, for instance, the current cultivation method is mainly based on propagation, which yields low-quality gum destined for a narrow range of export markets.[33]

More effective use of extension agents could build agricultural knowledge. However, the absence of reliable communication mechanisms between agents and farmers impedes the effectiveness of extension services. Furthermore, extension initiatives may be ineffective if they ignore context-specific variables (e.g., different soil types) or do not fully address the needs of farmers (e.g., utility maximization versus profit maximization). The country's low level of human capital is also reflected in the poor quality of extension services.

Low levels of human capital also contribute to the absence of farmer organizations, which are critical to successful value chains. The lack of farmer organizations prevents the formation of economies of scale and limits the use of digital technologies and financial services, which are vital to connect farmers to markets. Results from an ordinary least squares regression of the correlates of selling a share of output suggest that the presence of a farmer organization has a positive and significant effect on sales. Farmers with a permanent market located less than an hour from their farms sell a greater share of their output than famers who must travel for over an hour to reach a permanent market. By contrast, access to a periodic market does not appear to increase the share of output sold, indicating that proximity to a permanent market is a key determinant of agricultural commercialization. Access to an asphalt road, even if it is more than an hour away from the farm, also matters more than access to a nearby laterite road.

The poor state of the healthcare system further undermines human capital and deepens the impact of idiosyncratic health shocks on labor income and household productivity. The public healthcare system, which is characterized by poor accessibility and quality, is the main source of care for the country's poor population. Rural households in remote areas are especially affected by inadequate healthcare infrastructure. Combined with liquidity constraints that reduce access to hired labor, a lack of health services places the rural poor at especially high risk of income loss in the event of a health shock. According to ECOSIT 4, up to 50 percent of rural respondents report having a sick member who did not seek medical services even though their condition prevented them from working.

Lack of Complementary Services

Limited insurance markets, inadequate public investment in information and communications technology (ICT) infrastructure, and weak land rights restrict the ability of the rural population to access market opportunities and invest in productive activities. The extension of mobile coverage has been shown to significantly reduce transaction costs and price dispersion in rural areas in low- and lower-middle-income countries.[34] However, only about 58 percent of Chadians own a cellphone, and this share drops to 46 percent among poor households. Mobile-money services are also limited, with a penetration rate of only 16 percent, versus 24 percent in Mali and 33 percent in Burkina Faso.[35] The rate of active users of mobile money is likely very low, especially in rural areas, where mobile-money agents are extremely rare. In Chad, over 80 percent of NFEs use personal funds as startup capital, underscoring their limited access to credit.

As in other low-income countries, the absence of crop or livestock insurance in Chad heightens the production uncertainty arising from weather-related shocks. The lack of insurance discourages farmers from making productive investments, taking risks on new crop types and production models, or accessing new market opportunities. While

33 Rahim, A. H., Ierland, E. C. V., & Weikard, H. P. (2010). Competition in the gum arabic market: a game theoretic modelling approach. *Quarterly Journal of International Agriculture, 49*(892-2016-65207).

34 Aker, J. C. (2010). Information from markets near and far: Mobile phones and agricultural markets in Niger. *American Economic Journal: Applied Economics*, 2(3), 46-59.

35 Demirgüç-Kunt, Asli, Leora Klapper, Dorothe Singer, Saniya Ansar, and Jake Hess. 2018. The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. Washington, DC: World Bank. doi:10.1596/978-1-4648-1259-0. License: Creative Commons Attribution CC BY 3.0 IGO

there is evidence that increased tenure security supports long-term investment,[36] Chad's community-based land systems and overlapping land rights, weak tenure security, and costly land certification procedures create uncertainty around long-term ownership and access rights.[37] The latest household survey shows that fewer than 3 percent of the country's cultivated plots have formal titles, and parallel customary and formal land-tenure systems exacerbate uncertainty and discourage investment in fixed capital.[38] In rural areas, informal customary tenure systems, including Islamic land rights, are the dominant model, and obtaining formal land titles is often a lengthy, complex, and costly process. A new land code that would address land titling and property issues was drafted in 2014 but has yet to be adopted. Meanwhile, there are currently no laws governing the grazing rights of itinerant pastoralists or mechanisms for resolving land disputes involving them, which heightens tensions between livestock owners and farmers. In August 2019, a state of emergency was declared the provinces of Sila and Ouaddaï, as disputes between pastoralists and farmers threatened to erupt into widespread conflict.[39]

The Gender Gap

Sustainably increasing rural income will require measures to address the wide gender disparities that prevail in rural areas. Compared to men, women tend to have less access to human capital and productive assets, such as land and large livestock, due to social and structural barriers. Early marriage is among the most harmful social norms, as it keeps girls out of school and contributes to low levels of human capital among women. In Chad, high fertility rates and low maternal health indicators limit women's livelihood options, increase their risk of poverty, and contribute to a range of deeply negative health consequences, including early death. In some communities, social norms limit the free movement of women, thereby constraining their access to economic opportunities.[40]

Gender-related inequalities also extend to access to tenure security, financial services, and knowledge. In Chad, 11 percent of women over the age of 15 have a mobile-money account, compared to 20 percent of men, and only 5 percent of women have a financial account, compared to 13 percent of men (Figure 2.18). The gender gap in financial access in Chad is much wider than in comparable countries such as Mali. Moreover, most extension agents and lead farmers are male,[41] which increases information frictions and tends to exclude women from agricultural programs, even those that are specifically designed to reach them.[42]

Shocks and Fragility

Chad is located in a vulnerable region, and Chadian households regularly face both natural and manmade shocks. The closure of the border with Nigeria since August 2019 has dealt a devastating blow to the Chadian economy, as Nigeria provides a critical trade link both for imports and exports. Repeated border closures have negatively impacted farmers' output prices while increasing input prices,[43] with a disproportionate impact on the populations of the Lac and Hadjer-Lamis regions. The Recovery and Peacebuilding Assessment reported a slowdown in business activities in the area due to reduced purchasing power and weakening demand.[44]

36 Goldstein, M., Houngbedji, K., Kondylis, F., O'Sullivan, M., & Selod, H. (2018). Formalization without certification? experimental evidence on property rights and investment. Journal of Development Economics, 132, 57-74.

37 World Bank (2020). Land property rights, investments, and agricultural productivity in Chad: Evidence from the 2018 LSMS-ISA in Chad. Volume I – Main synthesis report.

38 World Bank (2020). Land property rights, investments, and agricultural productivity in Chad: Evidence from the 2018 LSMS-ISA in Chad. Volume I – Main synthesis report.

39 World Bank (2020). Land property rights, investments, and agricultural productivity in Chad: Evidence from the 2018 LSMS-ISA in Chad. Volume I – Main synthesis report.

40 According to the DHS STAT Compiler, Chad is among the countries with the largest share of women who agree that domestic violence is justified when a woman goes out without telling her husband.

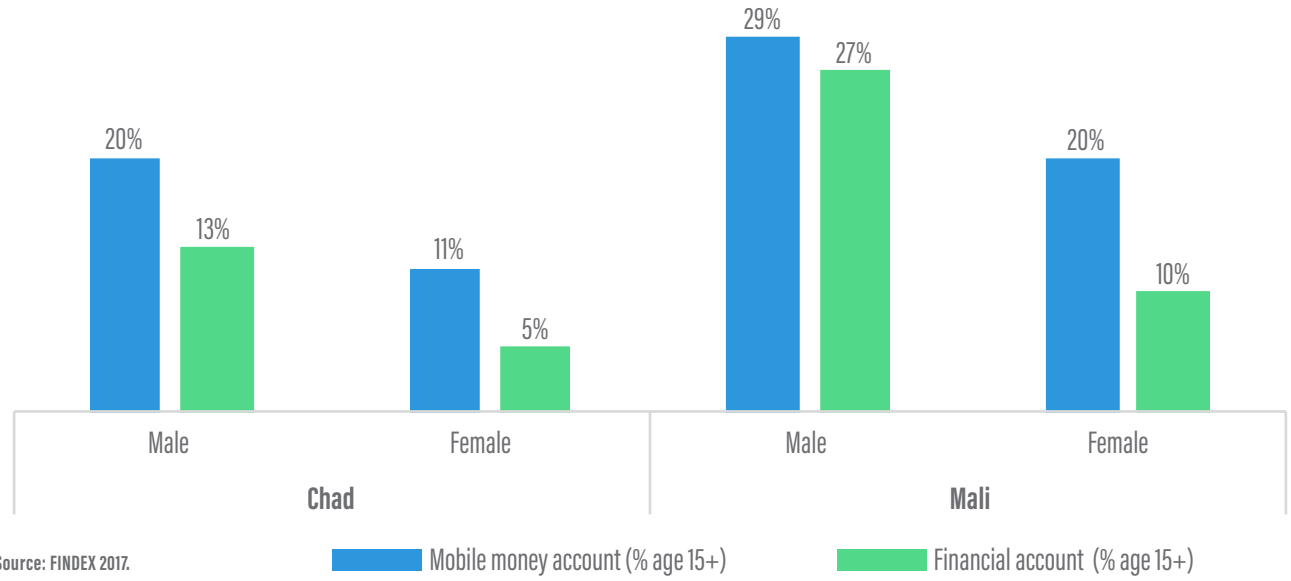
41 Kondylis et al. (2016) and Cohen and Lemma (2011).

42 Kondylis, F., Mueller, V., Sheriff, G., & Zhu, S. (2016). Do female instructors reduce gender bias in diffusion of sustainable land management techniques? Experimental evidence from Mozambique. *World Development, 78*, 436-449

43 WFP (2016). Lake Chad basin crisis regional market assessment preliminary observations.

44 FAO (2017). Mitigating the impact of the crisis and strengthening the resilience and food security of conflict-affected communities. http://www.fao.org/3/a-bs126e.pdf.

Figure 2.18. Access to Financial Services by Gender, Chad and Mali



Source: FINDEX 2017.

Rural livelihoods are increasingly at risk from drought due to declining levels of rainfall and rising temperatures linked to climate change. In the northern part of the country, desertification is threatening grazing lands, forcing pastoralists to migrate to the south, where pressure on land is rising.[45] High rainfall variability linked to climatic change is also making households more vulnerable to crop-production shocks. For example, drought or irregular rainfall affects about 20 percent of households, making it the largest source of natural covariate shocks. Drought or irregular rainfall is also the major cause of vulnerability due to covariate shocks, affecting about 48 percent of households. Climate change and the unsustainable use of natural resources also threaten the livelihoods of crop producers and fishermen. Lake Chad has shrunk dramatically and is predicted to vanish entirely in the next 20 years at its current rate of use.[46] The intensifying scarcity of water is negatively impacting agriculture and food security, threatening to drive even more households into extreme poverty.[47]

The Boko Haram insurgency in the Lake Chad region has severely disrupted economic activity. The conflict has sharply reduced the incomes of many pastoralist, agro-pastoralist, and fishing households that rely on cross-border trade with neighboring countries such as Cameroon, CAR, Nigeria, Libya, and Sudan. Violent clashes have led to the forced displacement of households, resulting in losses of crops, livestock, and productive assets. Meanwhile, an influx of refugees into Chad from neighboring countries has further strained livelihoods and diminished access to land.[48]

45 World Bank Climate Knowledge Portal. https://climateknowledgeportal.worldbank.org/country/chad/vulnerability

46 NASA (2017). The Rise and Fall of Africa's Great Lake. https://earthobservatory.nasa.gov/features/LakeChad

47 FAO (2017). Lake Chad Basin: A Crisis Rooted in Hunger, Poverty and Lack of Rural Development. http://www.fao.org/news/story/en/item/880741/icode/

48 WFP (2018). Executive Board. Chad Draft Country Strategic Plan (2019-2023). https://docs.wfp.org/api/documents/6ddef21988944069ae3d908a9cec1d20/download/; Watson, C., Dnalbaye, E., & Nan-guer, B. (2018). Refugee and Host Communities in Chad: Dynamics of Economic and Social Inclusion.

2.3 POLICY OPTIONS FOR SUPPORTING RURAL INCOME GROWTH

Chad's poor population is overwhelmingly concentrated in rural areas, and poverty rates are especially high among smallholder farming households. At the national level, agriculture accounts for 65 percent of household income, while nonfarm income represents 30 percent, and remittances make up the remaining 2 percent. Among poor households, agriculture accounts for 71 percent of household income, while nonfarm income represents about 19 percent, and remittances make up just 4 percent. Moreover, an estimated 85 percent of the rural population depends on agriculture and related activities, as about 88 percent and 62 percent of rural households are engaged in crop and livestock production, respectively. The relative importance of these activities varies across the Saharan, Sahelian, and Soudanian AEZs.

Due to the composition of the Chadian economy and the distribution of poor households, rural development will be critical to poverty reduction and shared prosperity. The international experience shows that in countries such as Chad, which have largely agricultural economies and high rates of rural poverty, agriculture can act as the engine of economic growth and a key instrument of poverty reduction.[49] Moreover, improving agricultural productivity can stimulate growth in other parts of the economy. Accelerating agricultural growth requires increasing the productivity of smallholder farming while protecting the welfare of vulnerable households.

Though Chad's rural sector faces considerable challenges, the country's underexploited agricultural potential offers valuable opportunities to accelerate its economic development. Only 6 percent of Chad's arable land is cultivated, and more that 80 percent of farms cultivate fewer than two hectares, underscoring the possibilities to increase crop production through area expansion. Moreover, only 9 percent of Chad's available water resources are being used to irrigate less than 1 percent of its agricultural land. Investing in irrigation networks could enable farmers to diversify into cash crops and generate additional income during the off season. The prevalence of agro-pastoralism in the southern AEZs offers a unique opportunity to develop complementary and inclusive value chains for crops and livestock. Given rising international demand for gum arabic, shea, dates, and other NTFPs, linking producers to national and global markets could greatly accelerate rural development.

Six key challenges constrain rural income growth. These include: (i) insecurity and the risk of conflict over natural resources; (ii) the risk of climatic shocks; (iii) low levels of human capital; (iv) a wide infrastructure gap; (v) a lack of complementary services; and (vi) a deep gender gap. To make agricultural development an effective pathway out of poverty, policymakers must address each of these constraints.

Security is the most fundamental prerequisite for rural

49 World Bank (2002) World Development Report. Washington DC: The World Bank

development in Chad. Greater international efforts to address the Boko Haram conflict and enable the return of refugees and internally displaced persons will be critical to reestablish international trade linkages and enable investment in the rural economy. The Chadian government is currently working with the African Union, France, and neighboring countries to improve the security situation. However, even a permanent resolution to the Boko Haram conflict would not be sufficient to alleviate the broader security risks stemming from increased competition for scarce and dwindling resources, especially water and pastureland. Sustainably addressing conflict risks in rural Chad will require a coordinated multi-stakeholder effort that combines direct security assistance with large-scale investments in economic infrastructure and ecological restoration. Over the longer term, a robust capacity-building program focused on strengthening the legal system, enhancing land-tenure security, and formally establishing the land-use rights of pastoralist groups could further attenuate the risk of conflict.

Chad is highly vulnerable to climatic shocks. Rural livelihoods are increasingly at risk from drought due to declining levels of rainfall and rising temperatures linked to climate change. Desertification is threatening grazing lands in the northern part of the country, forcing pastoralists to migrate to the south, where pressure on land is rising. High rainfall variability linked to climatic change is also making households more vulnerable to crop-production shocks. The pursuit of high profitable opportunities necessarily entails risk taking. Poor people tend to be risk averse because they fear the potential negative consequences of failure. The absence of crop or livestock insurance heightens production uncertainty due to weather-related shocks. The lack of insurance discourages farmers from making productive investments, taking risks on new crop types and production models, or accessing new market opportunities. Effective risk management can be a powerful instrument for building resilience to risk, which is essential to achieving and sharing prosperity, and reducing poverty.[50]

Risk management can build household resilience to adverse shocks and enable rural workers and entrepreneurs to take advantage of new opportunities. Building resilience entails developing financial markets, insurance schemes, and social-protection systems capable of alleviating reliance on costly coping mechanisms and enabling households to invest more in risky but more profitable agricultural activities. Index insurance products, such as agricultural index insurance or index-based livestock insurance, have emerged as a suitable instrument for bolstering resilience among vulnerable agricultural households in developing countries with limited institutional capacity and weak information systems. Policymakers can begin constructing the institutional framework for implementing these mechanisms in Chad.

Accelerating human capital development will be critical to support productivity growth and diversification. Chad's extremely poor health and education indicators directly reduce the income-generating capabilities of rural households. The government faces a very tight resource envelope, and Chad's diffuse, low-density population increases the marginal cost of providing social services, making the prioritization of cost-effective interventions especially important. Improvements in maternal health can offer high returns, as efforts to reduce adolescent pregnancy and encourage family planning are often less costly than other health interventions and yield benefits at the household level that extend across generations. Meanwhile, expanding school feeding programs could boost educational attendance while improving nutrition indicators, with positive implications for the lifetime productivity of children.

50 World Development Report 2014: Risk and Opportunity: Managing Risk for Development. Washington, DC: The World Bank Group. The report emphasizes that this characterization of risk management is true whether risk stems from natural disasters, pandemics, financial crises, a wave of crime at the community level, or severe illness of a household's main provider. In general, building resilience to risk entails a balanced approach that includes structural policy measures, community-based prevention, insurance, education, training, and effective regulation.

Infrastructure investment can increase commercialization and create new opportunities for value addition. Access to paved roads and permanent markets is strongly correlated with participation in commercial agriculture. While budgetary constraints limit the government's ability to invest in costly road networks, targeted investments in areas with underutilized potential to produce export crops such as gum arabic, shea, and dates could contribute to income growth and diversification at a manageable fiscal cost. In addition, modest public investments in ICT-related infrastructure could enable the expansion of digital services, enhancing access to market information and attenuating the high transaction costs imposed by the low quality of the road network. Expanded ICT access would also increase the uptake of digital financial services, easing capital constraints that inhibit investment and entrepreneurship. Policymakers can work with private ICT firms to identify bottlenecks to digital connectivity and develop cooperative strategies to address them.

Limited insurance markets, inadequate public investment in ICT infrastructure, and weak land rights restrict the ability of the rural population to access market opportunities and invest in productive activities. As communication and transportation links improve, rural extension services can collaborate with international partners to form farmer organizations capable of leveraging economies of scale in both input supply and output marketing. These groups can be organized geographically or around the production of specific crops. In either case, collective purchasing can bring down input costs while making input sales viable in remote locations that cannot sustain a permanent market. Similarly, collective marketing can reduce reliance on spot transactions, alleviate information asymmetry, and encourage farmers to diversify into cash crops. Farmer organizations can also facilitate the provision of training and extension services and encourage the adoption of new technologies and production methods.

Gender is a vital cross-cutting issue in Chad and should be mainstreamed into all rural development efforts. Gender disparities in education and health indicators, land access, the use of financial services and technology, and the ability to participate in the full range of economic activities have profound consequences for household productivity, income diversification, and intergenerational economic mobility. Gender norms are socially ingrained, and while some disparities can be addressed through investments in health, education, and social services, others will require sustained outreach efforts designed to highlight the broad-based gains that households and communities can realize by eliminating gender gaps. Prioritizing maternal health, encouraging girls to complete school before marriage, proactively recruiting women as agricultural extension workers and lead farmers, and implementing both legal and administrative reforms to equalize access to land and financial services could enable rural women to realize far more of their productive potential, with positive effects on their economic security, health, and education.

CHAPTER

03 VULNERABILITY TO SHOCKS IN CHAD

Key Insights

- Chad's national poverty rate is 42 percent, but 48 percent of households are vulnerable to falling into poverty in the event of a shock.
- Poverty and vulnerability rates are both highest in rural areas, where a negligible share of households is financially secure.
- Vulnerability to poverty is driven by high levels of consumption variability.
- Households headed by a white-collar worker tend to be among the least vulnerable to poverty, while rural households—especially those with children under the age of six—are most likely to fall into poverty in the event of a shock.
- A large share of households experience shocks, including the severe illness or injury of a household member (39 percent), the death of a household member (24 percent), and drought or irregular rainfall (20 percent). Households in the cash crop and cereals zone are the most exposed to shocks.
- At the national level, households' exposure to covariate and idiosyncratic shocks is broadly similar. However, poor households are more exposed to natural covariate shocks, and those in the cash crop and cereals zone are more exposed to demographic idiosyncratic shocks. The incidence of demographic idiosyncratic shocks is also higher among female-headed households.
- Exposure to shocks is associated with the depletion of assets, including livestock, and/or declines in income. Many households adopt detrimental coping strategies, such as selling or consuming assets, especially in rural areas.
- Following a shock, key welfare indicators deteriorate to a similar extent among different demographic groups, male- and female-headed households, households headed by people with different occupations, and households that do and do not receive transfers.
- In response to shocks, households rely primarily on informal coping mechanisms, such as support from family and friends and their own savings. A sizeable share of households, especially in rural areas, also reduce their consumption of food, buy cheaper food, and/or sell their livestock to mitigate the effects of shocks.
- Female-headed households are less likely to draw on savings than are their male peers, likely due to their lower rates of savings. Additionally, many households in the cash crop and cereals zone reduce their food consumption in the event of a shock.
- The COVID-19 pandemic has resulted in higher food prices, the bankruptcy of nonfarm enterprises, and the loss of wage employment, and many households have suffered from the illness of an income earner. As a result, household income has declined, and many households have seen their ability to access essential food items diminish. Households have mainly reduced their consumption and used their personal savings to mitigate the effects of the crisis.
- The authorities need to strengthen formal safety nets to ease reliance on informal social support systems and prevent the use of detrimental coping strategies. The government should consider a combination of short-term interventions to provide immediate relief following a shock, such as cash transfers or temporary food subsidies, and longer-term schemes to increase the overall resilience and capacity of households to respond to shocks, including efforts to accelerate human capital development.

3.1 VULNERABILITY TO POVERTY

Vulnerability to poverty is defined as the likelihood that a household will fall below the poverty line during a given period. Vulnerability reflects both the probability that a negative shock will occur and its potential impact on household welfare.[51] The methodology for measuring vulnerability is presented in Annex E. While a static time-bound measure of poverty enables the identification of households with a per-person consumption level below the national poverty line, it does not distinguish between households that are structurally poor and those that are transitionally poor but have access to sufficient assets to escape poverty.[52] Moreover, static measures are especially unsuitable for gauging vulnerability to poverty, which is influenced by multiple factors that change over time.[53] Chadian households are especially likely to face fluctuations in income and consumption levels, as Chad is a landlocked Saharan-Sahelian country that faces numerous shocks in any given year. Relying on a static measure in this context would elide critical nuances in poverty dynamics that determine both a household's current poverty status and its vulnerability to poverty.

Table 3.1. Idiosyncratic and Covariate Shocks

	Idiosyncratic Shocks		Covariate Shocks
Demographic	Severe illness or injury of a household member	Natural	Drought or irregular rainfall
	Death of a household member		Flooding
	Divorce/separation		Fire
Economic	End of regular transfers from other households		High rate of crop disease
	Important loss of nonfarm income		High rate of animal disease
	Bankruptcy of nonfarm enterprise		Locusts or other pests
	Important loss of salary incomes		Landslide
	Loss of wage employment	Economic	Important output price drop
	Theft of money, assets, production, or other goods		High input prices
			High food prices
		Violence	Farmer/pastoralist conflict
			Armed conflict, violence, or insecurity
			17.5

Source: World Bank staff calculations using data from ECOSIT 4

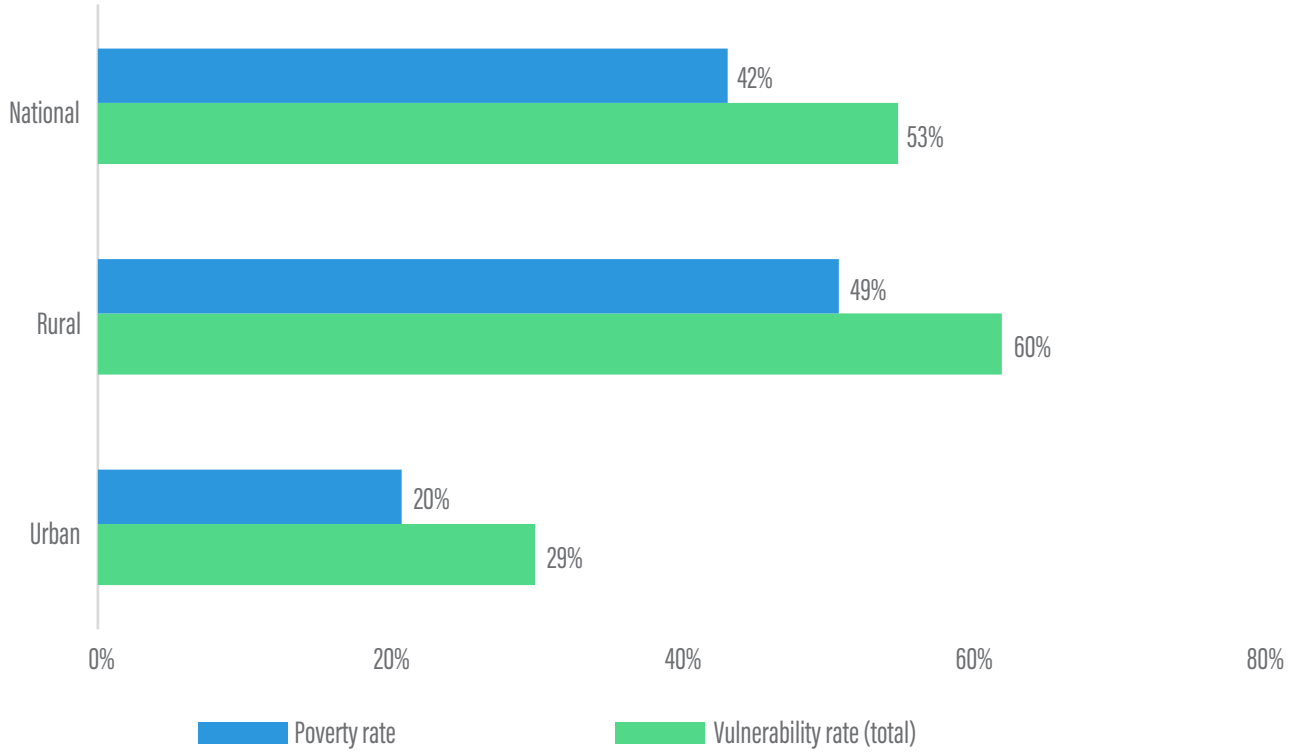
51 Calvo and Dercon, 2013; Hoddinott and Quisumbing, 2003.

52 Baulch and Hoddinott, 2000; Carter and Barrett, 2006.

53 Gunther and Harttgen, 2009.

Vulnerability to poverty can be decomposed into poverty-induced and risk-induced vulnerability. Poverty-induced vulnerability, or structural poverty, reflects persistently low levels of consumption, which are rooted in low levels of physical and human capital accumulation. Households experiencing poverty-induced vulnerability are prone to falling below the poverty line because they lack the productive capacity to achieve economic security. By contrast, risk-induced vulnerability is driven by the volatility of consumption, which reflects household-level exposure to shocks. These households are at risk of falling below the poverty line because of their sensitivity to idiosyncratic shocks, such as the illness or death of an income-earning household member, and covariate shocks, such as a natural disaster (Table 3.1).[54] The sum of poverty-induced vulnerability and risk-induced vulnerability is the overall vulnerability rate.

Figure 3.1 Close to half of Chad's population is vulnerable to poverty.



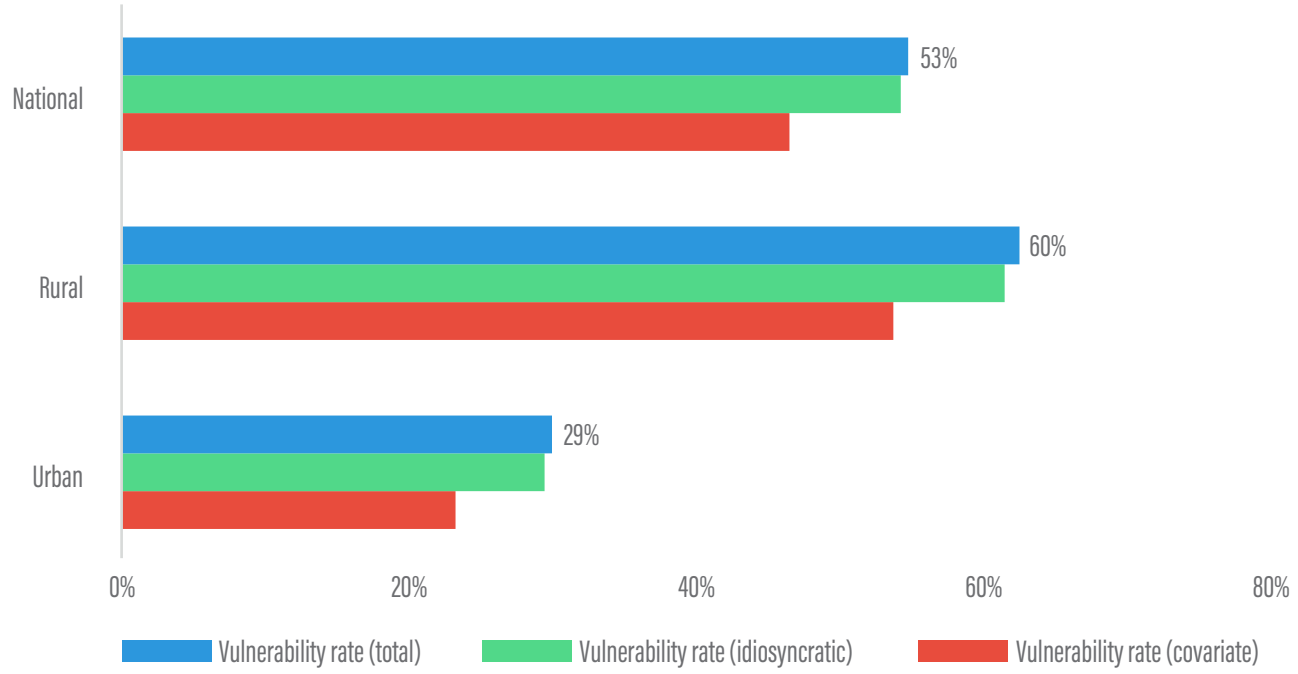
Source: World Bank staff calculation using data from ECOSIT 4

54 Covariate shocks affect everyone within a defined geographic region at the same time, while idiosyncratic shocks have individual-specific and isolated effects. Covariate shocks include natural, economic, and conflict-driven events, while idiosyncratic shocks include household-level financial and demographic events. The incidence of shocks is based on household surveys, which asked respondents whether they had experienced any of the events listed in Table 3.1 over the past three years.

This poverty assessment estimates the expected mean and variance in consumption using both household- and community-level characteristics.[55] This approach makes it possible to analyze both the level and sources of vulnerability. The assessment begins by quantifying vulnerability to poverty and examining its sources. It then estimates the relationship between various household characteristics and vulnerability to poverty.

Among nonpoor households in Chad, 53 percent have a 20 percent or greater chance of falling into poverty in the next year.[56] Chad's poverty rate is extremely high at 42 percent,[57] but the poverty rate is a simple binary distinction, and it overlooks the many Chadian households that are at risk of falling into poverty in the future (Figure 3.1). The vulnerability rate compensates for this limitation by capturing the probability that a nonpoor household will drop below the poverty line over the near term. Exposure to idiosyncratic shocks represents close to 52 percent of the vulnerability rate, while exposure to covariate shocks represents 45 percent (Figure 3.2). Data from the 2018/2019 ECOSIT 4 suggest that vulnerability due to covariate shocks is primarily attributable to drought or irregular rainfall (24 percent), while vulnerability to idiosyncratic shocks arises largely from the risk of severe illness or injury of a household member (39 percent).

Figure 3.2 : Idiosyncratic shocks have a marginally greater impact on household vulnerability than covariate shocks.



Source: World Bank staff calculation using data from ECOSIT 4

55 The analytical methodology is based on the work of Gunther and Harttgen (2009). Please refer to Table E.1 in the appendix for a summary statistic of the household and community level variables used in the estimation.

56 The measure of vulnerability to poverty and poverty rate should not be added as they capture different metrics of poverty. In the estimation, to identify households that are vulnerable to poverty, we chose a threshold of 20 percent above which a household is categorized as vulnerable to poverty hence the interpretation.

57 Chad's poverty rate is based on the national poverty line of FCFA 242,094.

Across livelihood zones, households in the cash crop and cereals zone are the most vulnerable to poverty. This zone has the highest vulnerability rate at about 61 percent, followed by the cereal and market gardening zone at 50 percent and the agro-pastoralism zone at 46 percent (Figure 3.3). The pastoralism and transhumance zone has the lowest vulnerability rate at 30 percent, which is likely due to the relative importance of livestock in this area, as herds are less sensitive to erratic weather patterns than crops. Livelihood zones also exhibit large differences in poverty rates, which range from 50 percent in the cereals zone to 28 percent in the pastoralism and transhumance zone. Across all zones, vulnerability due to idiosyncratic shocks is moderately higher than vulnerability due to covariate shocks (Figure 3.4). However, an analysis of the idiosyncratic/covariate ratio for vulnerability reveals that the relative importance of covariate shocks is greatest in the pastoralism and transhumance zone.

Most rural households are vulnerable to poverty. Approximately 60 percent of rural households are vulnerable to poverty, compared to just 29 percent of urban households. Rural households also have a significantly higher average poverty rate at 49 percent, versus a poverty rate of 29 percent in urban areas. As rural households account for approximately 77 percent of the population, these high rates indicate that both poverty and vulnerability to poverty are heavily concentrated in rural areas.

Figure 3.3 : Households in the cash crop and cereals zone are the most vulnerable to poverty.

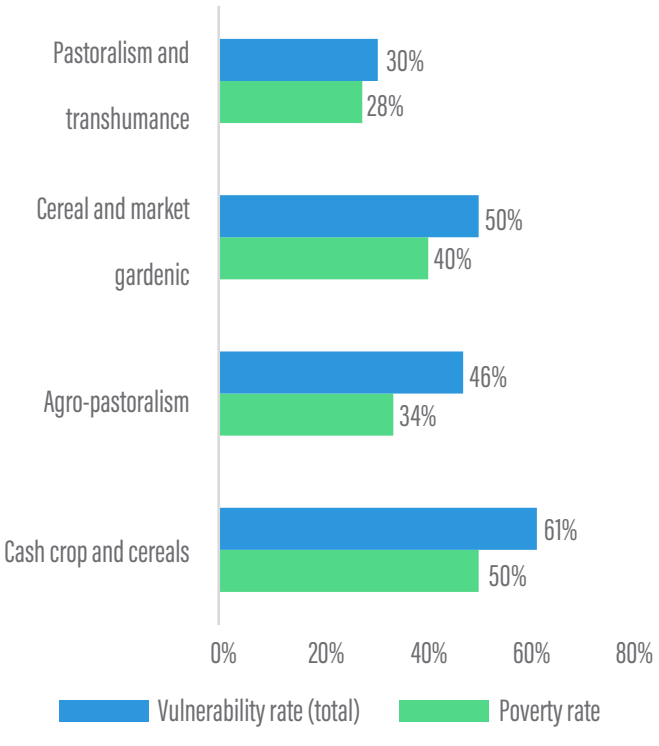
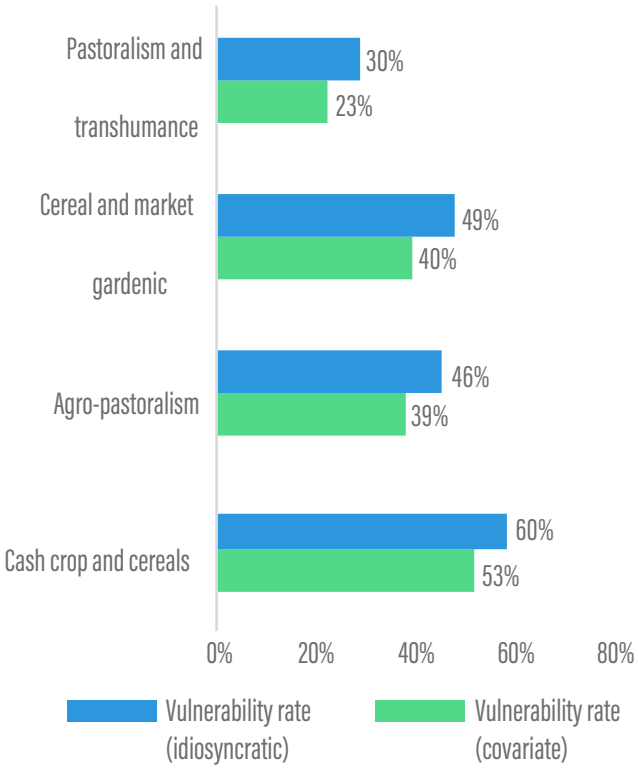


Figure 3.4 : Vulnerability due to covariate shocks is prevalent across regions.



Covariate shocks have a slightly stronger effect on the vulnerability of rural households than on urban households. The magnitude of vulnerability to poverty due to idiosyncratic shocks is greater than that of covariate shocks both in rural and urban areas (Figure 3.2). The idiosyncratic vulnerability rate is 59 percent in rural areas and 29 percent in urban centers, while the covariate vulnerability rate is 52 percent and 22 percent, respectively. However, the idiosyncratic/covariate ratio for vulnerability in rural areas (1.1) and urban centers (1.3) reveals that the relative size of covariate shock is greater in rural areas. Covariate shocks such as drought have an adverse impact on agricultural production, and idiosyncratic shocks such as the severe illness of a household member can be particularly damaging to agricultural households that depend on family labor.

In Chad, vulnerable households primarily contend with poverty-induced vulnerability, especially in rural areas. Approximately 43 percent of households are subject to poverty-induced vulnerability, while just 10 percent face risk-induced vulnerability (Figure 3.5). The ratio between poverty-induced and risk-induced vulnerability is 4.5 in rural areas versus 2.3 in urban areas, indicating that poverty-induced vulnerability is 4.5 times greater than risk-induced vulnerability among rural households. In other words, many rural households are unable to rise far enough above the poverty line that they are no longer vulnerable to falling below it.

Figure 3.5: Household vulnerability is driven by low levels of consumption, as most nonpoor households remain close to the poverty line.

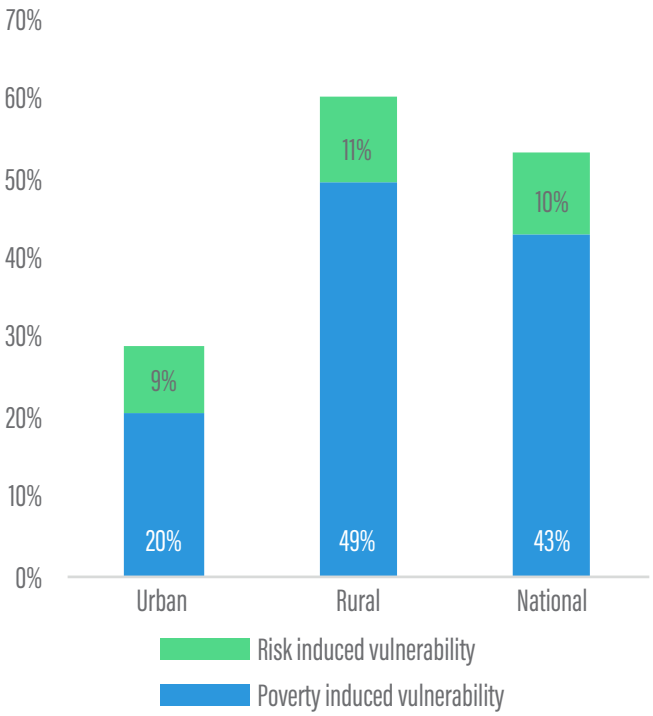
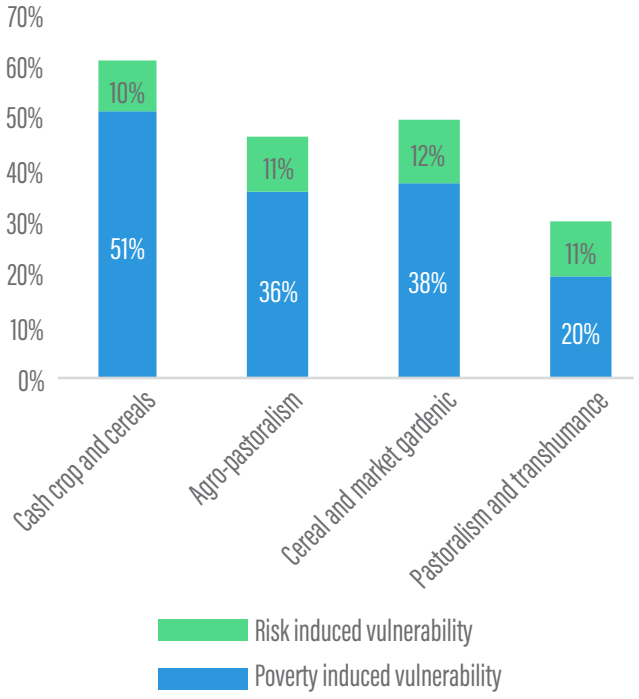


Figure 3.6: Low levels of consumption are the dominant source of vulnerability across all regions.

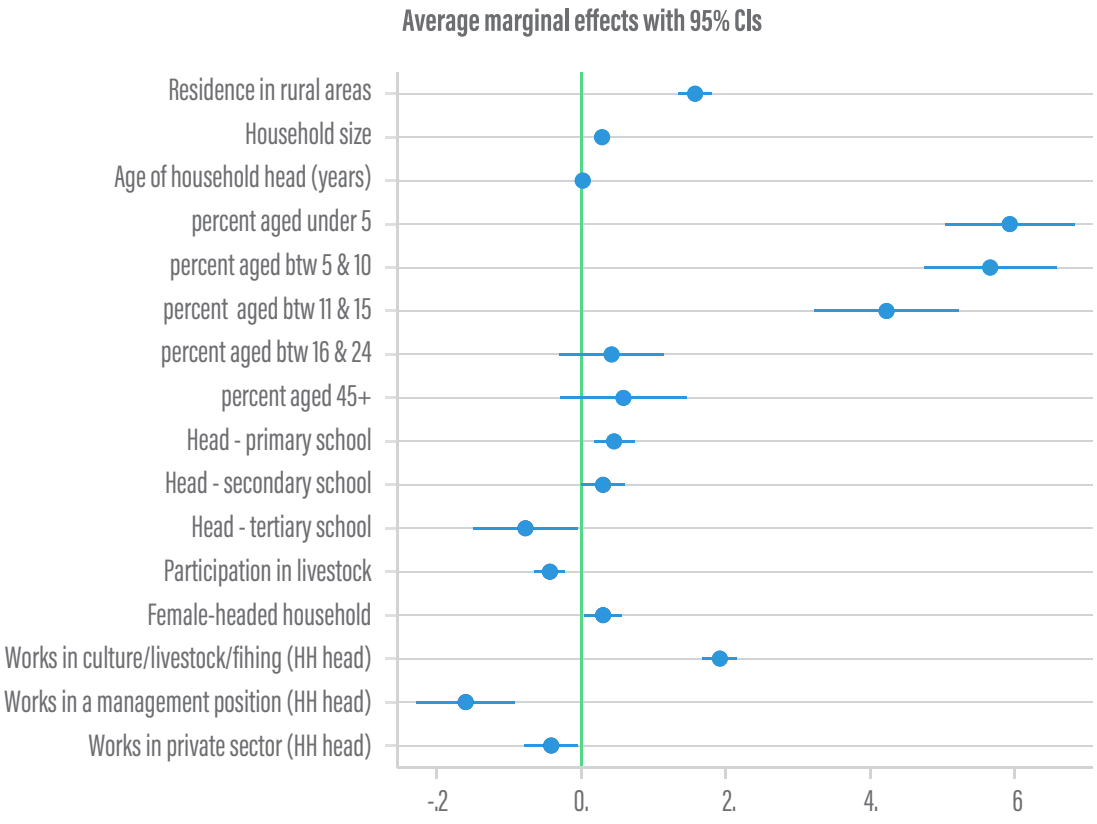


Source: World Bank staff calculation using data from ECOSIT 4

Poverty-induced vulnerability is prevalent across livelihood zones, but rates of poverty-induced vulnerability are highest in the cash crop and cereals zone (Figure 3.6). The poverty-induced vulnerability rate ranges from 20 to 51 percent nationwide, while the risk-induced vulnerability rate ranges from 10 to 12 percent. Among households in the cash crop and cereals zone, the poverty-induced vulnerability rate is 5.3 times the risk-induced vulnerability rate. By contrast, in the pastoralism and transhumance zone the poverty-induced vulnerability rate is just 1.8 times the risk-induced vulnerability rate.

Vulnerability rates are lowest among households headed by a skilled office worker. The results of a multivariate analysis (logistic model) show that households headed by a skilled office worker are the least likely to be vulnerable to poverty, though only about 7 percent of Chadian households fall into this category (Figure 3.7). Moreover, having completed tertiary education, engaging in livestock production, and being employed in the private sector are all correlated with a lower likelihood of household vulnerability. By contrast, heads of household engaged in the agricultural sector and those with young children (especially ages five and under) are more likely to be vulnerable to poverty. Across regions, rural households are significantly more likely to be vulnerable to poverty than urban households.

Figure 3.7: The presence of young children significantly increases the likelihood of household-level vulnerability to poverty.



Source: World Bank staff calculation using data from ECOSIT 4
Notes: The figure presents logit marginal effects of the correlates of being vulnerable to poverty.

3.2 OCCURRENCE OF SHOCKS

Almost all households in Chad have been affected by some type of shock. Between 2014 and 2017, nearly 90 percent of the population experienced a shock, including 89 percent of rural households and 86 percent of urban households (Figure 3.8). This finding is consistent with previous analyses of household-level shocks in the Sahel region, which indicate that most households in that region are exposed to repeated idiosyncratic and covariate shocks.[58] However, Chadian households are more exposed to shocks than their counterparts in Sahelian comparators countries (73 percent) and in Senegal (48 percent). The most common shocks in Chad are: (i) the severe illness or injury of a household member (39 percent), (ii) the death of a household member (24 percent), and (iii) drought or irregular rainfall (20 percent).

The relatively large share of households affected by the illness or death of a household member has a direct impact on agricultural productivity. About 80 percent of Chadian households are involved in the agriculture sector, with a majority relying on family labor at different stages of the planting season. In this context, the loss of labor due to illness or death can significantly reduce productivity and undermine food security. In addition, many households operate nonfarm microenterprises that also rely on family labor.

The incidence of covariate and idiosyncratic shocks differs between rural and urban areas. Both covariate and idiosyncratic shocks affect approximately 63 percent of households in Chad. Households in urban areas are, however, more likely than their counterparts in rural areas to be affected by idiosyncratic shocks (71 percent), as rural households predominantly encounter covariate shocks (67 percent). This rural-urban difference in the prevalent types of shocks potentially calls for location-based contextual safety-net policies to meet the different needs of urban and rural households.

Most poor households in Chad are affected by natural covariate shocks. About 90 percent of both poor and nonpoor households report experiencing shocks. However, about 70 percent of poor households experience covariate shocks, while 59 percent experience idiosyncratic shocks. As in other Sahelian countries, the incidence of climate- and weather-related shocks is greatest among the poorest households, underscoring the importance of drought-responsive adaptative social protection systems.[59] By contrast, 60 percent of nonpoor households are subject to covariate shocks, while 65 percent are affected by idiosyncratic shocks. Overall, 54 percent of poor households are vulnerable to natural covariate shocks, especially drought and irregular rainfall.

58 Brunelin et al., 2020.

59 Ibid.

Demographic idiosyncratic shocks affect just over half of Chadian households. In both rural and urban areas, close to 40 percent of the population report being affected by the severe illness or injury of a household member, and about 23-26 percent of households report the death of a household member (Figure 3.9). More than half of rural households experience natural covariate shocks: 27 percent are affected by drought or irregular rainfall, 11 percent by flooding, 10 percent by a high rate of crop disease, and 9 percent by a high rate of animal disease. Violence-related covariate shocks, especially farmer/pastoralist conflicts, are reported by 14 percent of rural households and just 5 percent of urban households.

In urban areas, about 30 percent of households face economic idiosyncratic shocks as well as economic and natural covariate shocks. Urban households are less likely to suffer from drought or irregular rainfall than their rural counterparts (11 percent versus 27 percent), but urban households are more likely to suffer from high food prices (25 percent versus 20 percent). The most common economic idiosyncratic shocks facing urban households are the theft of money, assets, production, or other goods (17 percent) and the loss of wage employment (5 percent). By contrast, theft is reported by only about 11 percent of rural households, suggesting that security concerns differ between rural and urban areas.

Figure 3.8: Almost all Chadian households experience shocks.

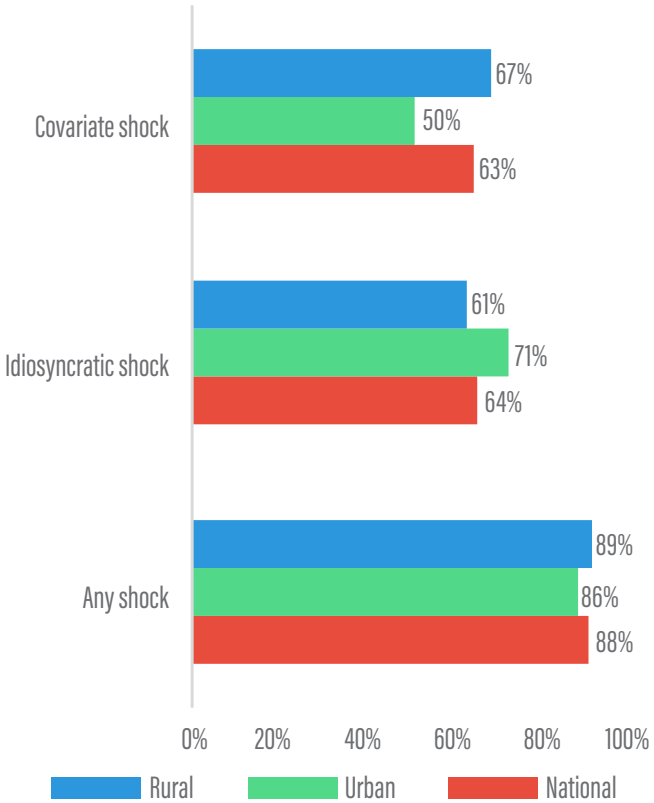
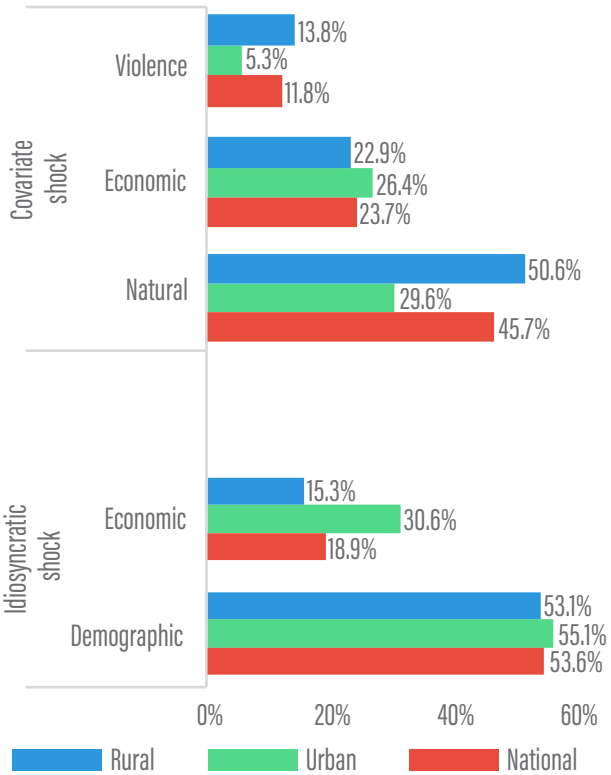


Figure 3.9: The incidence of demographic idiosyncratic shocks is especially high.



Source: World Bank staff calculation using data from ECOSIT 4

Households in the cash crop and cereals zone are the most exposed to shocks. About 95 percent of households in this zone report experiencing a shock in the three years preceding the 2018/2019 ECOSIT 4 survey, with no significant differences in the rate of covariate and idiosyncratic shocks (Figure 3.10). The leading type of covariate shock is drought or irregular rainfall (25 percent), while major idiosyncratic shocks include the severe illness or injury of a household member (46 percent) and the death of a household member (28 percent). About 87 percent of households in the agro-pastoralism zone are exposed to shocks, as are 83 percent of households in the cereal and market gardening zone, while just 55 percent of households in the pastoralism and transhumance zone are exposed to shocks.

Demographic idiosyncratic shocks are widespread across all livelihood zones. In the cash crop and cereals zone, demographic idiosyncratic shocks are the most common, followed by natural covariate shocks. The severe illness or injury of a household member is the leading type of demographic idiosyncratic shock and affects close to 50 percent of households. Drought or irregular rainfall is the main type of natural covariate shock and affects about one-quarter of households. Economic idiosyncratic shocks and violence-related and economic covariate shocks affect approximately 20 percent of households in the cash crop and cereals zone. In the pastoralism and transhumance zone, 30 percent of households experience natural covariate shocks, while 15 percent and 5 percent of households are affected by drought/irregular rainfall and flooding, respectively.

Exposure to covariate shocks is greater among households headed by men than among those headed by women. About 65 percent of male-headed households report experiencing covariate shocks, versus 57 percent of female-headed households (Figure 3.11). Male-headed households are most likely to experience natural and economic covariate shocks, with 23 percent and 20 percent reporting drought/irregular rainfall or high food prices, respectively. Given that men often oversee farming activities, shocks like drought significantly affect their livelihood, although drought also makes it more challenging for women to collect water.

Figure 3.10 Households in the cash crop and cereals zone are the most exposed to shocks.

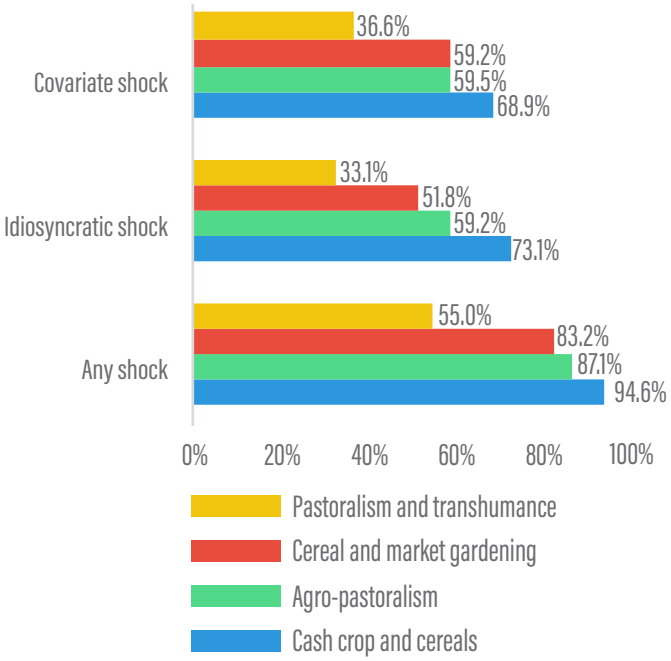
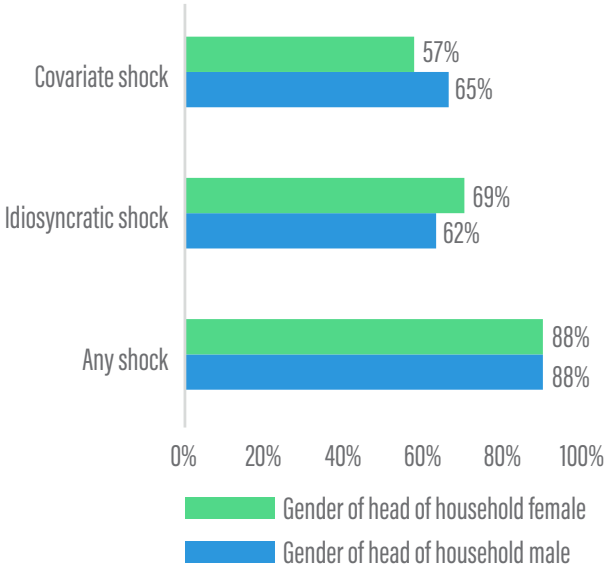


Figure 3.11 Female-headed households are more vulnerable to idiosyncratic shocks than their male counterparts.



Source: World Bank staff calculation using data from ECOSIT 4

Female-headed households are more likely than their male counterparts to experience idiosyncratic shocks.[60] About 69 percent of female-headed households report experiencing idiosyncratic shocks, compared with 62 percent of male-headed households. Moreover, 61 percent of households headed by a woman report demographic idiosyncratic shocks, with 42 percent affected by severe illness or injury of a household member and roughly 27 percent by the death of a household member. The share of female-headed households affected by drought/irregular rainfall and high food prices is comparable to that of male-headed households.

Heads of household with higher education are the least likely to be affected by shocks. Although a strikingly high 80 percent of heads of households with higher education experience shocks, among households headed by a person with primary, secondary, or no education this share rises to 90-95 percent.[61] Regardless of educational attainment, households in Chad are slightly more likely to experience idiosyncratic than covariate shocks, except those headed by a person with no education, which exhibit a higher rate of exposure to covariate shocks. Consistent with national trends, demographic idiosyncratic shocks frequently affect all households, regardless of the education level of the household head. However, about 35 percent of households headed by someone with higher education also experience economic idiosyncratic shocks, including: (i) theft of money, assets, production, or other goods (16 percent); (ii) loss of salary income (8 percent); and (iii) loss of wage employment (7 percent).

60 Households self-identified as female headed or male headed households. The survey does not allow us to state whether a household became female headed as a result of one of the shocks that affected a household. 24 percent of households are headed by female against 76 percent headed by male.

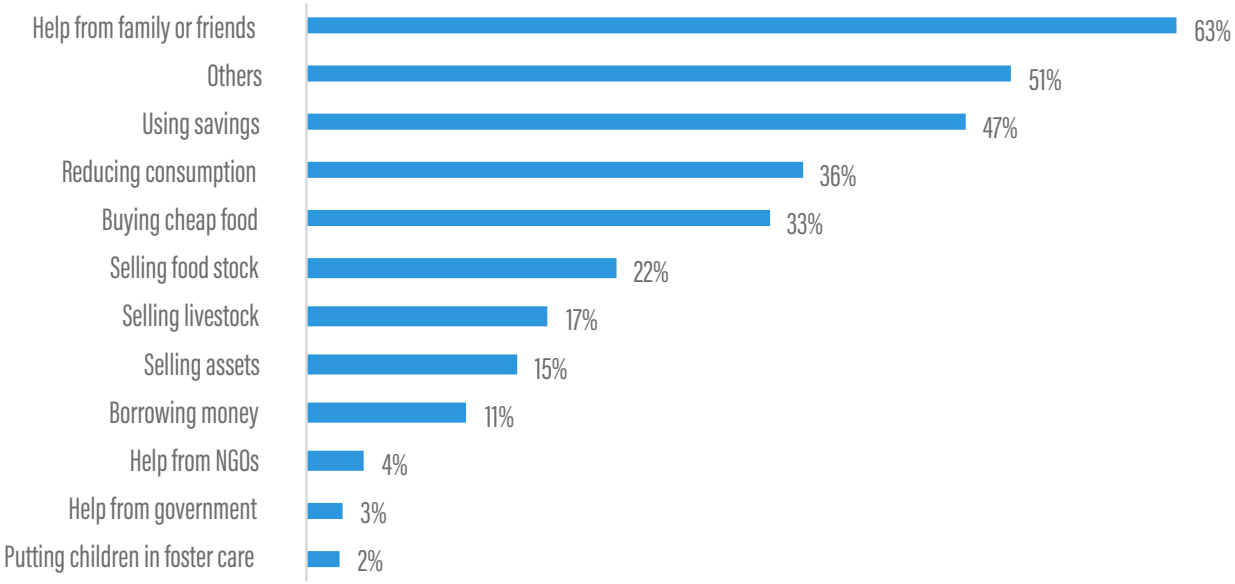
61 Only about 5 percent of heads of household have higher education.

3.3 COPING MECHANISMS

Households in Chad primarily rely on family or friends to cope with the impact of shocks. Approximately 63 percent of households report receiving help from family or friends, and 47 percent report using savings to manage the impact of shocks (Figure 3.12). Among Sahelian comparator countries, about 34 percent of households mitigate the effects of shocks with the help of friends and relatives, while 41 percent rely on savings. In Senegal, these figures are 26 percent and 22 percent, respectively. In Chad, other coping strategies that households use during times of crisis include: (i) reducing the quantity or number of meals consumed in a day (36 percent); (ii) procuring cheaper food (33 percent); and (iii) selling livestock (17 percent). These findings underscore the threat that household-level shocks pose to food security Only 3.9 percent of the country's households report not adopting any coping strategy in the event of a shock.

Poor households are more likely than nonpoor households to reduce their consumption and/or procure cheaper food in the event of a shock. While approximately 38 percent of poor households report reducing their consumption following an adverse event, 34 percent of their nonpoor counterparts do the same. Similarly, 36 percent of poor households cope with shocks by procuring cheaper food, compared to 32 percent of their nonpoor counterparts. This is aligned with cross-country findings indicating that the adoption of detrimental coping strategies tends to be most common among the poorest households.[62] As expected, poor households rely on savings (40 percent) and family or friends (58 percent) at a lower rate than nonpoor households (51 percent and 65 percent, respectively).

Figure 3.12: Most Chadian households rely on help from family or friends in the event of a shock, a significantly larger share than in most comparable countries.



Source: World Bank staff calculation using data from ECOSIT 4

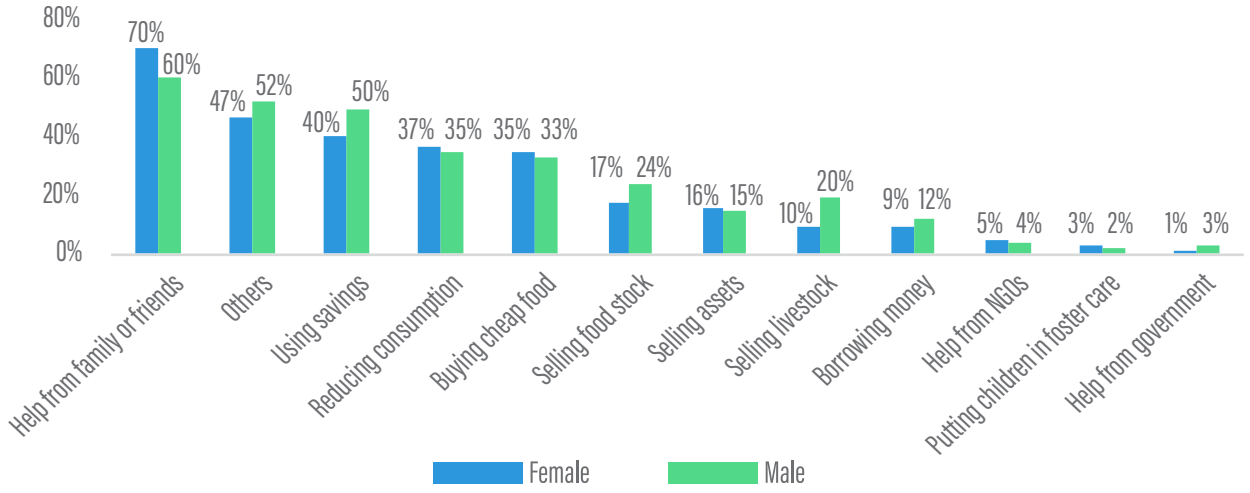
62 Brunelin, 2020

Rural households are more likely than their urban counterparts to sell stored food and livestock in response to shocks. In rural areas, about 26 percent and 21 percent of households respond to an emergency by selling livestock and stored food, respectively, while only 11 percent and 6 percent of urban households do the same. However, rural/urban differences are smaller for other coping strategies: about 63 percent of rural and urban households receive help from family or friends, roughly 35 percent reduce their consumption, and about 33 percent buy cheaper food. Rural residents are slightly less likely than their urban counterparts to use savings in the event of a shock.

Households in the cash crop and cereals zone are especially likely to reduce their consumption or sell stored food to cope with shocks. Close to 43 percent of these households report reducing their consumption, compared to about 28 percent of households in the agro-pastoralism and cereal and market gardening zones. In addition, 31 percent of households in the cash crop and cereals zone report selling stored food in the event of a shock. Coping strategies that involve reducing caloric intake are likely to adversely affect the growth and development of younger children in the household.[63] While 36 percent of households in the cereal and cash crop zone use savings in times of crisis, between 58 and 67 percent of those in the agro-pastoralism, cereal and market gardening, and pastoralism and transhumance zones use savings. As a result, households in the cash crop and cereals zone are both the most exposed to shocks and the most likely to resort to detrimental coping mechanisms in the event of a shock.

Female-headed households are somewhat less likely to use savings as a coping strategy than male-headed households. While relying on family or friends and using savings are the dominant types of coping strategies among all households, there are important differences in their use between female- and male-headed households. Approximately 70 percent of female-headed households report receiving help from relatives or friends in the event of a shock, compared to 60 percent of male-headed households, while about 52 percent of male-headed households use savings, versus just 47 percent of female-headed (Figure 3.13). This disparity suggests that female-headed households are less likely to have savings to draw upon and are therefore more likely to rely on the help of others during emergencies. Finally, similar shares of female- and male-headed households report changing their consumption patterns and buying cheaper food in the event of a shock.

Figure 3.13: When coping with shocks, female-headed households are less likely to use savings and more likely to rely on help from family or friends.



Source: World Bank staff calculations using data from ECOSIT 4

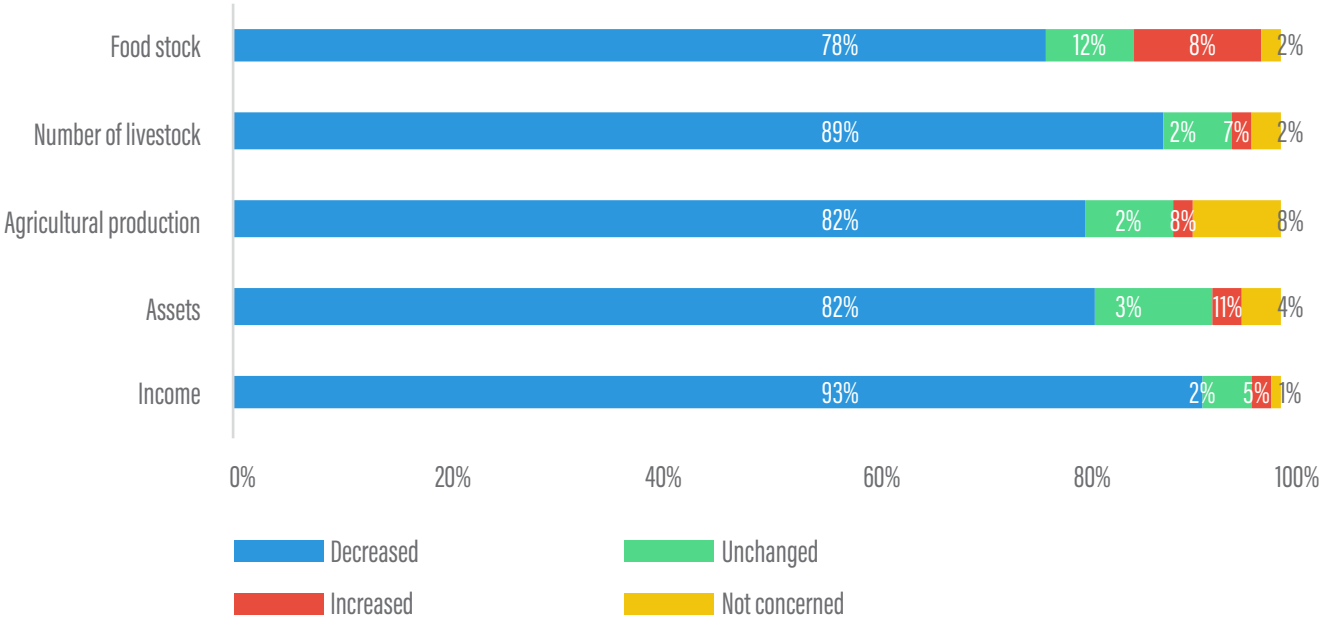
63 Hoddinott, 2006

Households whose members work in the services sector tend to fall back on their savings in the event of a shock. Approximately 61 percent of households with members working in the services sector (e.g., hospitality and commercial services) use savings as a coping strategy, compared to about 43-47 percent of households with members working in agriculture or industries (including mining and other extractive industries). This divide could reflect differences in earning levels across sectors, as wages in the services sector are often higher than wages in other sectors. The shares of households that receive help from family or friends, reduce their consumption, or buy cheaper food during a crisis are comparable across the three major employment sectors.

There are no major differences between the primary coping mechanisms of households with and without small children.[64] Although reduced caloric intake can have deeply negative effects on child development, households with and without small children are roughly equally likely to reduce their consumption or procure cheaper food, with about 35 percent of both types of households reporting the former and 33 percent reporting the latter. However, households with small children are marginally more likely to draw on savings or borrow money in the event of a shock than households with no small children.

Most households report a decline in income and in the number of livestock following a shock. Approximately 90 percent of Chadians report a sharp drop in income and the number of livestock in the aftermath of a shock (Figure 3.14). The adverse impact of a shock on income is also evident, though markedly less severe, among households in Sahelian comparator countries (85 percent) and in Senegal (75 percent). While shocks have a non-negligible impact on livestock holdings in Sahelian comparators and in Senegal, reductions in income are consistently greater than the depletion of livestock.

Figure 3.14. Shocks lead to major reductions in income and livestock holdings.



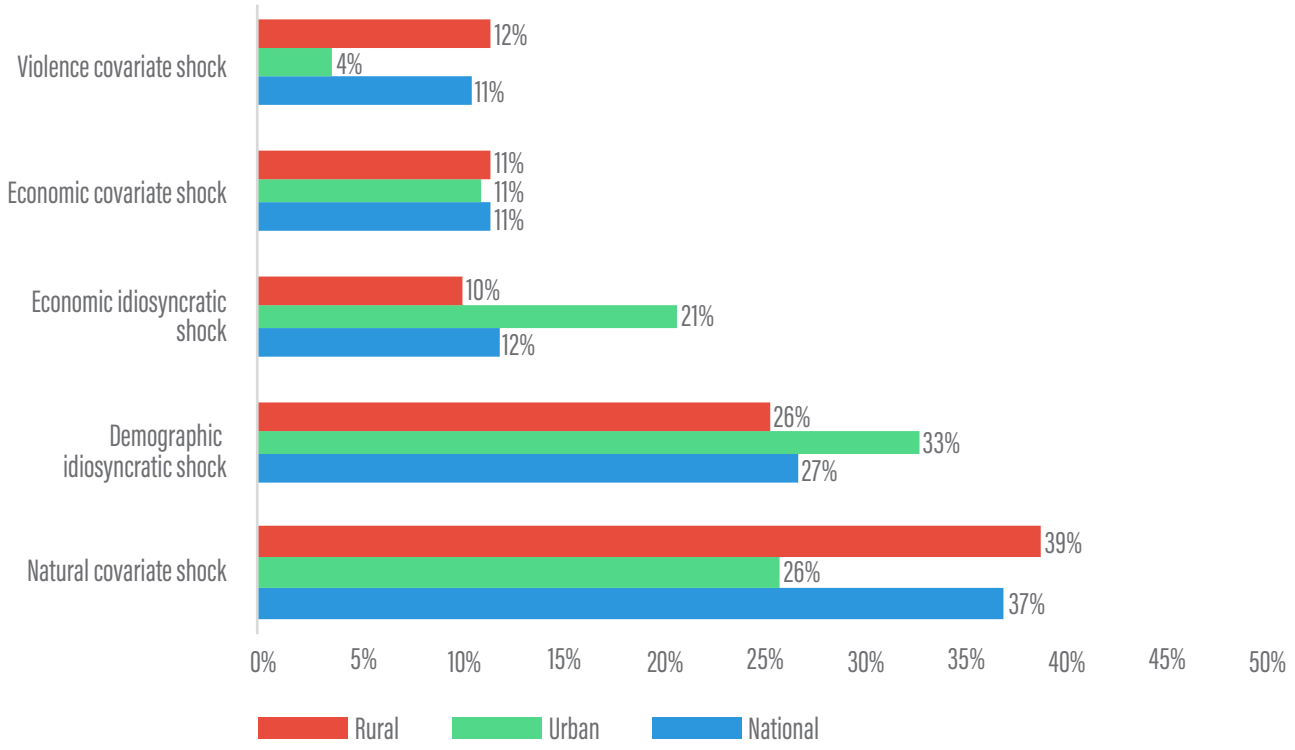
Source: World Bank staff calculations using data from ECOSIT 4

64 Nationwide, 68 percent of households have at least one child under the age of six.

Other key welfare indicators in Chad are also adversely affected by the occurrence of shocks, further indicating that households adopt negative coping strategies. In the wake of a shock, more than 80 percent of households in Chad report a decline in agricultural production, food stock, and assets. Just 8-11 percent of households do not report any change in assets, food stocks, or agricultural production in the event of a shock. These findings suggest that many of the country's households lack access to savings or other benign coping mechanisms and are instead forced to adopt strategies that reduce their long-term productivity and consumption.

Natural covariate shocks are correlated with the adoption of detrimental coping strategies, especially in rural areas.[65] In Chad, 32 percent of households respond to shocks by using detrimental coping mechanisms such as selling livestock and other durable assets or reducing consumption (Figure 3.15). These coping strategies reduce the long-term productivity of households and hinder their efforts to escape poverty and vulnerability.[66] This is especially true for rural households, about 21 percent of which sell their livestock in the event of a shock, compared to just 6 percent of their urban counterparts.

Figure 3.15. Households resort to detrimental coping mechanisms to respond to natural covariate shocks.



Source: World Bank staff calculations using data from ECOSIT 4

65 The full set of detrimental coping strategies considered in this text are child marriage, child labor, pulling children out of school, migration of household members, reduction in health and education expenditures, sale of durable assets, sales of land/real estate, sale of livestock, putting up children in foster care. Besides the sale of livestock or assets or putting children in foster care, the other strategies are adopted by less than 1 percent of households.

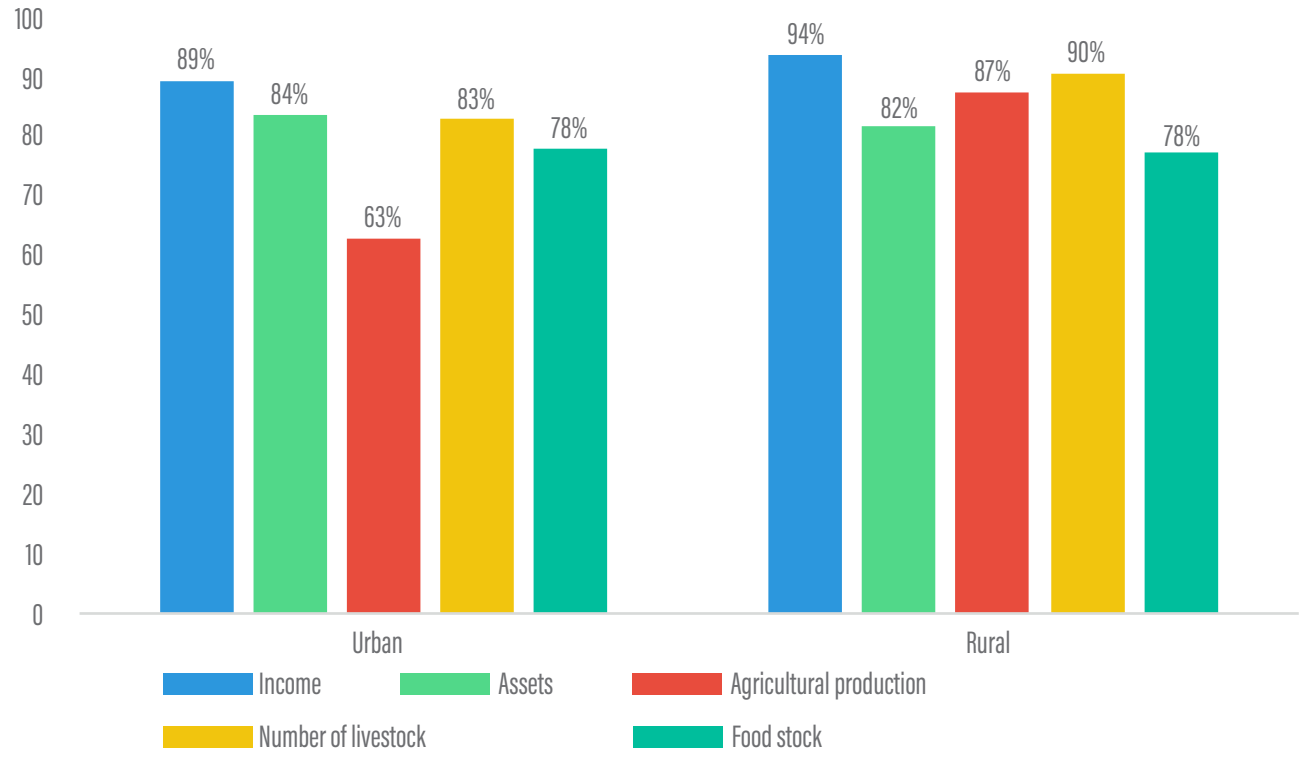
66 Brunelin et al., 2020

In rural areas, the occurrence of shocks has an adverse impact on agricultural production. Approximately 90 percent of rural residents experience a fall both in agricultural production and in the number of livestock in the aftermath of a shock (Figure 3.16). By contrast, about 63 percent of urban households see their agricultural production fall in the event of a shock, owing to their greater involvement in nonfarm activities. Comparable shares of urban and rural households—between 80 and 90 percent—report a reduction in their income, assets, and food stocks following a shock.

Demographic idiosyncratic shocks are strongly associated with the adoption of negative coping strategies. About 36 percent of urban residents and 34 percent of rural residents who experience demographic idiosyncratic shocks implement detrimental coping strategies such as selling assets, reducing food consumption, or removing children from school. This finding highlights the general absence of unemployment compensation, disability benefits, life insurance, or other formal mechanisms for offsetting the sudden loss of income caused by the illness or death of a household member.

Households affected by violence-related covariate shocks are less likely to adopt coping mechanisms. This finding may reflect the limited coping strategies available to these households. During periods of conflict, people are often forced to leave their homes unexpectedly and immediately, leaving little to no time to gather their assets. Conflict can also displace or disperse entire communities, disrupting traditional social mechanisms for coping with shocks.

Figure 3.16 The impact of shocks on agricultural production is more severe in rural areas.



Source: World Bank staff calculations using data from ECOSIT 4

Shocks cause a similar deterioration in the key welfare indicators of various groups. Shock-induced changes in household income, assets, agricultural production, livestock herds, and food stores vary only slightly among different types of households. Except for the 5 percent of households headed by someone with completed higher education, which are less likely to experience a decline in welfare indicators than their less-educated counterparts, there are no clear differences in post-shock welfare indictors among households based on the gender or occupation of the household head. Likewise, there is no significant difference in changes in welfare indicators between households that receive transfers and those that do not.

Comparable shares of male- and female-headed households experience a decline in welfare indicators following a shock. In the aftermath of a shock, approximately 90 percent of both types of households report a decline in their income levels and in the size of their livestock herds, and roughly 80 percent report a drop in agricultural production or dwindling assets. While female-headed households are affected by shocks to the same extent as their male counterparts, they lack access to the same coping strategies. For example, 17 percent of households headed by a woman draw down their food stores following a shock, compared to 24 percent of households headed by a man, and female-headed households are also less likely to sell livestock following a shock. Moreover, female-headed households are more likely to reduce their food consumption or purchase cheaper food. These findings underscore the need for policies that improve women's access to benign coping strategies.

There are no clear differences in the deterioration of welfare indicators based on the occupation of the household head. Indeed, the reduction of income and food stock following a crisis is similar regardless of the occupation of the household head. However, 89 percent of agricultural households experience a decline in agricultural production following a shock, higher than 76 percent of households engaging in industries and for 65 percent of households in the services sector.[67]

There are also minimal differences in key welfare measures between households that benefit from transfers and those that do not. In the event of a shock, households that receive and do not receive transfers experience similar drops in income, assets, livestock numbers, and food stores. However, about 79 percent of households that receive transfers experience a decrease in agricultural production, lower than 83 percent of households that do not receive transfers, which may indicate that households that receive transfers have more liquidity to invest in agricultural inputs.

The 5 percent of households headed by a person with completed higher education are less likely to report a drop in agricultural production, number of livestock, and food stores vis-à-vis their less-educated counterparts. In the event of a shock, close to 58 percent of households headed by a person with higher education report a decline in agricultural production, far below the 82-86 percent of households headed by a person with primary, secondary, or no education. Shock-induced declines in livestock numbers are reported by 80 percent of households headed by a person with tertiary education and by 90 percent of those headed by a person with less education. Similarly, 70 percent of the former report declines in food stores following a shock, compared with 80 percent of the latter. However, 90-95 percent of households report shock-induced declines in income, while 80-85 percent report diminished assets, regardless of the education level of the household head.

67 71 percent of household heads work in the agricultural sector; 7 percent work in the industrial sector; and 22 percent work in the services sector.

3.4 PRELIMINARY ASSESSMENT OF THE IMPACT OF THE COVID-19 OUTBREAK

To support data-driven decision-making in the wake of the COVID-19 pandemic, the World Bank has collaborated with Chad's National Institute for Statistics and Economic and Demographic Studies (Institut National de la Statistique et des Études Économiques et Démographiques, INSEED) to implement a nationally representative high-frequency phone survey. The survey targets a subsample of 2,833 households that were included in ECOSIT 4, which was implemented in 2018/19. The first round of the high-frequency phone survey took place between May and June 2020, and the second round followed between July and August 2020. Reflecting the impact of the pandemic, the types of shocks assessed in the phone survey differ somewhat from those included in the 2018/19 ECOSIT 4 survey, and the survey begins by asking respondents "Has your household been negatively affected by the following issue since the beginning of the COVID-19 pandemic?". Nevertheless, various idiosyncratic and covariate shocks assessed by the phone survey are comparable with the data from the ECOSIT 4 survey discussed above (Table 3.2).

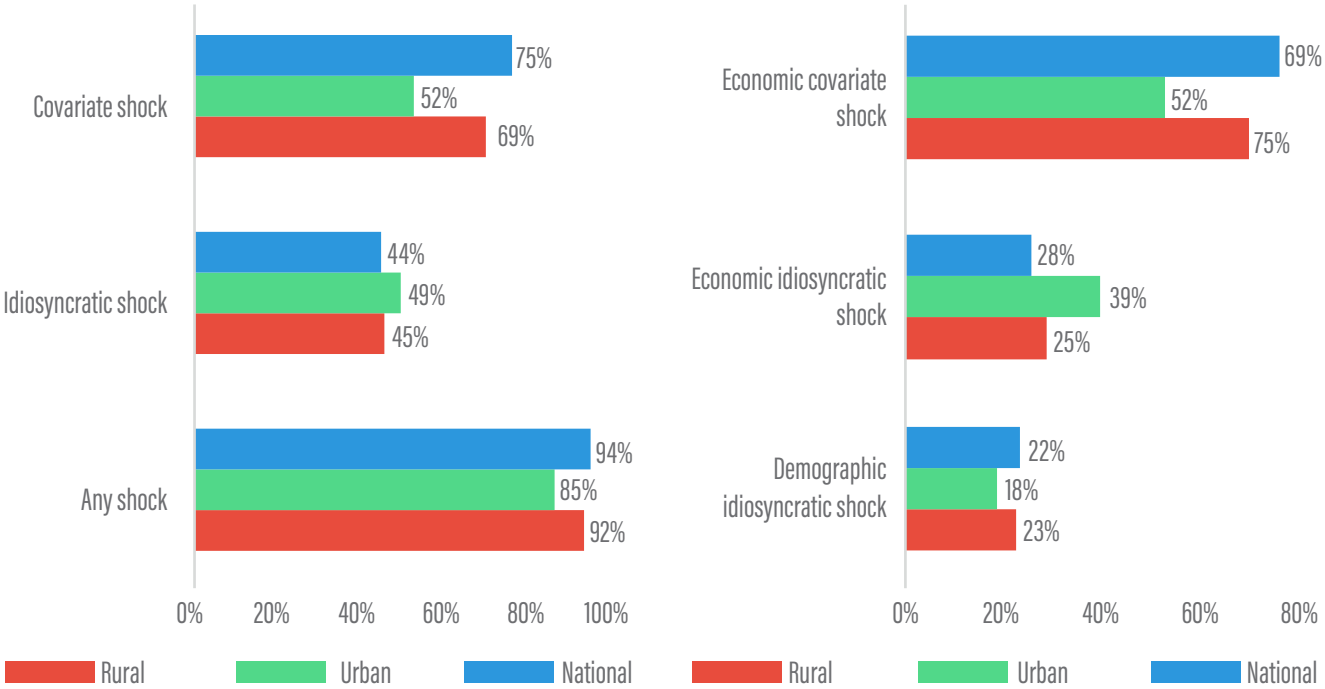
Table 3.2: Covariate and Idiosyncratic Shocks Assessed in the High-Frequency Phone Survey

	Idiosyncratic Shocks		Covariate Shocks
Demographic	Death or disability of an active adult household member	Natural	Locusts or other pests
	Death of an individual who sends money to the household		
	Illness of an income earner in the household		
Economic	Loss of an important acquaintance	Economic	Important output price drop
	Loss of wage employment		
	Bankruptcy of nonfarm enterprise		High input prices
	Theft of money, assets, production, or other goods		
	Bad harvest owing to lack of labor		High food prices

The high-frequency phone survey reveals that the COVID-19 pandemic has increased the rate of economic covariate shocks, particularly in rural areas. About 92 percent of households report experiencing a shock during the pandemic, and rural households have been especially affected (Figure 3.16). An estimated 69 percent of households have been impacted by covariate shocks and 45 percent by idiosyncratic shocks. All covariate shocks have been economic, and rural households (75 percent) have been more affected than their urban counterparts (52 percent). Meanwhile, urban residents have been more affected by economic idiosyncratic shocks (39 percent) than rural residents (25 percent). These shocks likely reflect the lockdown measures implemented by the government since March 19, 2020 to contain the spread of COVID-19, precautionary behaviors adopted by firms and consumers in response to the pandemic, and extensive disruptions that continue to affect global markets and supply chains.

Following the outbreak, households have struggled primarily with high food prices. In the 2018/19 EHCVM, 39 percent of households reported the severe illness or injury of a household member, making this the most common shock recorded by the survey. Since the start of the pandemic, 69 percent of households report being affected by shocks related to high food prices. Rising food prices have adversely affected 75 percent or rural households and 50 percent of urban households (see Table F.3 in Annex F). Other important shocks recorded during the pandemic include the illness of an income earner (18 percent) and the bankruptcy of a nonfarm enterprise (14 percent), with no major differences observed between rural and urban areas. A larger share of households reported the loss of wage employment during pandemic than in the 2018/19 EHCVM.

Figure 3.17 The pandemic has heightened household exposure to economic covariate shocks.

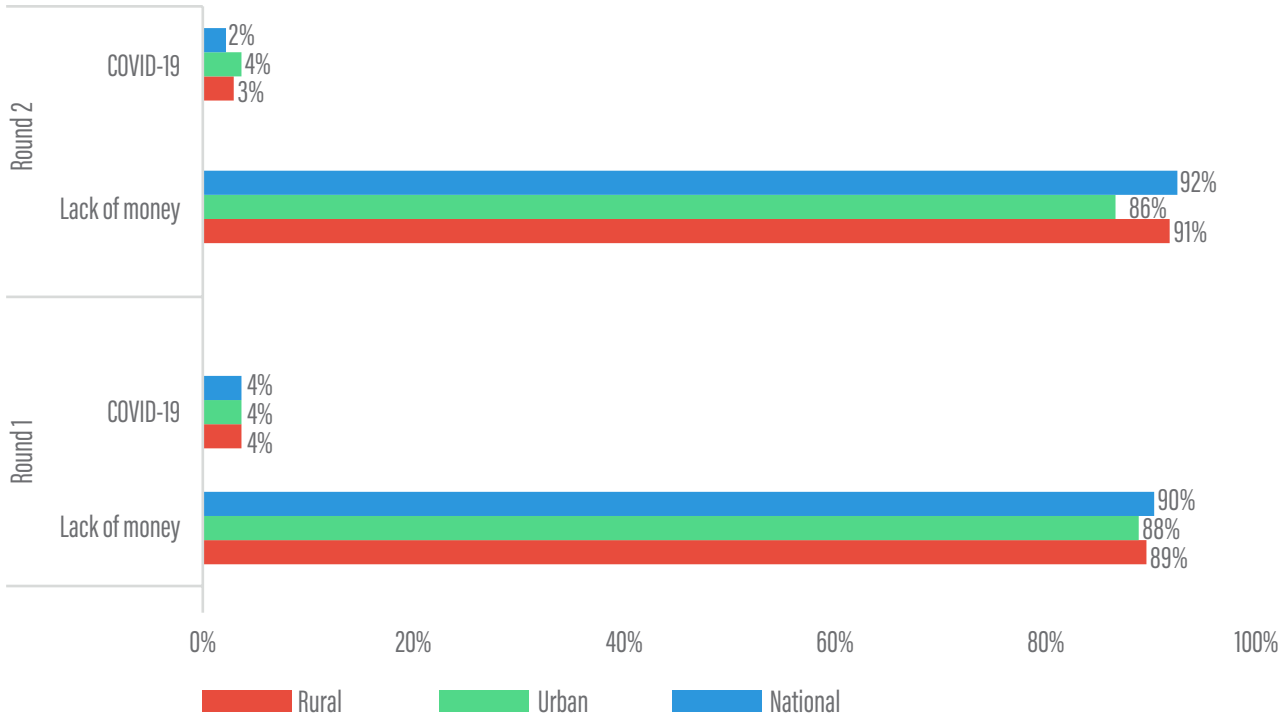


Source: HFPS 2020.

Economic covariate shocks have had an especially significant impact on poor and female-headed households. Many of the shocks reported during the pandemic appear to be largely unaffected by the gender of the household head or by household poverty status, but economic covariate shocks have disproportionately impacted poor and female-headed households. Approximately 49 percent of poor households have experienced economic covariate shocks during the pandemic, compared to 42 percent of nonpoor households. Similarly, 54 percent of female-headed households have reported being exposed to this type of shock, versus 44 percent of male-headed households. In addition, the spike in food prices has affected 73 percent of poor households but just 66 percent of their nonpoor counterparts.

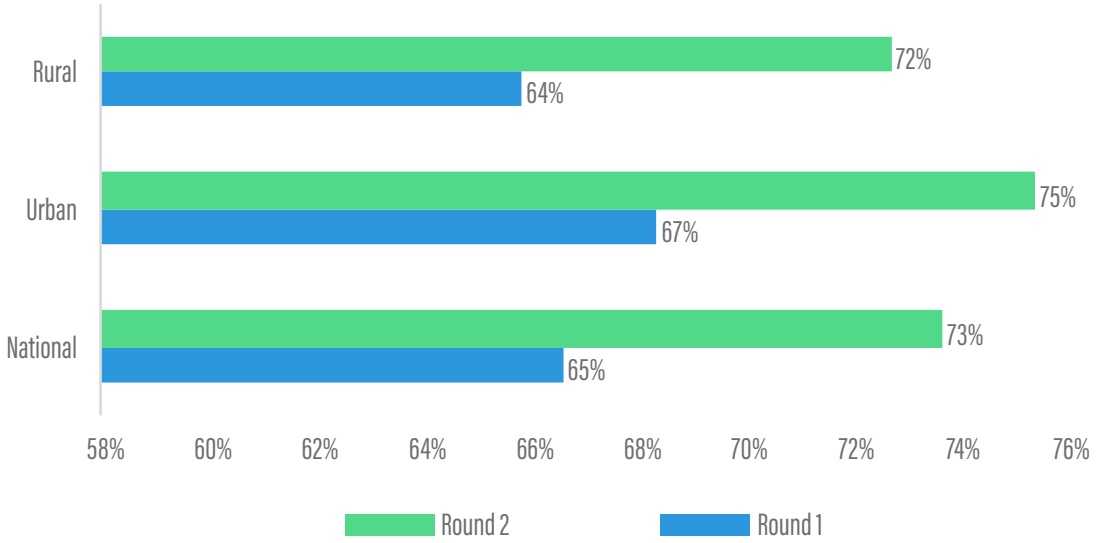
Households' ability to procure essential food items has not improved since March 2020. Since the onset of the pandemic, Chadian households have been significantly less able to access staple grains such as rice and maize, as well as other basic food items such as oil and sugar. Most households cite lack of money as their primary obstacle to procuring adequate food, likely due to the slowdown in economic activity during the pandemic (Figure 3.18). Few households attribute their inability to access essential foods to COVID-19 directly. While food shocks affect comparable shares of urban and rural households, female-headed households across the country are especially likely to report a lack of money as a key obstacle to obtaining basic foods. In addition to reducing the purchasing power for essential food items, the economic shocks induced by the pandemic have eroded the ability of households to pay for healthcare and to save for the future: approximately 81 percent of households report that the pandemic has hindered their ability to pay for healthcare, and 73 percent report that it has negatively affected their ability to save.

Figure 3.18 A lack of money has prevented households from accessing essential food items since Mach 2020.



Source: HFPS 2020.

Figure 3.19 The impact of the pandemic on income has worsened over time.



Source: HFPS 2020.

The pandemic has had a negative impact on household income. Between May and August 2020, the share of households that reported a reduction in income increased sharply (Figure 3.19). The pandemic has had an especially negative effect on the incomes of workers in agricultural businesses, nonfarm enterprises, and salaried positions. In both rounds of surveys, urban households fared worse than their rural counterparts, indicating that their sources of income are more at risk in the current environment. Among household members who were working prior to the lockdown, 20 percent reported that they had stopped working due to the pandemic. Moreover, 34 percent of female heads of household reported having stopped working, compared to just 18 percent of male heads of household.

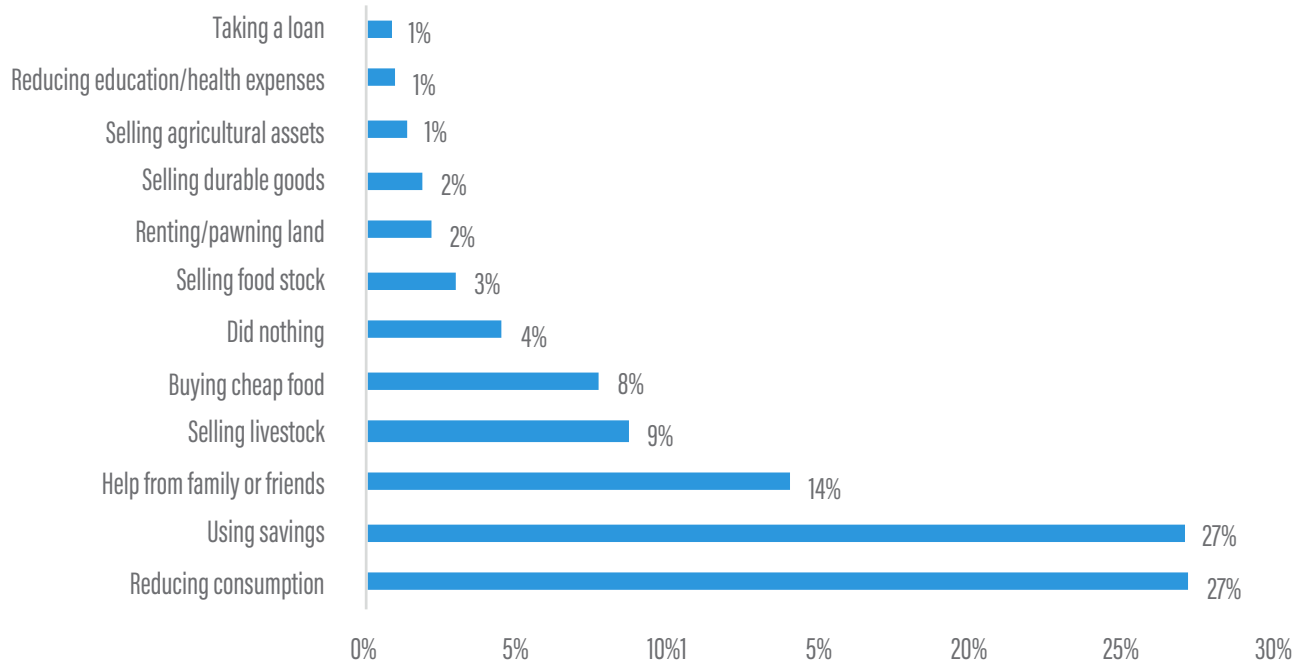
Self-reported assessments of wellbeing indicate that most households became less able to meet their basic needs between the start of the pandemic and the second round of the survey in August 2020. About 84 percent of respondents reported that their household wellbeing had worsened between March and May, and by August this share had ticked up to 88 percent. Even larger shares of rural residents and poor households reported that their wellbeing had deteriorated. However, the share of households that believed that they were at risk of losing their employment or main source of income within the next four weeks dropped from 52 percent in May to 11 percent in August 2020.

Reducing consumption and using savings have been the main coping strategies adopted during the pandemic, and rural households have been more likely than their urban counterparts to adopt detrimental coping strategies. Approximately 27 percent of all households have reduced their consumption or used savings to mitigate the effects of the crisis (Figure 3.20). Another 14 percent of households have received help from family or friends, and 9 percent have sold livestock. However, the choice of coping strategy varies widely between rural and urban areas: 43 percent of urban households drew on their savings, versus just 22 percent of rural households; 18 percent of urban households reduced their consumption, compared to 30 percent of rural households; and only 2 percent of urban households

sold livestock, versus 11 percent of rural households. These figures suggest that rural households have been more likely to adopt detrimental coping strategies. Less than 1 percent of all households have received assistance in the form of food or cash transfers from the government, non-governmental organizations, or other groups.

The COVID-19 crisis has diminished the ability of Chadian households to rely on family or friends to cope with shocks. While the 2018/2019 EHCVM found that 63 percent of households turned to family or friends for support in the event of a shock, this share has plummeted to 27 percent during the pandemic. In effect, the pandemic is a nationwide covariate shock that has weakened informal safety nets by impacting a large majority of households simultaneously. Female-headed households have been less likely to reduce their consumption, and they have relied more on family or friends. Fewer households have resorted to selling livestock during the pandemic than in the period covered by the ECOSIT 4 survey, which may also reflect the generalized nature of the shock, as the crisis is affecting both potential sellers and potential buyers of livestock. Poor and nonpoor households have adopted broadly similar coping strategies.

Figure 3.20: Chadian households have primarily reduced their consumption and used savings to mitigate the effects of the pandemic.



Source: HFPS 2020.

3.5 CONCLUSION AND POLICY RECOMMENDATIONS

The analysis presented in this chapter highlights the large share of Chadian households that are vulnerable to poverty due to their exposure to both covariate and idiosyncratic shocks. Vulnerability rates are estimated at 50 percent for covariate shocks and 45 percent for idiosyncratic shocks. Furthermore, more than 80 percent of households in 17 out of Chad's 21 regions are exposed to shocks. At the national level, exposure to covariate and idiosyncratic shocks is broadly similar, but in the three regions where households are most likely to be affected by shocks, the incidence of covariate shocks is significantly greater than that of idiosyncratic shocks.

Chad has experienced recurrent floods, suffered major outbreaks of domestic and cross-border conflict, and has a high prevalence of endemic diseases, but the most frequent covariate shocks faced by Chadian households are drought or irregular rainfall. In recent years, water levels have fallen dramatically in many rivers and lakes, particularly Lake Chad. Persistent drought has accelerated the desertification of the northern part of the country, shrinking the size of agro-pastoral areas and spurring a southward shift in livestock grazing patterns.[68] Drought and irregular rainfall also have a deeply negative impact on agricultural production, threatening the livelihoods of millions of people.

Many of the idiosyncratic shocks experienced by Chadian households stem from the severe illness, injury, or death of a household member. This finding has important implications for agricultural productivity and food security: about 80 percent of households in Chad are involved in agriculture, and the majority rely on family labor for planting, cultivation, and harvesting. Moreover, many households own nonfarm microenterprises that rely on family labor. Climate-related covariate shocks may amplify idiosyncratic shocks, as extreme weather events can increase the population's susceptibility to endemic diseases. Across all AEZs, and in both rural and urban areas, households are more vulnerable to covariate than to idiosyncratic shocks. Households in the cash crop and cereal zones are the most exposed to shocks and hence most vulnerable to poverty.

Households in Chad rely on a range of coping mechanisms to respond to shocks. The most common responses include: (i) help from family or friends (63 percent), (ii) drawing on savings (47 percent), (iii) reducing consumption (36 percent), (iv) procuring cheaper food (33 percent), (v) selling stored food (22 percent), (vi) selling livestock (17 percent), and (vii) selling assets (15 percent). These coping strategies fall within three main categories: consumption-based, asset-based, and assistance-based. While consumption-based and asset-based strategies can help households weather a crisis in the short run, they entail a heavy opportunity cost, as they tend to deplete productive assets and human capital, which limits the household's capacity to improve its living standard in the future.

68 Source: https://climateknowledgeportal.worldbank.org/country/chad/vulnerability.

The COVID-19 pandemic has severely constrained the ability of Chadian households to turn to family and friends as a coping strategy. The main coping mechanisms adopted by Chadian households include reducing consumption and drawing down savings, both of which exacerbate long-term vulnerability. Cash and in-kind transfers to affected households could provide immediate short-term relief. The challenge will be to open adequate fiscal space for these transfers while enabling people to safely resume their economic activities.

Household-level vulnerability is driven by a combination of climate-related risks and health risks, and existing coping mechanisms are overwhelmingly informal and inadequate. Household vulnerability to shocks is a function of both exposure and coping ability. Most Chadian households have a limited assets and human capital, and they frequently employ consumption-based and asset-based coping responses that further deplete their assets and erode their human capital. Chadian policymakers must design and implement risk-management interventions that build resilience and enable households to escape poverty. The intervention theory underlying most risk-management interventions targeting rural households focuses on smoothing production and consumption while protecting productive assets and human capital.[69] Helping households overcome risk-related barriers to adopting improved production technologies and practices can reinforce household food security and build long-term wealth, which are vital to mitigating vulnerability and escaping poverty.

Drought and irregular rainfall are the most frequent covariate shocks facing rural households in Chad, and thus climate variability is a major source of risk to smallholder farmers and pastoralists. Disseminating improved production technologies and practices and implementing institutional risk-management interventions can boost the marginal productivity of farming households and strengthen their resilience to climate variability. Improved production technologies and practices include the use of drought-resistant seeds, diversified farming systems, and conservation-focused agricultural practices. Proper targeting is critical to the design of climate-risk management interventions, as the risk-reduction and resilience effects of improved agricultural technologies and practices are context-specific and will vary depending on local bio-physical and socioeconomic factors. Policymakers must calibrate interventions to reflect these conditions and the livelihood strategies available to local households. Moreover, the effectiveness of these interventions will hinge on the scope and quality of agricultural extension services.

Index-based insurance is the institutional intervention most often promoted to manage climate risk in developing countries. Rather than basing payouts on an assessment of actual crop or livestock losses for an individual household,[70] index-based insurance triggers payouts based on an index of agricultural losses for the larger area in which that household is located. The index is usually based on factors such as an area's rainfall or vegetation growth,[71] and

69 Hansen et al. 2019.

70 A distinction is commonly made between index-based insurance for crops and livestock.

71 Stoeffer et al., 2018. Agricultural Index Insurance Has Big Impacts for Farmers in Burkina Faso. Innovation Lab for Assets and Market Access Policy Brief No. 2018-05.

index values tend to be closely correlated with individual outcomes.[72] Index insurance has lower transaction costs than conventional insurance mechanisms that require individual losses to be reported, verified, and indemnified, making it a more viable option in areas with limited physical and institutional infrastructure.

Strengthening social protection by establishing adaptive safety nets can complement the use of index-based insurance to further strengthen household resilience and support sustainable poverty reduction.[73] Social protection mechanisms involving cash or in-kind transfers are crucial to mitigate vulnerability, and they can alleviate credit, savings, and liquidity constraints, enabling households to exit poverty. The international literature provides evidence that cash transfers are more effective at mitigating the adverse impacts of drought when combined with vocational training or productive investment grants. This type of integrated approach incorporates both livelihood promotion and protection.

Table 3.3 Summary of policy recommendations

Constraints	Policy Action	Time Horizon	Potential welfare gains and uses	Evidence
Vulnerability to poverty	Strengthen the response mechanisms available to households through investments in human capital (e.g., education) and physical capital (e.g., community infrastructure).	Long term	Positive impact on education, health, income, and food security.	– Sahel Adaptive Social Protection Program: Annual Report 2019. Available at http://documents.worldbank.org/curated/en/680361585895594749/Sahel-Adaptive-Social-Protection-Program-Annual-Report-2019
	Reduce consumption high variability in consumption through the a diversification of income sources.	Medium term	Positive impact on consumption and welfare.	
	Implement public works programs to further reduce the volatility of household consumption.	Short term	Positive impact on income and food security. Increase in productive investments.	– Gehrke, E., & Hartwig, R. (2018), "Productive effects of public works programs: What do we know? What should we know?". World development, 107, 111-124. – Zimmermann, L. (2014), "Public works programs in developing countries have the potential to reduce poverty" IZA World of Labor.
	Introduce basic universal health insurance schemes.	Long term	Positive impact on health and income.	

72 Another desirable property of index insurance is that the index is based on data that is promptly available, collected inexpensively and reliably (e.g., satellite-based imagery). In addition, the data are not manipulable by either the insurer or the insured. For details, see Barrett et al., 2008. Altering Poverty Dynamics with Index Insurance: Northern Kenya's HSNP+. Basis Brief No. 2008-08.

73 Hansen et al., 2019.

Constraints	Policy Action	Time Horizon	Potential welfare gains and uses	Evidence
Exposure to demographic idiosyncratic shocks	Increase the availability of affordable health care services.	Medium term	Positive impact on health and income.	
	Establish early warning systems and seasonal forecasts to inform households' agricultural decisions	Medium term	Positive impact on agricultural production and income.	– Sahel Adaptive Social Protection Program: Annual Report 2019. Available at http://documents.worldbank.org/curated/en/680361585895594749/Sahel-Adaptive-Social-Protection-Program-Annual-Report-2019
Exposure to natural covariate shocks	Increase access to agricultural technologies and practices adapted to drought and irregular rainfall.	Medium term	Positive impact on agricultural production and income.	– Hansen, J., Hellin, J., Rosenstock, T., Fisher, E., Cairns, J., Stirling, C., … & Campbell, B. (2019), "Climate risk management and rural poverty reduction", Agricultural Systems, 172, 28-46.
	Introduce index-based insurance to help mitigate the effects of drought or irregular rainfall.	Short term	Positive impact on agricultural investment and production, health, and education.	– Greatrex, H., Hansen, J., Garvin, S., Diro, R., Le Guen, M., Blakeley, S., Le Guen M, Rao KN, & Osgood, D. (2015). Scaling up index insurance for smallholder farmers: Recent evidence and insights. CCAFS Report No. 14. – Hansen, J., Hellin, J., Rosenstock, T., Fisher, E., Cairns, J., Stirling, C., … & Campbell, B. (2019), "Climate risk management and rural poverty reduction", Agricultural Systems, 172, 28-46. – Stoeffler, Q., Carter, M., Guirkinger, C., & Gelade, W. (2020). "The spillover impact of index insurance on agricultural investment by cotton farmers in Burkina Faso." NBER Working Paper w27564.
	Develop social protection schemes, such as food distribution programs and child nutritional support programs, to decrease the likelihood of households reducing their consumption as a coping mechanism.	Short term	Positive impact on food security.	

Constraints	Policy Action	Time Horizon	Potential welfare gains and uses	Evidence
Prevalence of detrimental coping mechanisms	Develop livestock insurance programs to support pastoralists during periods of drought or irregular rainfall.	Medium term	Reduction in detrimental coping strategies, including the emergency sale of livestock.	– Jensen, N. D. & C. B. Barrett (2017). "Agricultural Index Insurance for Development." Applied Economic Perspectives and Policy, 39.2, pp. 199-219.
	Provide cash transfers to help households purchase essential food items.	Short term	Positive impact on food security.	– Asfaw, S., Davis, B., Dewbre, J., Handa, S., & Winters, P. (2014), "Cash transfer programme, productive activities and labour supply: evidence from a randomised experiment in Kenya", The Journal of Development Studies, 50(8), 1172-1196.
Pandemic-related pressures on income sources and access to essential food items	Provide in-kind transfers of essential food items such as rice, maize, sugar, and oil.	Short term	Positive impact on household food security.	
	Extend favorable credit lines to nonfarm enterprises.	Short term	Positive impact on household income.	

CHAPTER
04 HUMAN CAPITAL IN CHAD

Key Insights

- Chad score on the Human Capital Index (HCI) was the second lowest in the world in 2020 at 0.30, indicating that a child born today can expect to attain only 30 percent of her lifetime productive potential. Chad also lags its comparators in terms of gender parity on the HCI. Households in the southern regions tend to have higher HCI scores than their northern counterparts.

- Many households contend with chronic food insecurity, and more than half of the population is estimated to be severely food insecure. Food insecurity is especially prevalent among female-headed households and rural communities. Across regions, households in northern and central zones are generally more food secure relative to those in the south.

- In recent years, net primary enrollment rates have improved, reflecting the government's commitment to strengthening the educational system. However, in a country dominated by public schools, education spending as a share of GDP remains extremely low, and weak educational outcomes and large gender disparities persist at the primary and secondary levels.

- School enrollment rates are higher for boys than girls, and this gap widens among older age groups. Literacy rates are also far higher among men than among women.

- Enrollment gaps are evident across wealth quintiles and between rural and urban areas. However, early childhood education indicators are low across all wealth quintiles.

- The unavailability of schools and excessive distance to schools are the leading reasons for never attending school. Dilapidated classrooms, inadequate equipment and supplies, and high rates of teacher absenteeism further weaken the quality of the school system.

- Rates of paid and unpaid work are lower among children enrolled in school, but girls spend twice as much time on domestic chores as boys. Among older students who work, both boys and girls are more likely to work outside the home.

- Over the last decade, maternal mortality rates have declined, but early marriage remains prevalent. Urban households fare better than their rural peers on maternal and child health outcome indicators. Northern regions have especially poor vaccination coverage, and households in the lowest wealth quintiles experience the highest rates of under-five mortality.

- Girls continue to face enormous challenges, including child marriage, teenage pregnancy, and higher dropout rates than boys.

- The COVID-19 pandemic has left many students without alternative learning options, and the resulting crisis threatens food security , especially among the poorest households. Declining income levels have further diminished access to medical, and many households are struggling to meet their basic needs.

- To accelerate human capital development, the government must increase public spending and build institutional capacity in the education and health sectors. Policies that reduce school dropout rates are especially critical. Moreover, due to the pandemic, many households require immediate relief to meet their basic needs.

This chapter assesses the state of human capital in Chad as measured by education, health, and nutrition indicators. This assessment is based on data from the ECOSIT 4, which enables both a descriptive analysis and an econometric analysis of human capital. The COVID-19 pandemic is having a devastating impact on human capital across the globe, and this chapter includes a preliminary analysis of the effects of the crisis on education and food security in Chad. The preliminary analysis draws on data collected from two rounds of a high-frequency phone survey jointly implemented by the World Bank and INSEED.

4.1 ACHIEVEMENTS IN HUMAN CAPITAL

In 2018, the World Bank introduced the Human Capital Index (HCI), which presents an aggregate measure of human capital at the national level. The HCI score reflects the expected lifetime productivity of a child born today relative to what her lifetime productivity would have been had she enjoyed a complete education and full health. The HCI includes three components—survival, education, and health—and applies five key measures that global research has linked to productivity. These five measures are child survival, school enrollment, quality of learning, healthy growth, and adult survival. Each measure has corresponding indicators, including the under-five mortality rate, average years of school attendance by age 18, harmonized test scores, under-five stunting rate, and survival rate between age 15 and age 60. The index calculates a single value between 0 and 1, with a score of 1 indicating that a child born today is expected to achieve her maximum lifetime productivity.[74]

In 2020, Chad ranked second lowest in the global HCI.[75] Chad's HCI score was estimated at 0.30, indicating that a typical child born today can expect to attain only 30 percent of her lifetime productive potential.[76] Nearby Sahelian countries Niger and Mali had HCI scores of 0.32, and Burkina Faso led the regional comparator group with an HCI score of 0.38 (Table 4.1). Across these four benchmark countries, Chad's HCI ranked lowest in indicators of child survival, years of school, and adult survival. In Chad, 88 percent of children survive to age five; a child born today can expect to receive 5.3 years of schooling; and 64.6 percent of 15-year-olds survive to age 60, far below the average for comparator countries. Chad outperformed Niger on the rate of stunting, and it performed better than both Mali and Niger on harmonized test scores. Between 2010 and 2020, Chad's HCI score for girls improved but did not close the gap with the score for boys.[77]

74 World Bank, 2018.

75 The Central African Republic ranked lowest with an HCI score of 0.29.

76 World Bank, 2020a. World Bank, 2020a.

77 Ibid.

Table 4.1. Human Capital Index Scores by Component, Chad and Comparators, 2020

Indicator	Burkina Faso	Chad	Mali	Niger	Sub-Saharan Africa	Low Income
HCI Component 1: Survival						
Probability of Survival to Age Five	0.924	0.881	0.902	0.916	0.934	0.928
HCI Component 2: Education						
Expected Years of School	7.0	5.3	5.2	5.5	8.3	7.6
Harmonized Test Scores	404	333	307	305	374	356
HCI Component 3: Health						
Survival Rate from Ages 15 to 60	0.761	0.646	0.750	0.767	0.735	0.747
Share of Children Under Five Not Stunted	0.751	0.602	0.731	0.515	0.688	0.654
Human Capital Index Score	**0.38**	**0.30**	**0.32**	**0.32**	**0.40**	**0.37**

Source: World Bank (2020)
Note: Scores from international tests are converted into harmonized learning outcomes, with values ranging from approximately 300 to 600 across countries (World Bank 2020).

Between 2010 and 2020, Chad made very limited progress in improving its HCI score. A marginal increase in expected years of schooling among boys boosted Chad's HCI score from 0.29 to 0.30 (Table 4.2). As a result, a typical child born today can expect to attain an additional 1 percent of her lifetime productive potential compared to a child born in 2010. Moreover, the improvement in HCI scores was limited to boys, causing the gap between boys and girls to widen by 2 percentage points.

A comparison of HCI scores across regions within Chad reveals similar trends, though the southern regions performed slightly better than the northern ones. N'Djamena had the highest HCI score, but neighboring regions such as Chadi-Barguirmi, Lac, and Hadjer-Lamis had some of the lowest scores in the country (Figure 4.1a). The southern regions tended to have slightly higher scores than their northern counterparts, with values ranging from 0.31-0.32 in the former to an average of 0.30 in the latter. Of Chad's three major climatic zones, average HCI across were highest in the Soudanian zone and lowest in the Saharan zone, though these differences were modest.

Table 4.2: Human Capital Index Scores by Component, Chad, 2010 and 2020

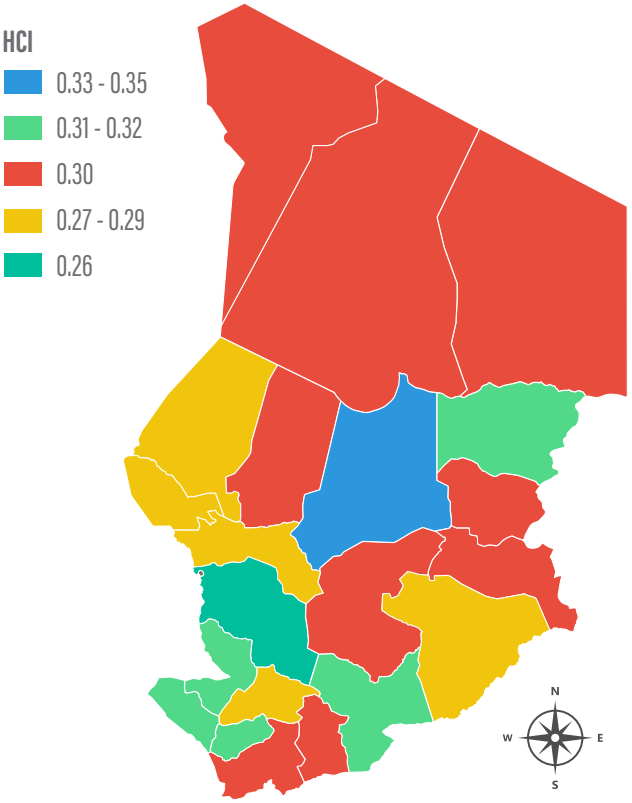
Indicators	Male		Female		Male + Female	
	2010	2020	2010	2020	2010	2020
HCI Component 1: Survival						
Probability of Survival to Age Five	0.870	0.875	0.884	0.888	0.877	0.881
HCI Component 2: School						
Expected Years of School	5.6	6.2	4.3	4.4	5.0	5.3
Harmonized Test Scores	338	338	323	323	333	333
HCI Component 3: Health						
Survival Rate from Age 15 to Age 60	0.620	0.625	0.665	0.667	0.642	0.646
Share of Children Under Five Not Stunted	0.591	0.591	0.614	0.614	0.602	0.602
HCI Score	**0.30**	**0.31**	**0.29**	**0.29**	**0.29**	**0.30**
Uncertainty Interval	**[0.28,0.31]**	**[0.29,0.33]**	**[0.27,0.30]**	**[0.27,0.31]**	**[0.28,0.31]**	**[0.28,0.32]**

Source: World Bank (2020)
Note: Scores from international tests are converted into harmonized learning outcomes, with values ranging from approximately 300 to 600 across countries (World Bank 2020).

Poverty is associated with low levels of human capital in Chad. Although average poverty rates are highest in the Soudanian zone and lowest in the Saharan zone, at the regional level high poverty rates tended to correlate with low HCI scores (Figure 4.1b). For example, the third-poorest region in the country, Tandjilé, also had the third-lowest human capital index score. According to the latest HCI report, which covers 50 countries, the average HCI score for a child born in the richest 20 percent of households is 45, while the average for a child born in the poorest 20 percent is 35. The gap between poor and nonpoor households is not consistent across HCI components: the difference in the probability of survival to age five is 2 just percentage points, while differences in average years of schooling (5.4 years versus 9.4 years), harmonized test scores (322 versus 357), and the share of children not stunted (59 percent versus 68 percent) are much wider. The HCI report urges governments to embrace policies that reduce inequality in access to healthcare between poor and nonpoor households.

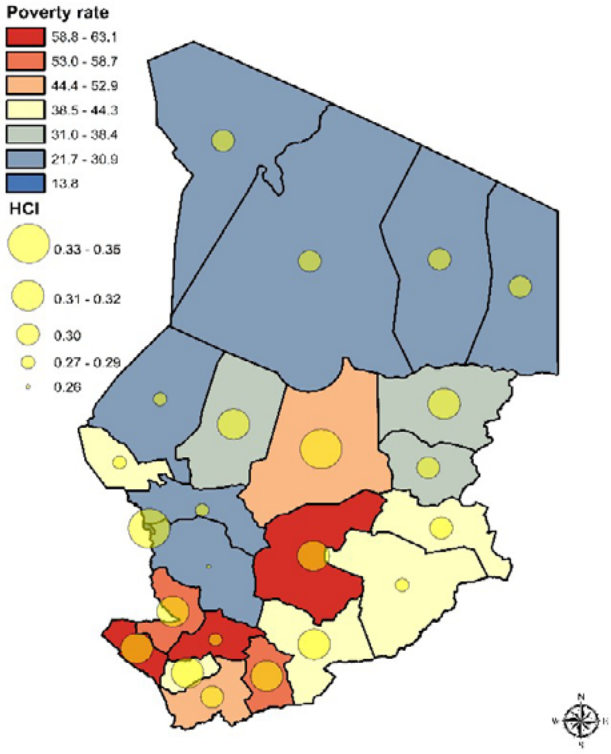
Figure 4.1: Human Capital land Poverty Rates across Regions

(a) Human capital across regions



Source: World Bank staff calculations using data from ECOSIT 4

(b) Human capital and poverty rates



Source: World Bank staff calculations using data from ECOSIT 4

4.2 EDUCATION

Recurrent conflicts, both within Chad and in neighboring countries, have created a large population of refugees and internally displaced persons (IDPs) while also disrupting access to education. Shortly after attaining independence from France in 1960, Chad suffered a devastating civil war and a protracted conflict with Libya that lasted until the 1990s. Chad has continued to experience periods of civil unrest, including ethnic and regional conflicts, as well as armed rebellions in the north and east and violence along on the border with Sudan's Darfur region. While Chad's internal conflicts largely ceased in January 2010, political unrest and terrorist attacks have continued. Recurrent violence compounds Chad's other socioeconomic challenges and contributes to its low HCI scores.

Resource dependence has intensified budgetary volatility. Following the discovery of oil, Chad's budget has become heavily dependent on oil revenues, leaving public spending vulnerable to oil-price volatility. After the 2008 financial crisis led to a sharp decline in oil prices, the Chadian government was forced to sharply reduce spending on education, health, and other public services.

In recent years, net primary enrollment rates have increased due to government programs aimed at strengthening the education system and building national capacity. The National Education for All Action Plan was designed to improve the quality of human resources in the education system and to seek to integrate the network of refugee-camp schools into the national school system, among other objectives. Meanwhile, the government improved the distribution of teaching staff across the country by offering contracts to community teachers, who make up an estimated 54 percent of all teachers in Chad. These efforts helped increase the net primary enrollment rate from 42 percent in 2003 to 44 percent in 2011.[78] Chad's net primary enrollment rate is now estimated at 73.2 percent, outperforming some neighboring countries like Mali and Niger (Table 4.3).

Despite recent progress, Chad continues to experience both low enrollment rates and wide gender disparities in primary and secondary education. More than half of all students enrolled in primary school do not continue to the secondary level (Table 4.3), and in 2016 the share of female students transitioning from primary to secondary school was 12 percentage points lower than that of their male counterparts. Similar patterns are observed across Chad's four closest regional comparators, for which the average primary enrollment rate is over 50 percent, while the average secondary enrollment rate is less than 33 percent. Chad ranks lowest in both net secondary enrollment rates and gender parity at the secondary level. In other words, Chad has the region's smallest share of total secondary students and female secondary students, as well as the largest share of female students who fail to transition from the primary to the secondary level. In addition to low enrollment rates and large gender gaps, Chad faces serious challenges in terms of education access and quality, as just 4 percent of students who complete primary school have adequate competency in math and reading.[79]

Though the government has made successive efforts to increase the education budget, public spending on education remains low. At 2.5 percent of GDP, Chad's education spending is the lowest in the region in relative terms (Table 4.3). Low rates of education spending weaken compensation incentives for teachers, including government-recruited teachers, trained community teachers, and untrained community teachers. The student/teacher ratio in Chad stands at 56:1, which further undermines academic achievement.[80]

78 Government of Chad, 2019

79 World Bank, n.d.

80 African Development Bank, 2019.

Table 4.3 Education Spending and Outcomes, Chad and Comparator Countries

	Public spending on education (% of GDP)	Public spending on education (% of total public spending)	Net primary enrollment rate (%)	Net secondary enrollment rate (%)	Share of female primary students (%)	Share of female secondary students (%)
Burkina Faso	6.4	21.4	76.4	29.1	48.8	48.4
Chad	2.5	16.4	73.2	18.9	43.4	31.3
Mali	3.8	16.5	61.3	29.4	46.4	44.1
Niger	3.5	13.2	65.1	20.1	45.6	41.9

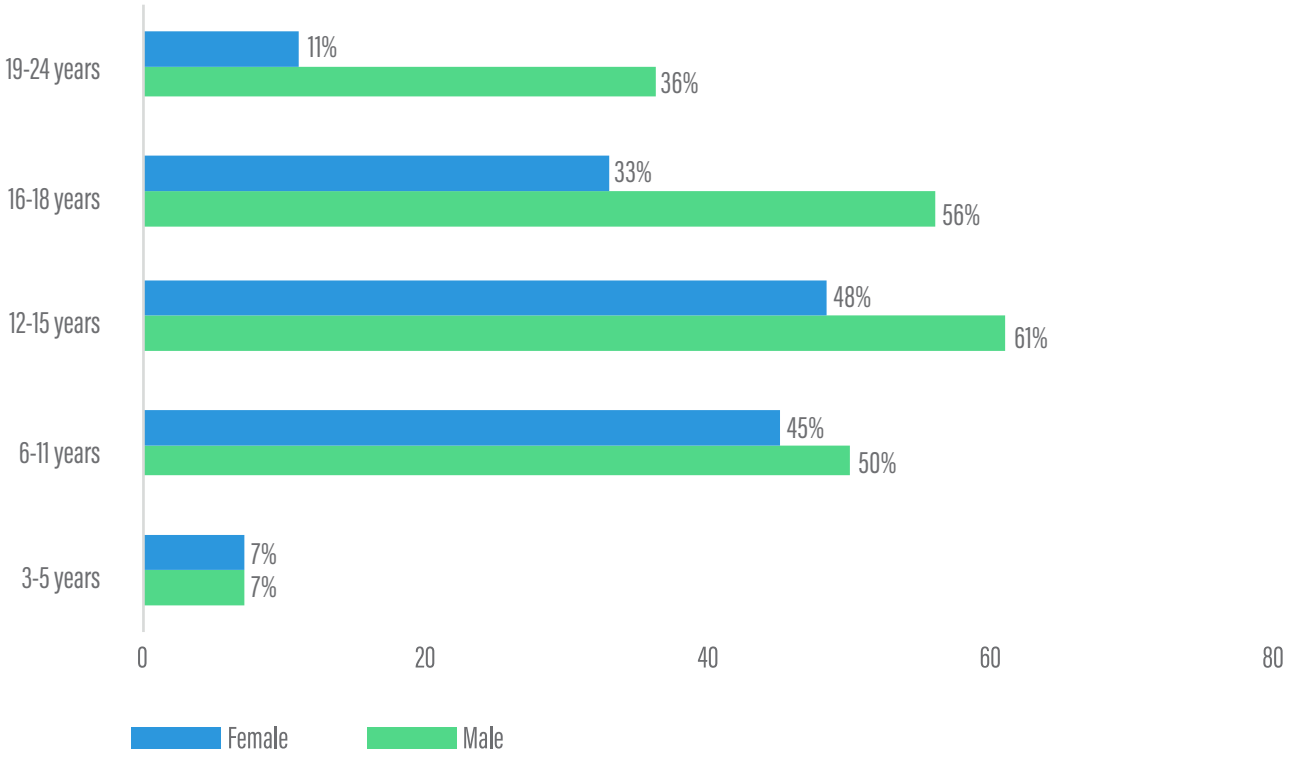
Source: UNESCO Institute for Statistics (2020)
Notes: These numbers refer to the year 2017 except for enrollment numbers in Chad, which are from 2016.

School enrollment rates are higher for boys than for girls, and the gender gap widens among older age groups. Public schools account for 66 percent of all schools in Chad, while private schools make up 30 percent, and community schools account for the remaining 4 percent. In 2016, enrollment rates were highest among the 12-15 age group at 55 percent and lowest among the 3-5 age group, indicating major deficiencies in early childhood education for both girls and boys (Figure 4.2). Among the 12-15 age group, 61 percent of boys and 48 percent of girls were enrolled in school—a gender gap of 13 percentage points. Among the 16-18 age group, the gender gap in enrollment widens to 23 percentage points. Enrollment rates for both boys and girls decline at age 19, likely reflecting a combination of marriage,[81] increased household responsibilities, and an inadequate supply of tertiary education. Additionally, 1.5 million girls are at risk for child marriage and teenage pregnancy, which increase their dropout rates and highlight the enormous challenges they face.

Households in the highest wealth quintiles are more likely to send their children to school, but enrollment in early childhood education is low across all wealth quintiles. In 2016, school enrollment rates were highest for the 12-15 age group, and children from wealthier households were the most likely to be enrolled in school (Figure 4.3). Enrollment rates for the 12-15 age group were highest among households in the top wealth quintile at 68 percent, and lowest among the households in the lowest and second-lowest quintiles at 54 percent and 51 percent, respectively. Enrollment in early childhood education is low across all wealth quintiles at 5-17 percent. The enrollment gap across wealth quintiles is lowest for the 16-18 age group, indicating that access to secondary education is more evenly distributed across households at different income levels. However, households in the top wealth quintile account for 28 percent of enrollment among the 19-24 age group.

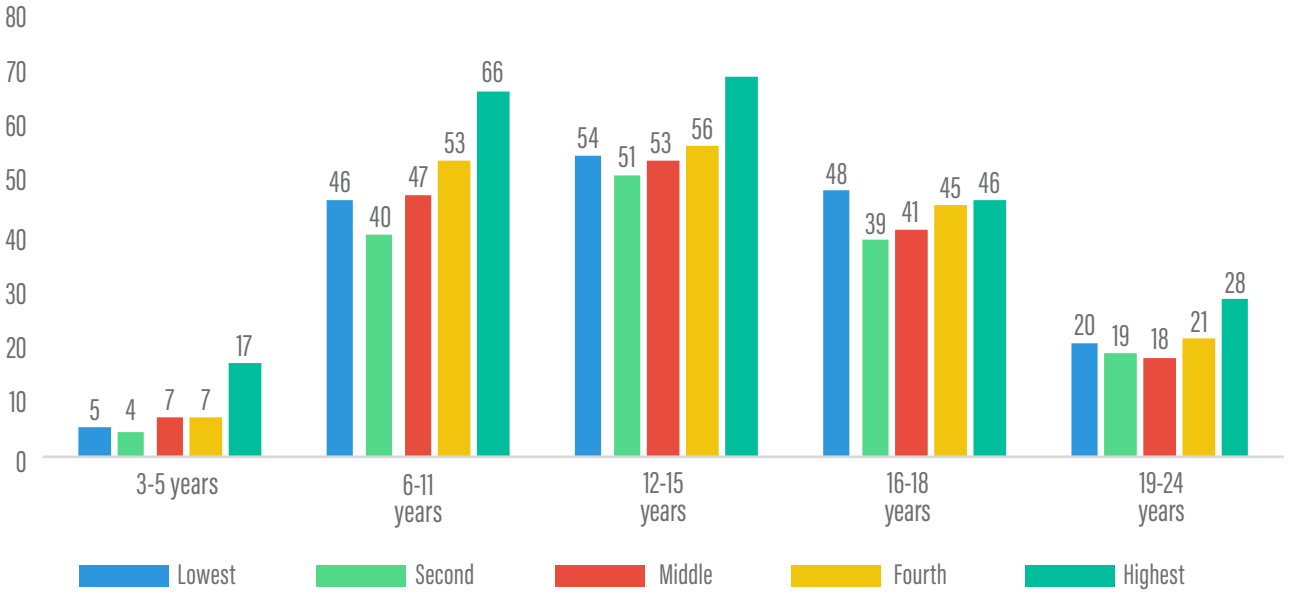
81 The median age for a first marriage in Chad is about 16 years old.

Figure 4.2. School enrollment rates by gender and age group



Source: World Bank staff calculation using data from ECOSIT 4

Figure 4.3. School enrollment rates by age group and wealth quintile

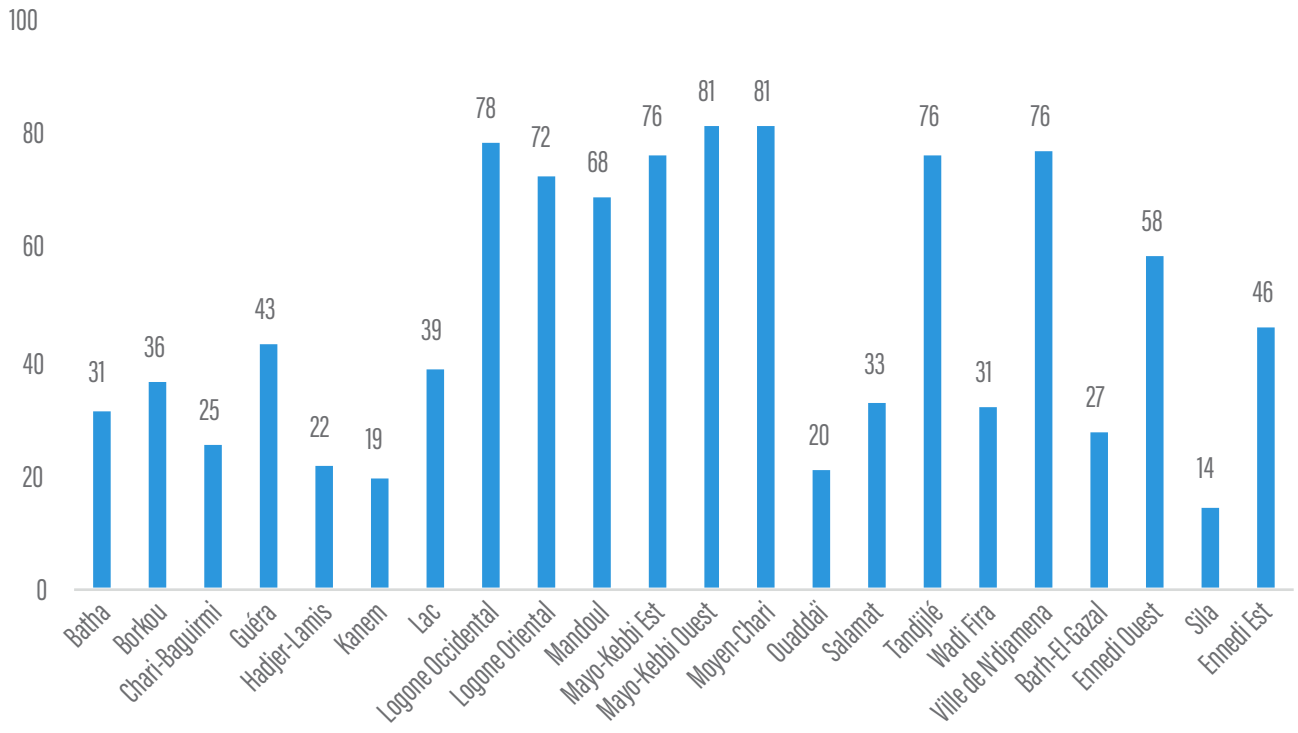


Source: World Bank staff calculation using data from ECOSIT 4

Stark differences in primary school enrollment rates are apparent across regions, with urban centers outperforming rural areas. In 2016, urban enrollment rates were about 30 percentage points higher than rural rates across all age groups. For the 16-18 age group, the urban enrollment rate was 68 percent, while the rural rate was 33 percent. Similar urban/rural disparities were also evident at the primary level (Figure 4.4). Across regions, Mayo-Kebbi Ouest and Moyen-Chari had the highest primary enrollment rates at about 80 percent, while Sila, Kanem, and Ouaddaï had the lowest rates at 14-20 percent. These gaps highlight the need to expand primary school access across rural areas and underserved regions.

Lack of schools and long distances to school were the leading reasons for never having attended a formal school. About 44 percent of boys ages 7 to 24 reported never attending school because there was no school in their area or it was too far away (Figure 4.5). This share was slightly lower among girls at 34 percent, though girls face unique challenges that prevent them from attending school. A significant share of girls reports not having attended school because of their gender, and families appear to refuse to send girls to school at a higher rate than boys. Among households that had access to a school, affordability appears to be a significant obstacle, especially for boys, and similar shares of boys and girls were kept out of formal schools because of their involvement in paid or unpaid work. Only a small fraction of boys and girls between the ages of 7 and 24 reported not having attended school because it was not suitable or useful.

Figure 4.4. Primary Enrollment Rates among Children Ages 7-12 by Region

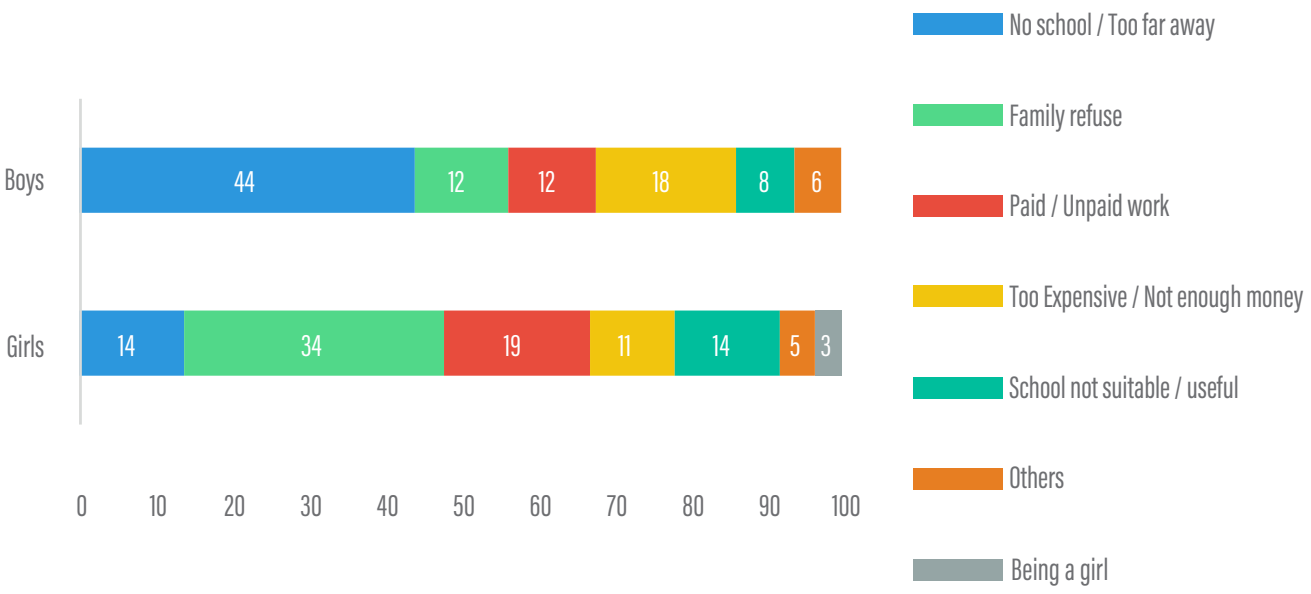


Source: World Bank staff calculation using data from ECOSIT 4

Children enrolled in school are less likely to participate in paid or unpaid work, though gender differences are significant. Older girls typically spend twice as much more time on domestic work than boys, and the domestic workload is greatest among girls ages 16-24 who are not enrolled in school. (Figure 4.6). In 2016, the average unenrolled girl between the ages of 19 and 24 spent 38 hours a week taking care of a child, collecting wood and water, and performing other household tasks, compared to an average of 12 hours for her male counterpart. While school enrollment slightly reduced the number of hours girls spent on domestic chores, their level of involvement in domestic activities remained far greater than that of their male peers.

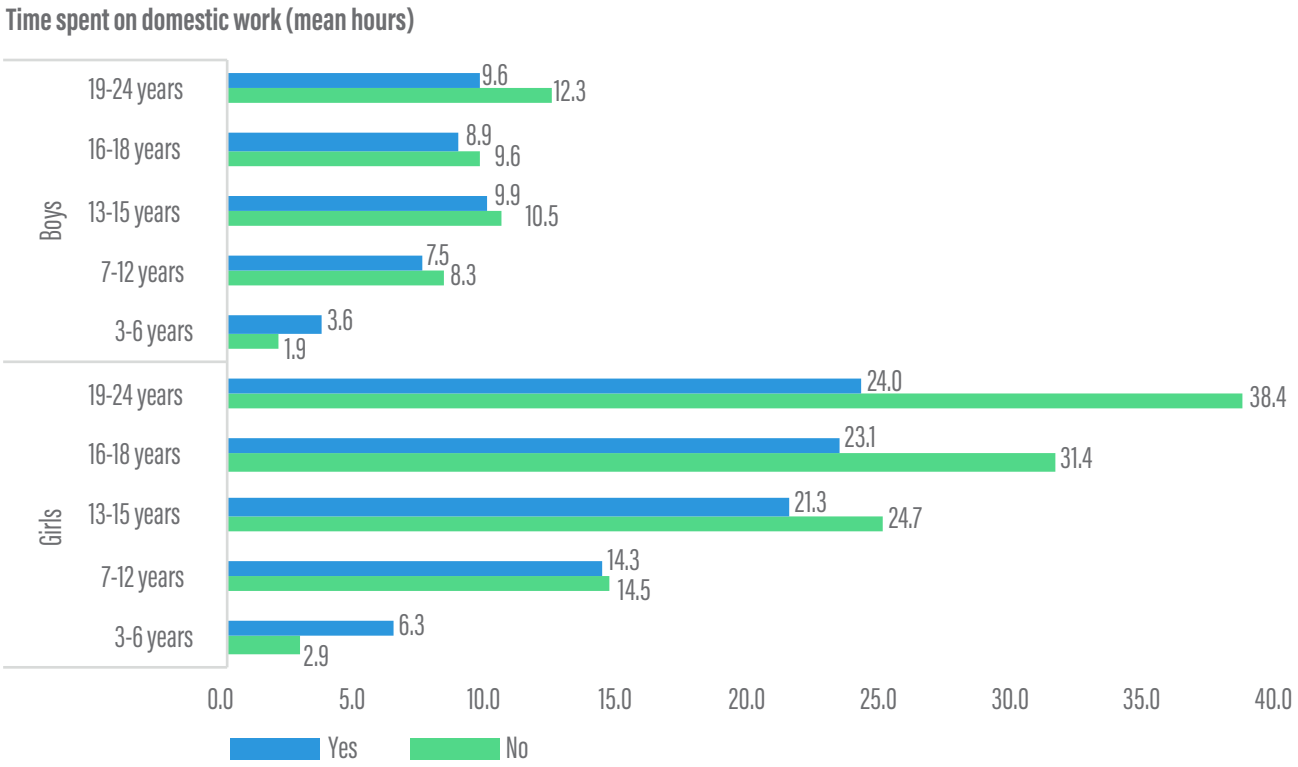
As they transition into adulthood, both boys and girls assume greater responsibilities that result in increased participation in work outside the home. In 2016, girls ages 19-24 who were not enrolled in school spent the most time on domestic work, while boys in the same age group who were not in school were the most likely to report participating in farm work, self-employment, wage labor, or other income-generating activities (Figure 4.6). Across all age groups, enrollment in school was associated with a lower likelihood of involvement in work outside of the home. This finding highlights the significant financial implications of the decision to keep children in school, as many household need both the income and extra labor provided by their school-aged children.

Figure 4.5. Distribution of Reasons for Having Never Attended a Formal School among Respondents Ages 7-24

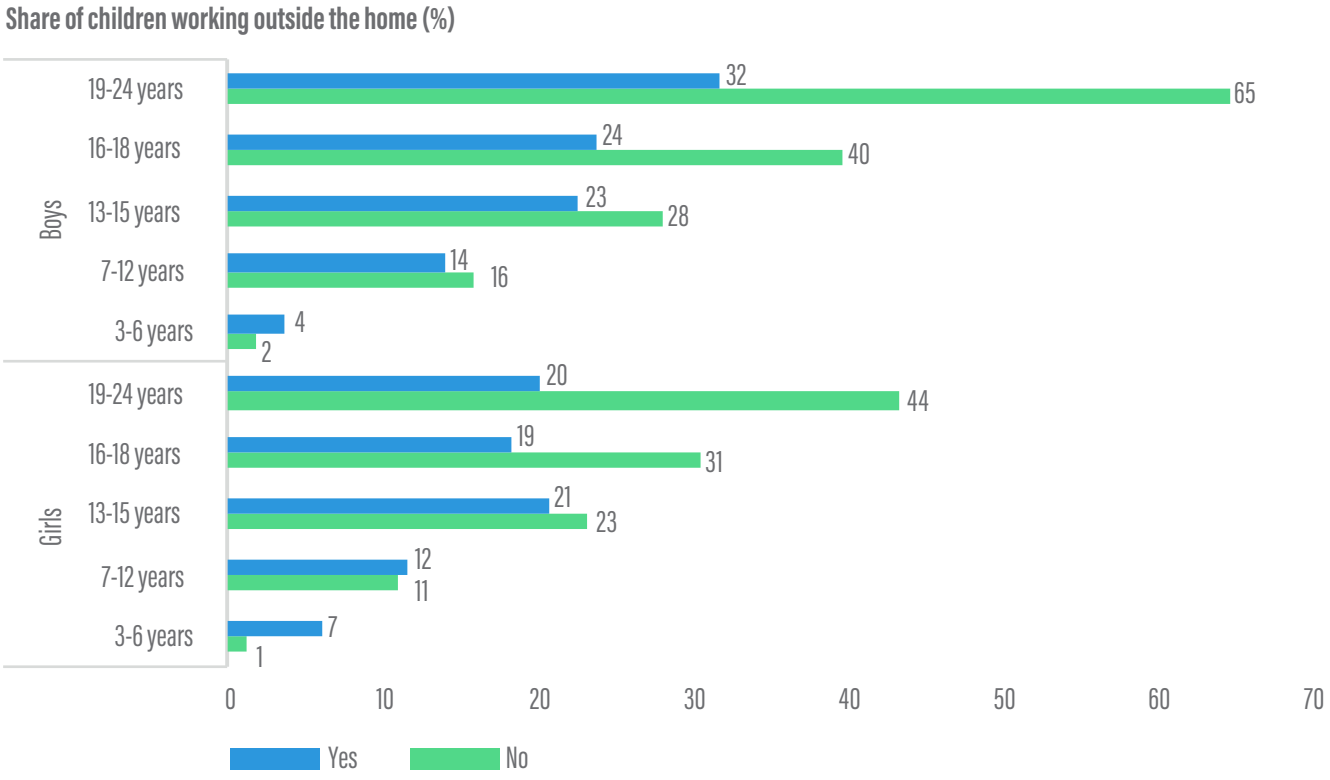


Source: World Bank staff calculation using data from ECOSIT 4

Figure 4.6 Hours of domestic work and work outside the home in the past week, disaggregated by gender, age group, and school enrollment (mean values)



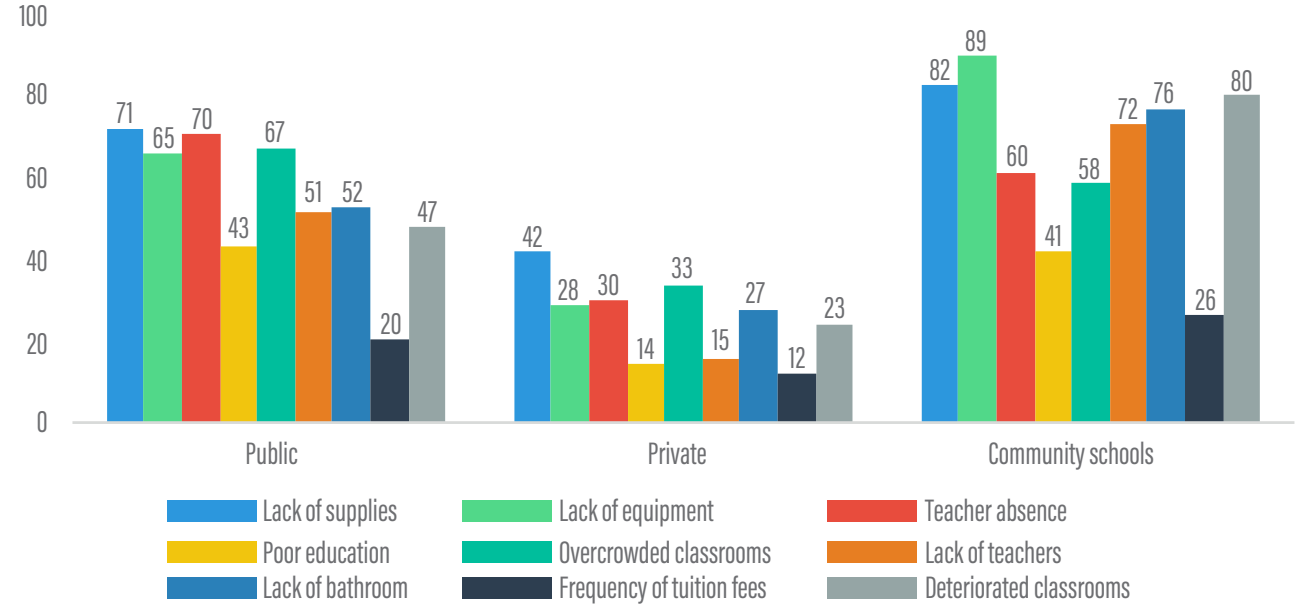
Source: World Bank staff calculation using data from ECOSIT 4



Community schools had the largest number of reported problems. Over 80 percent of community-school parents reported a lack of teaching supplies and equipment as well as dilapidated classrooms (Figure 4.7). By comparison, just 47 percent of public-school parents and 23 percent of private-school parents reported dilapidated classrooms. Private-school parents were the least likely to report problems at school, though 42 percent identified a lack of school supplies as a serious issue. A recent public expenditure analysis for Chad corroborates these findings. The analysis estimates that about one-third of classrooms are temporary structures and 62 percent are in poor condition, with community schools faring the worst.[82] Despite increased investments in school modernization and improvement since 2006, public education spending represented about 13 percent of total public spending in 2017, well below the target of 20 percent set by the Global Partnership for Education.

Lack of teachers and teacher absenteeism were also frequently reported problems in public and community schools. In addition to challenges with physical infrastructure, Chad's education system lacks adequate human capital (Figure 4.7). Among parents of students enrolled in public schools, about 70 percent reported that teacher absenteeism was a major problem, while 51 percent cited a serious lack of teachers. Among parents of students at community schools, these figures were 60 percent and 72 percent, respectively. At both community and public schools, almost 45 percent of parents reported that poor education quality hindered their children's ability to learn. Among parents of students at private schools, only 14 percent identified poor education quality as a serious problem.

Figure 4.7 Problems reported at schools, disaggregated by school type (%)

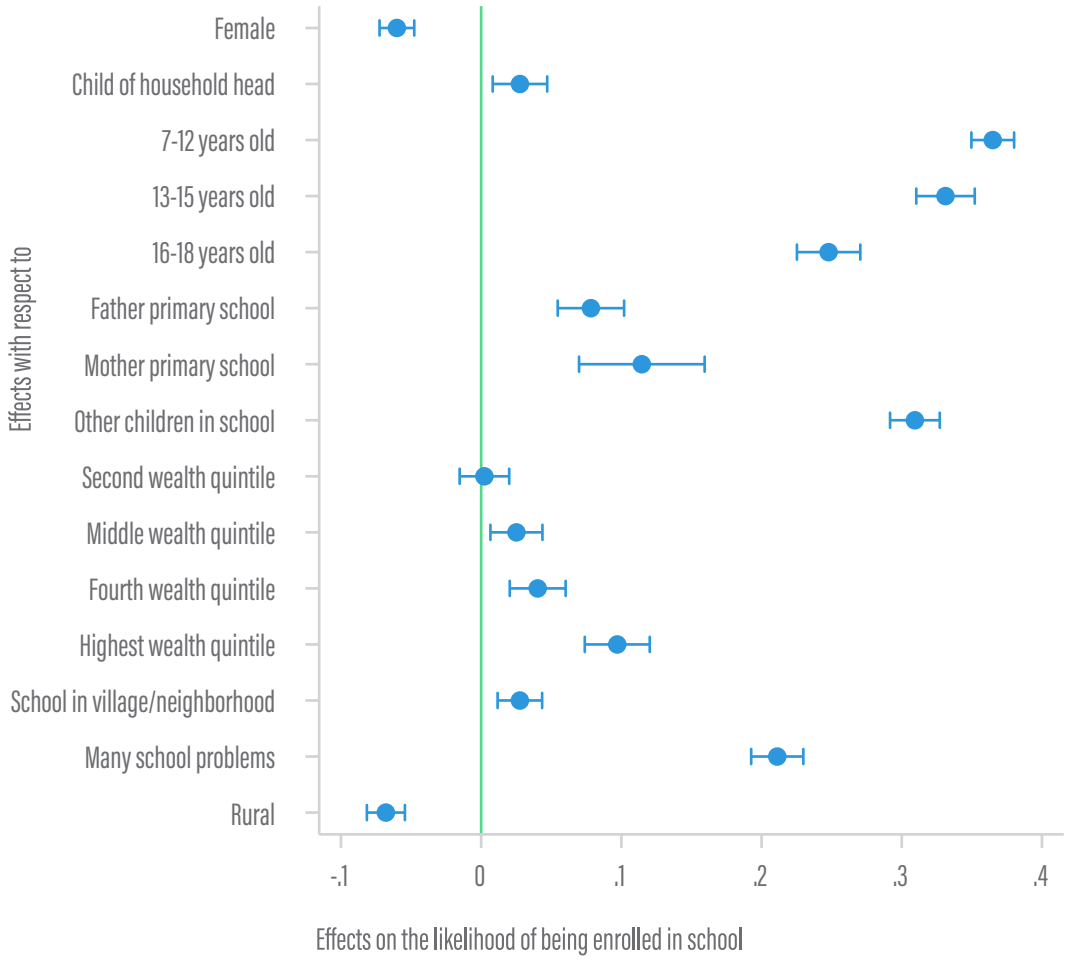


Source: World Bank staff calculation using data from ECOSIT 4

82 World Bank (2019) "Public Expenditure Analysis: Chad." Washington DC: The World Bank

Being a girl and residing in a rural area are negatively correlated with school enrollment, while being of primary-school age is positively correlated with enrollment. The results of a multivariate analysis (logistic model) reveal that girls and rural children are the least likely to be enrolled in school, while children ages 7-12 are more likely to be enrolled in school than are children in any other age group. Having siblings in school, having at least one parent with at least some primary school education, residing in a wealthier household, and residing near a school are also positively correlated with enrollment. Surprisingly, a high rate of reported problems at school does not negatively affect enrollment rates, though this may reflect a lack of alternatives among parents who are unsatisfied with their local school.

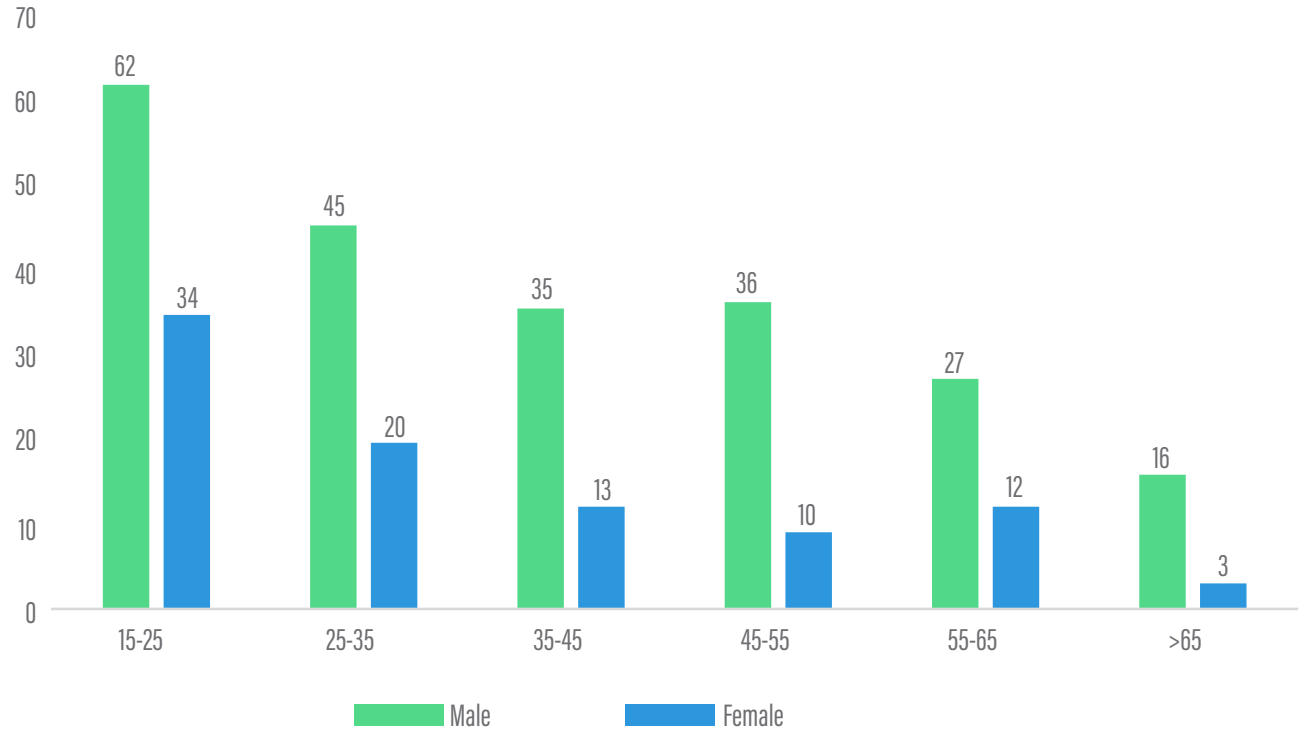
Figure 4.8. Correlates of the Likelihood of Being Enrolled in School (Logit marginal effects with 95% confidence intervals)



Source: World Bank staff calculation using data from ECOSIT 4
Notes: The base group for age is 3–6 years old. The regression is limited to children ages 3-18 because the survey captured local school presence (an explanatory variable) only up to high school.

Men of all ages exhibit higher literacy rates, and the gender gap is wider among younger age groups (Figure 4.9). Among respondents ages 15-25, about 62 percent of men report being able to read or write in any language, but this rate falls to just 34 percent among women—a gap of 27 percentage points. The disparity in literacy rates is consistent with the disparity in school enrollment rates. The gender gap in literacy rates remains broadly constant at 23-27 percentage points up to age 55, then narrows to 13-15 percentage points among respondents ages 55 and above. The narrowing gender gap in literacy rates among older cohorts is largely due to the smaller share of older men who are literate in any language, while literacy rates among women remain relatively stable across age groups. This finding reveals how the gains in school enrollment rates in recent years have disproportionately benefited men and highlights the need for targeted policies to encourage school enrollment among girls.

Figure 4.9. Literacy Rates by Gender and Age Group



Source: World Bank staff calculation using data from ECOSIT 4

4.3 HEALTH

Decade of civil unrest have prevented Chad from building adequate health infrastructure and system capacity, resulting in limited access to care and low service quality. Following the Abuja Declaration, the Chadian government committed to increase public health spending, but the sector continues to face enormous deficits in physical and human capital.[83] Unskilled workers make up almost half of the national healthcare labor force. Professional nurses and midwives represent slightly more than one-third of all healthcare workers, and the country has just 15.6 nurses per 100,000 people.[84] Fourteen regions experience a high prevalence of chronic malnutrition, with rates ranging from 40.1 to 63.9 percent. Moreover, the share of children suffering from stunted growth increased from 38.7 percent in 2010 to 40 in 2015.[85] These figures indicate that ensuring the health, nutritional, and social development of young children remains a major challenge in Chad.

Improvements in maternal mortality have been slow and uneven. The national maternal mortality rate declined from 1,420 deaths per 100,000 live births in 2000 to 1,140 in 2015, but it remains more than twice the SSA average of 534 deaths per 100,000 live births in 2017.[86] Limited access to health facilities and skilled healthcare professionals is a major driver of maternal mortality rates: in 2017, just 20 percent of Chadian women reported giving birth in a health facility, and between 2000 and 2017 the share of births attended by a skilled healthcare worker rose only slightly, from 15 percent to 20 percent.[87] The prevalence of early marriage and adolescent pregnancy, particularly in rural regions, is likely a major contributor to maternal mortality rates, as pregnant adolescents face an elevated risk of complications during pregnancy and delivery. (Figure 4.14). In Chad 47 percent, of women ages 20-24 report having given birth before the age of 18, and the short average duration between pregnancies likely contributes to adverse maternal and perinatal outcomes.[88] The low coverage of reproductive and maternal health services such as family planning and antenatal care partly explain the prevalence of early and frequent pregnancies and hinder the health system's capacity to identify high-risk pregnancies in a timely manner.

Household wealth and geographic location also have a significant impact on maternal health in Chad. In 2017, urban residents and wealthier households reported higher rates of contraception use and lower rates of early marriage (Figure 4.14). The share of women who reported completing at least four antennal care visits was 44 percent in urban areas and just 17 percent in rural areas, and the share of deliveries attended by a skilled healthcare worker was 59 percent in urban areas versus and 16 percent in rural areas. Even greater disparities are observed across household wealth quintiles: the gap between the richest and poorest households for the share of pregnant women completing at least four antenatal care visits was 34 percent, and the gap in the share of deliveries attended by a skilled healthcare worker was 49 percent.[89]

Chad's urban centers outperform rural areas in multiple child health outcomes. Children born in urban areas more likely to survive past the age of five, more likely to receive all

83 Under the 2001 Abuja Declaration, African Union member states pledged to allocate at least 15 percent of their annual budgets to the health sector.

84 Mills et al., 2010

85 Government of Chad, 2017

86 WHO, 2019; World Bank, 2020b

87 Obiang Obounou et al., 2020; WHO, 2019

88 UNICEF, 2016

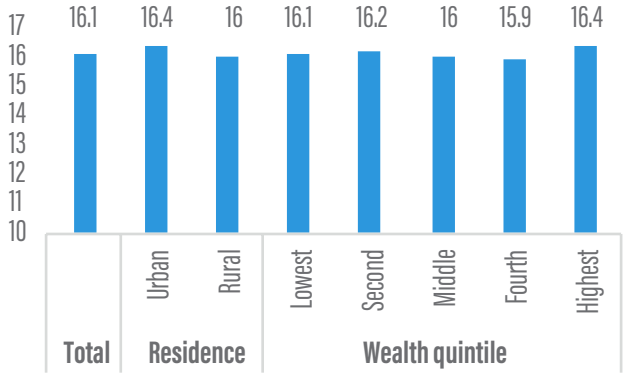
89 Ibid.

eight basic vaccines, and less likely to be stunted (Figure 4.15). At the national level, the under-five mortality rate dropped from 185.1 deaths per 1,000 live births in 2000 to 113.8 in 2019 but remains higher than the rates of neighboring countries, far above the SSA average of 76 deaths per 1,000 live births, and over four times the SDG target of 25 deaths per 1,000 live births.[90] The major causes of under-five mortality in Chad are birth asphyxia (32.2 percent), prematurity (27.9 percent), and sepsis (15.8 percent).[91] It is estimated that over 80 percent of all newborn deaths could be prevented by access to a skilled healthcare provider, but Chad continues to face a shortage of health workers with a mere 0.4 doctors and 5.6 other medical personnel per 10,000 people, far below the WHO standard of one doctor per 10,000 people. Close to half of Chad's doctors are in N'Djamena, and very few doctors are in rural areas.[92]

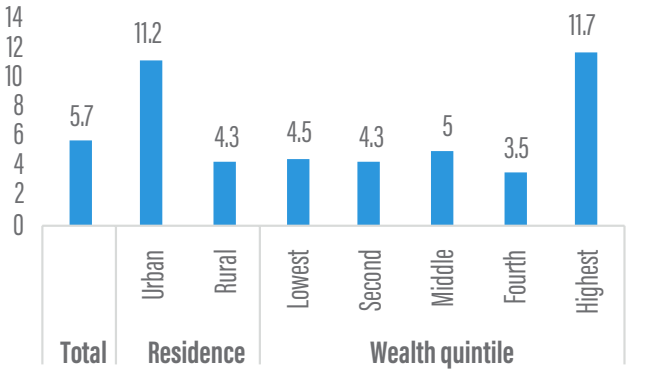
Under-five mortality rates tended to be higher among the poorest and the northern regions had the lowest vaccination coverage. In 2016, only 22 percent of children ages 12 to 23 months were fully vaccinated, with coverage for rates for tetanus/diphtheria at 50 percent in 2017 and measles coverage at 41 percent in 2019.[93] Across regions, vaccine coverage rates ranged from 56 percent in the far south to 19 percent in the north (Figure 4.11). Household socioeconomic indicators, such as maternal education levels or salaried heads of household, were associated with higher immunization rates.[94] Rural areas had both higher stunting rates and lower vaccination rates than urban centers. Immunization coverage was lowest among nomadic pastoralists populations, who have limited access to health services, and in some cases vaccination coverage rates for livestock exceeded the rates for children.[95]

Figure 4.10 Maternal Health Indicators across Subpopulations

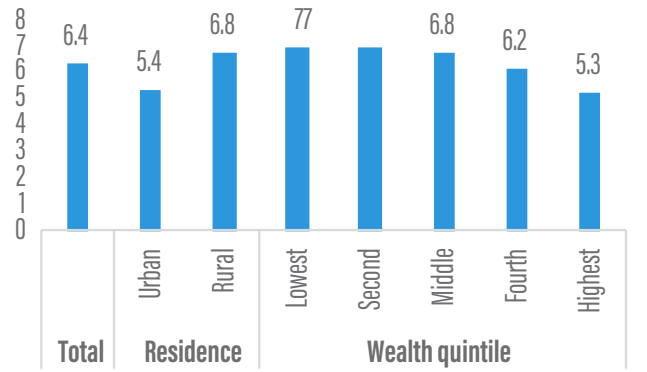
Median age of women at first marriage : 15-49



Married women currently using any method of contraception



Total fertility rate for women aged between 15-49 years olds



Source: DHIS 2014

90 World Bank, 2019; World Bank, 2020b

91 UNICEF, 2016

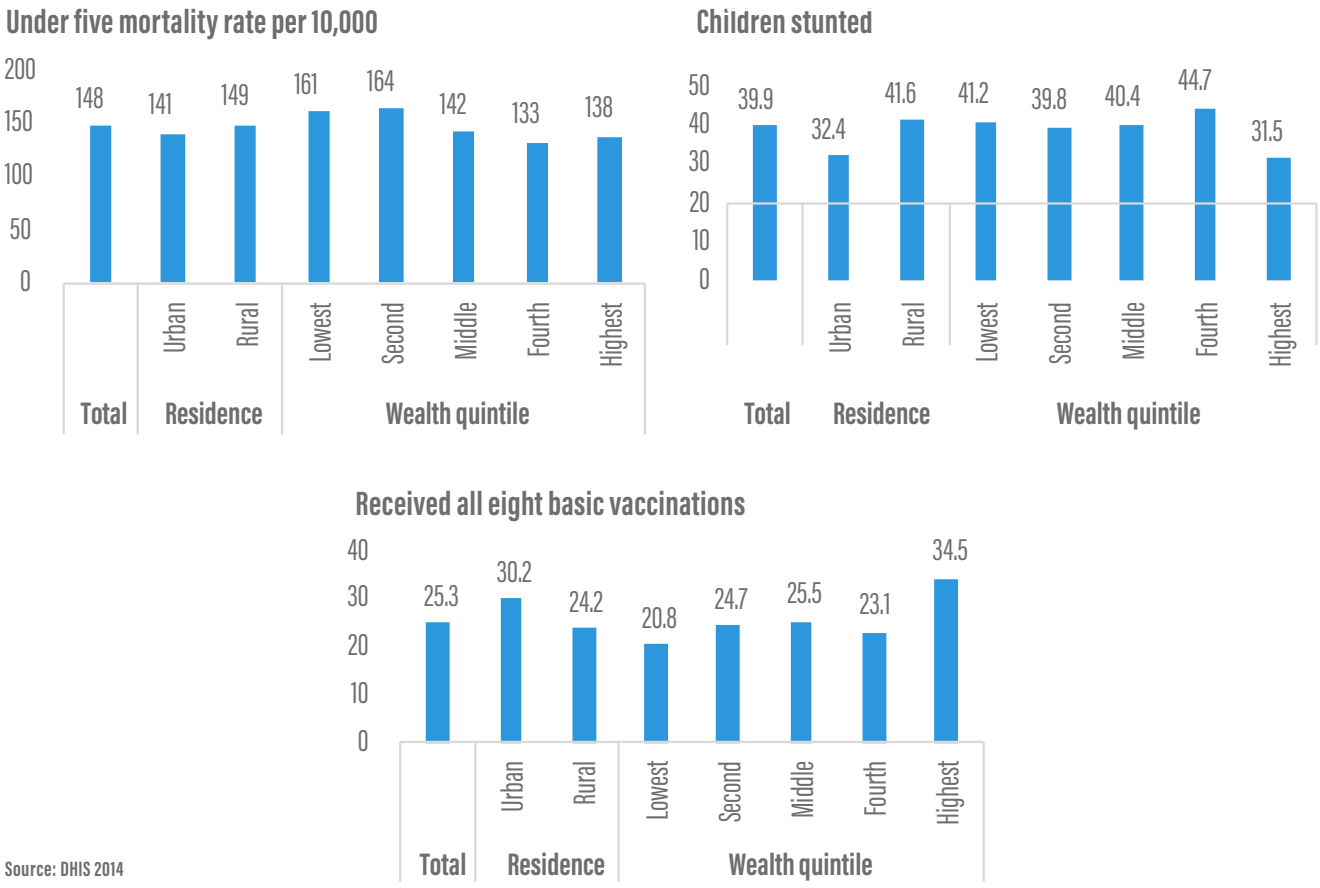
92 IMF, 2019

93 World Bank, 2020b; World Bank, 2020b

94 Gavi, 2019

95 Abakar et al., 2018

Figure 4.11 Child Health Indicators across Subpopulations



Source: DHIS 2014

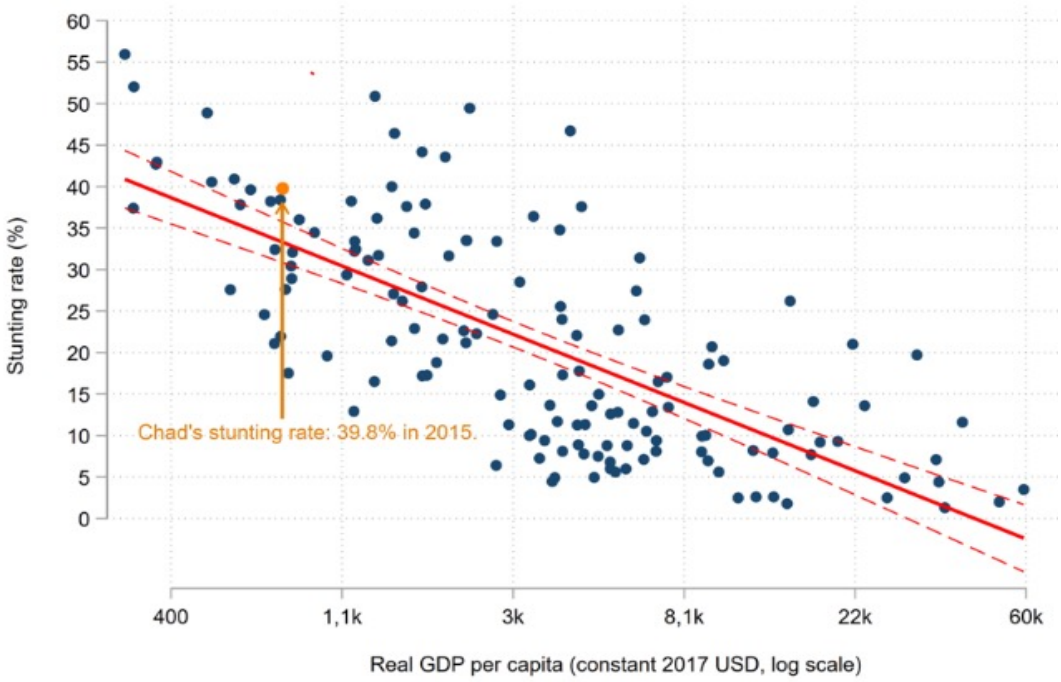
Stunting is a critical dimension of the human capital index (HCI). The stunting rate is a key indicator under the HCI's health component, and it directly affects other components through its impact on child survival and on learning outcomes. Stunting is a manifestation of chronic undernutrition, which results from inadequate quantity and quality of food intake and/or repeated episodes of infection. Stunting occurs early in life, with the highest risk during the first two years, after which its effects are largely irreversible.[96] Stunting is associated with weaker immune responses, and stunted children have elevated morbidity and mortality risks. Stunting is also effectively a marker of the inadequacy of the early childhood environment, and the interdependence between physical growth and cognitive development during the early years of life accounts for the strong association between stunting and lifetime productivity.[97]

According to Chad's 2015 Demographic and Health Survey, 40 percent of children under five are stunted and suffer from chronic malnutrition. Chad's stunting rate is high by the standards of countries with a similar level of GDP per capita (Figure 4.12), and two out of five children reach school age at a potential cognitive disadvantage compared to their non-stunted peers. The incidence of stunting has fell by an average of about 1 percentage point each year from 2004 to 2015 (Figure 4.13), significantly slower that then global rate of stunting reduction over the same period (-2.1 percent).

96 Black et al., 2013

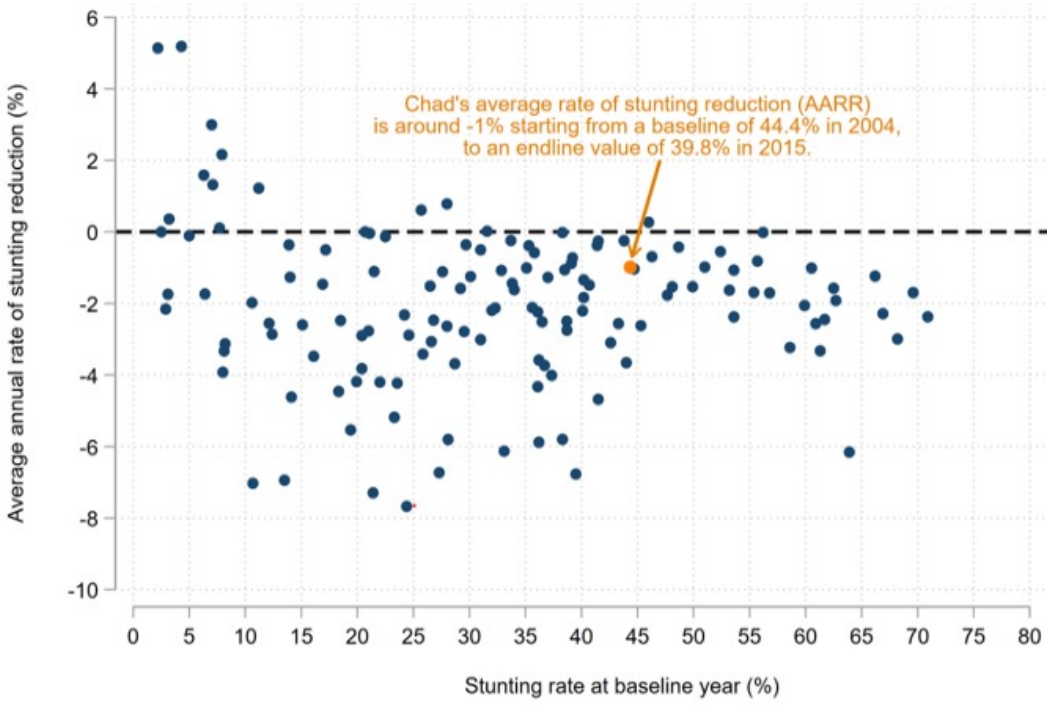
97 Currie and Vogl, 2013; Galasso and Wagstaff, 2019

Figure 4.12 Stunting Rates and GDP per Capita



Source: WDI 2020; DHS 2015.

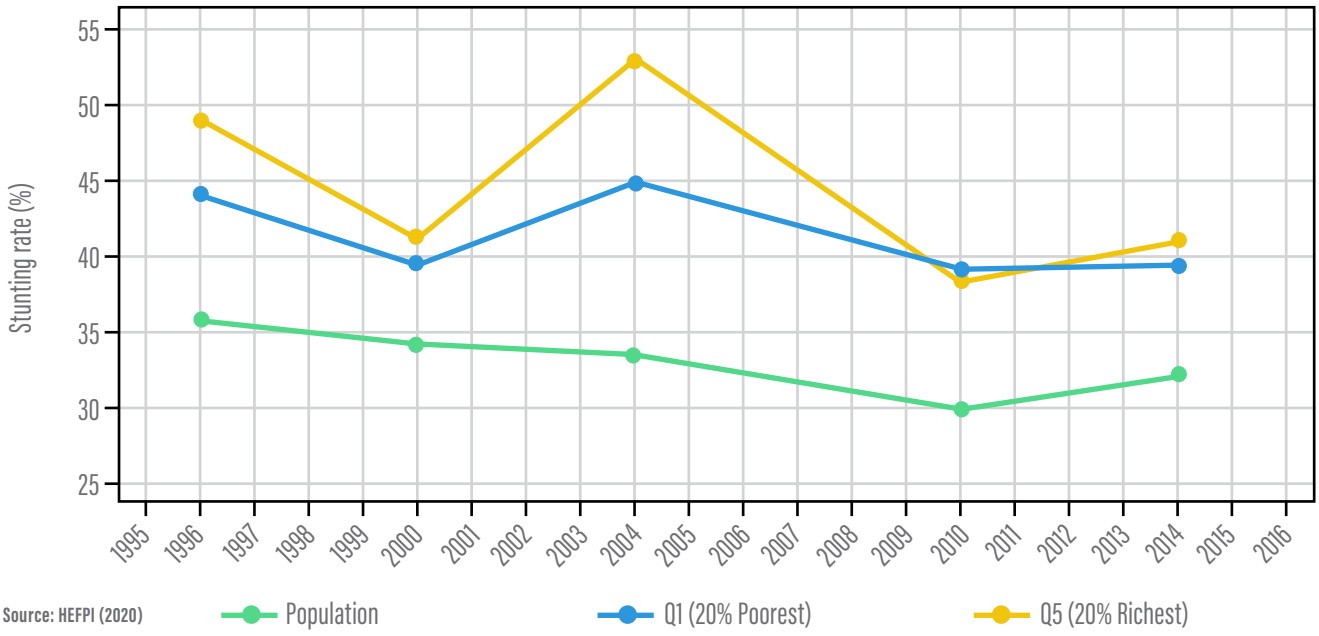
Figure 4.13. Average Annual Change in Stunting Rates



Source: WDI 2020; DHS 2015; MICS 2004.

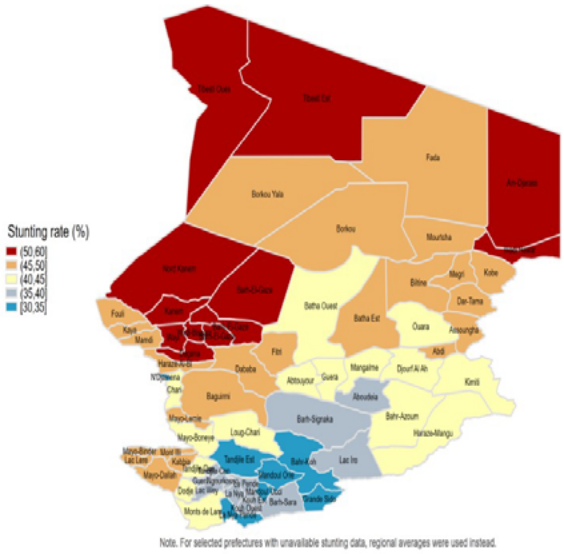
Despite the gradual improvement in stunting rates, large socioeconomic and geographic disparities persist. The large gap in stunting rates between the wealthiest and poorest quintiles has remained broadly consistent in recent decades. In 1996, the stunting rate among households in the poorest quintile was roughly 1.4 times higher than that of households in the wealthiest quintile; the gap widened to 1.5 times in 2004, then narrowed to 1.3 times in 2010 and remained stable until 2014 (Figure 4.14). Stunting is especially common in the Saharan zone, with rates ranging between 45 and 60 percent in Tibesti Est, Tibesti Ouest, Am-Djarass, Kanem Nord, Kanem, Bourkou, Borkou Yala, and Fada (Figure 4.15).

Figure 4.14: Stunting Trends and Inequality



Source: HEFPI (2020)

Figure 4.15: Stunting Rates at the Prefecture Level

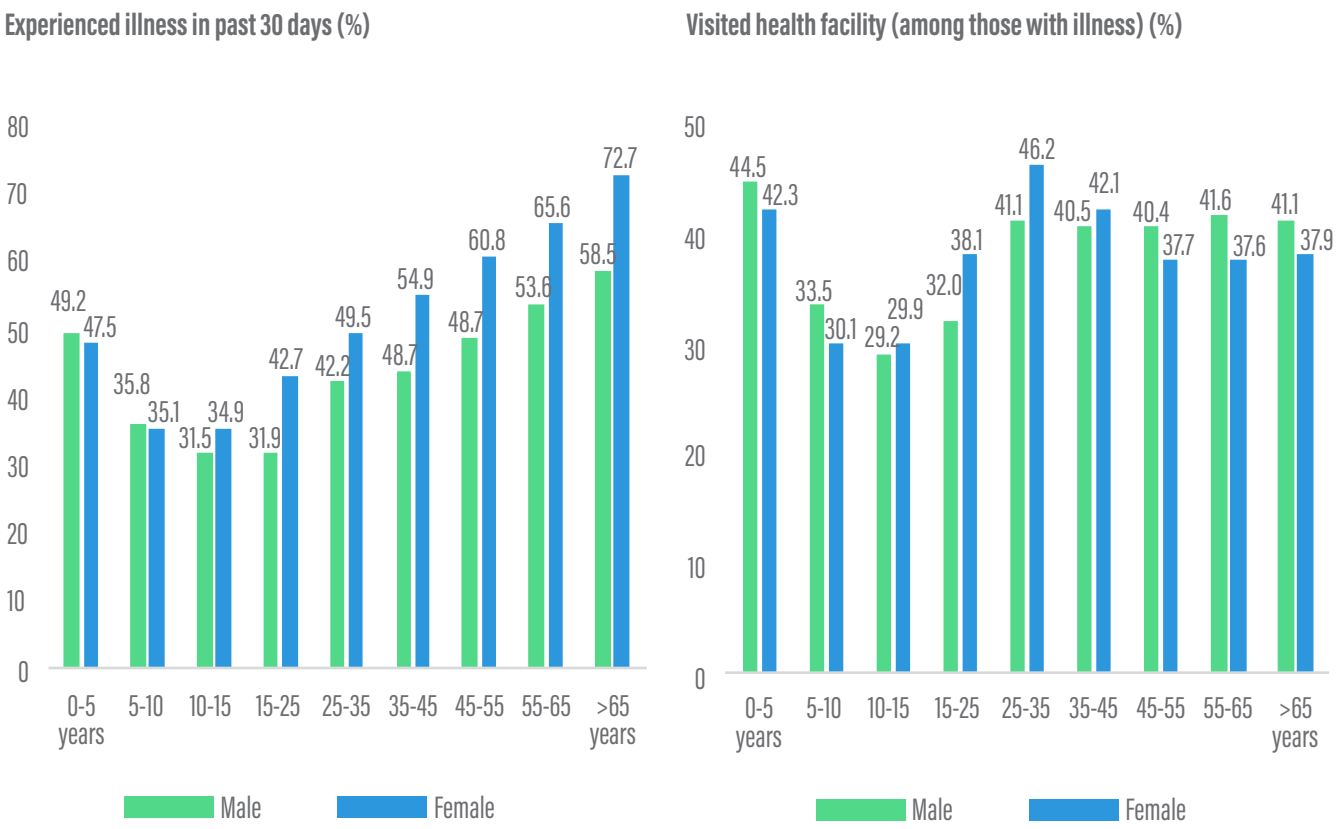


Source: IHME 2017, UN Humanitarian Data Exchange

Like other social services in Chad, access to healthcare varies widely across regions. In 2017, the average distance to a health facility was three kilometers in urban areas and five kilometers in rural areas. Men and women reported having been ill at similar rates, but men appeared to visit health facilities more often. Even though women over 45 experienced illness at a greater rate than men, they visited health facilities less often than their male counterparts (Figure 4.16). Across all wealth quintiles, distance from the nearest health facility was the main reason for not seeking care (Figure 4.17). The second most frequent reason for not seeking care across all wealth quintiles was reliance on self-treatment, though self-treatment was slightly more common among the poorest households.

In addition to inadequate facilities and human resources, the quality of care is a major challenge in Chad's health sector. The problems patients noted most when visiting both public and private health facility were long waiting times, inefficient treatments, and high costs. Public health facilities were generally perceived to have more problems than private ones, with long waiting times being an especially frequent complaint (Figure 4.18). The dearth of healthcare providers is exacerbated by their uneven distribution: of an estimated 4.3 physicians per 100,000 in 2017,[98] over half were based in N'Djamena, along with 88 percent of pharmacists, 100 percent of dentists, and 55.5 percent of midwives.[99]

Figure 4.16 Reported Incidence of Illness and Visits to a Health Facility by Gender and Age Group

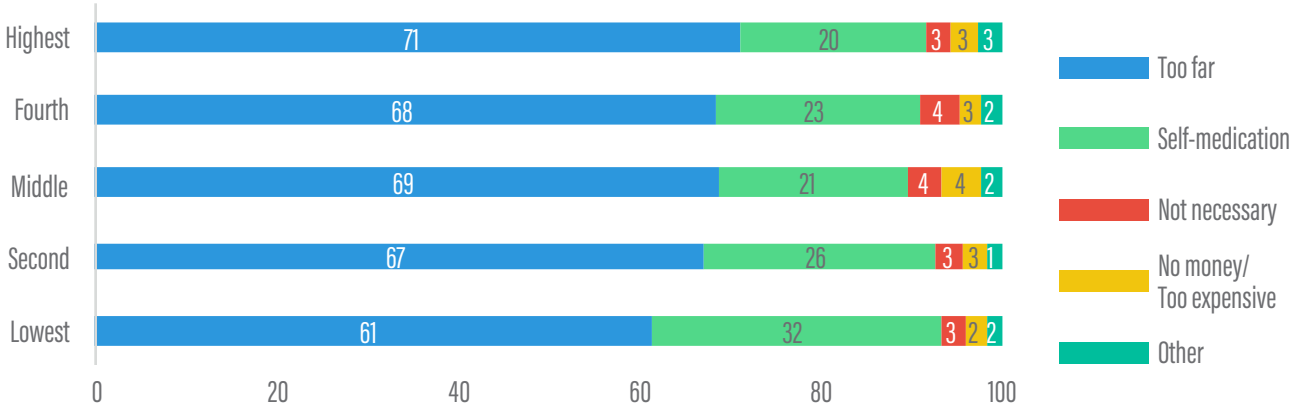


Source: World Bank staff calculation using data from ECOSIT 4

98 World Bank, 2020b

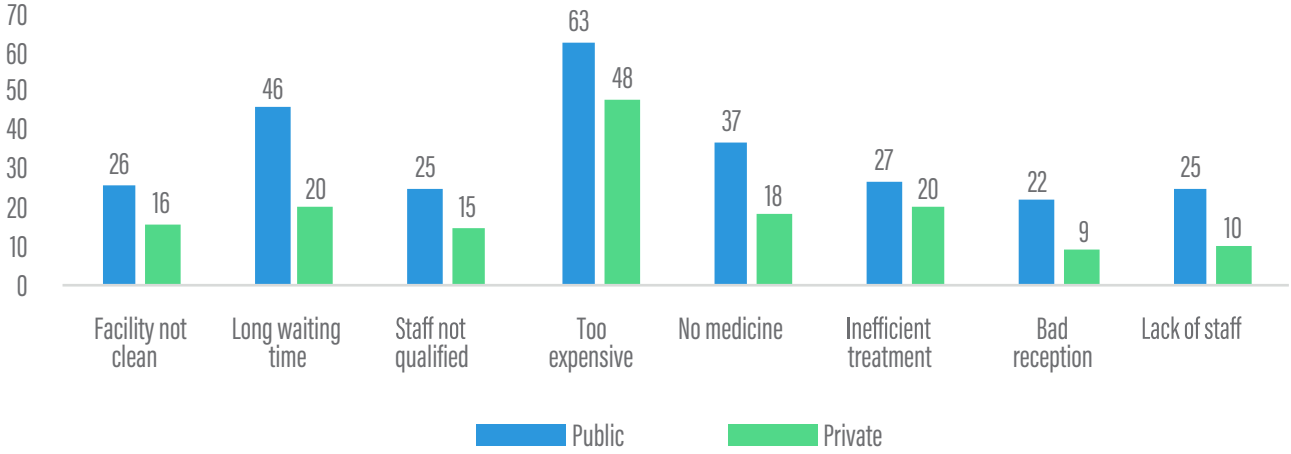
99 (GoC, 2010)

Figure 4.17 Reasons for Not Visiting a Health Facility when Ill by Wealth Quintile



Source: World Bank staff calculation using data from ECOSIT 4

Figure 4.18. Problems Reported at Public and Private Health Facilities



Source: World Bank staff calculation using data from ECOSIT 4

4.4 NUTRITION AND FOOD SECURITY

Chronic food insecurity is widespread in Chad. Approximately 66.2 percent of Chad's population is estimated to be severely food insecure, the highest share in the region.[100] Chad ranks among the bottom ten countries in the Global Hunger Index, and most households are heavily dependent on agriculture and pastoralism for both food and income. High poverty rates, recurrent droughts, desertification and environmental degradation, and increasing insecurity, particularly in the Lake Chad basin, drive chronic food insecurity. Conflict-related displacement has pushed an estimated 4.5 million people into a state of food insecurity, and the number of children at risk of severe acute malnutrition has more than doubled in recent years from an estimated 200,294 in 2017 to 461,186 in 2020.[101] Chad ranks lowest in the region in terms of average dietary energy supply adequacy, indicating that Chadian households are less able to meet their average dietary needs than their peers in other Sahelian countries. However, the relatively modest share of cereals, roots and tubers in the Chadian diet indicates somewhat greater dietary diversity compared to Mali and Burkina Faso, which may be due to higher consumption of protein.

nadequate access to basic drinking water and the high variability of food consumption aggravate food insecurity. In 2017, approximately 39 percent of Chadians had access to basic drinking water, 15 percentage points below the average for nearby comparator countries (Table 4.4). Inadequate access to drinking water increases the incidence of diarrheal diseases, especially in small children, which can compound the effects of malnutrition. Moreover, a comparison of per capita food-supply variability across the region suggests that Chad's food systems are the least resilient to shocks. Consequently, Chadian households are less able than their regional peers to cope with disruptions in the food supply chain.

Table 4.4 Food-Security Indicators across Benchmark Countries

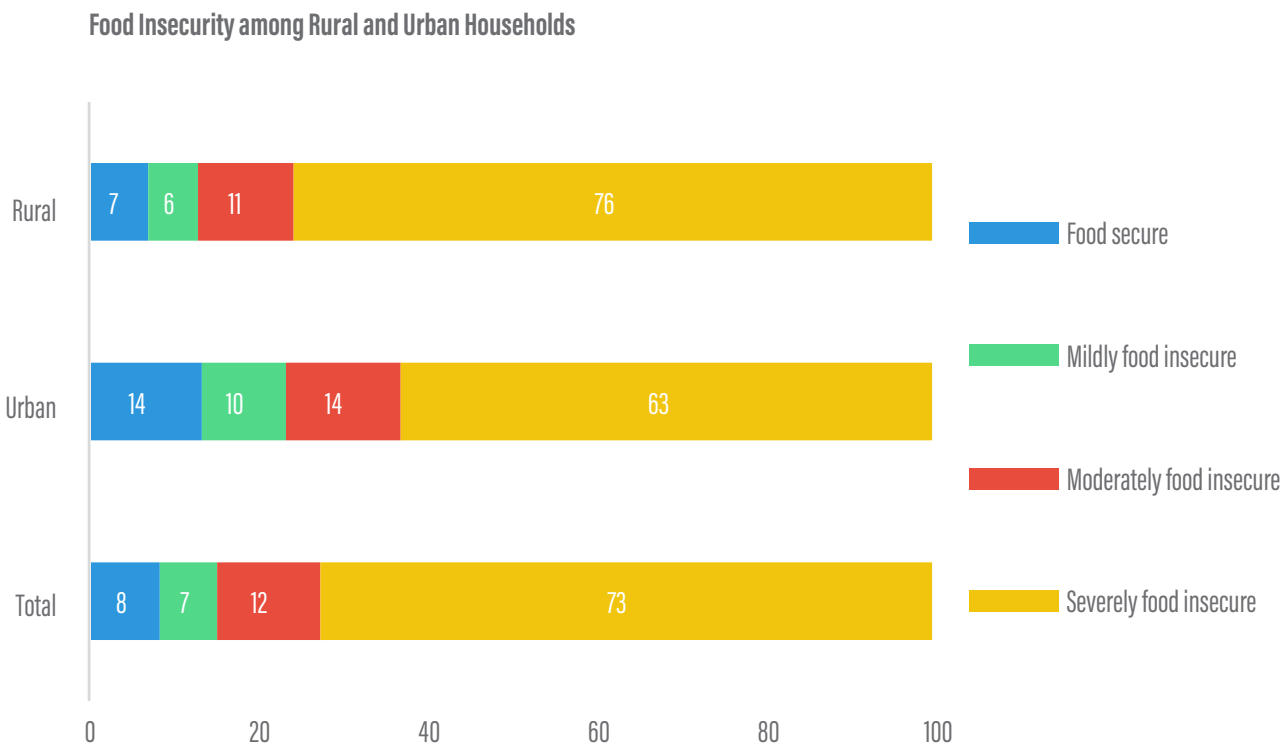
	Average dietary energy supply adequacy	Share of dietary energy supply derived from cereals, roots, and tubers	GDP per capita (in purchasing-power-parity terms)	Per capita food-supply variability	Share of population with access to basic drinking water (%)	Share of female secondary students (%)
Burkina Faso	122	64	2,190	30	48	48.4
Chad	95	62	1,580	31	39	31.3
Mali	135	68	2,327	36	78	44.1
Niger	121	62	1,219	40	50	41.9

Source: FAO (2020)
Note: These figures refer to values recorded in 2017, 2018, and 2019, except the share of dietary energy supply derived from cereals, roots, and tubers, which is for the 2015-17 period. Per capita food supply variability is the standard deviation of per capita food supply (in dietary energy) over the previous five years.

100 WFP, 2020a

101 OCHA, 2019; US Department of State, 2018

Figure 4.19: Food Insecurity among Rural and Urban Households



Source: World Bank staff calculation using data from ECOSIT 4

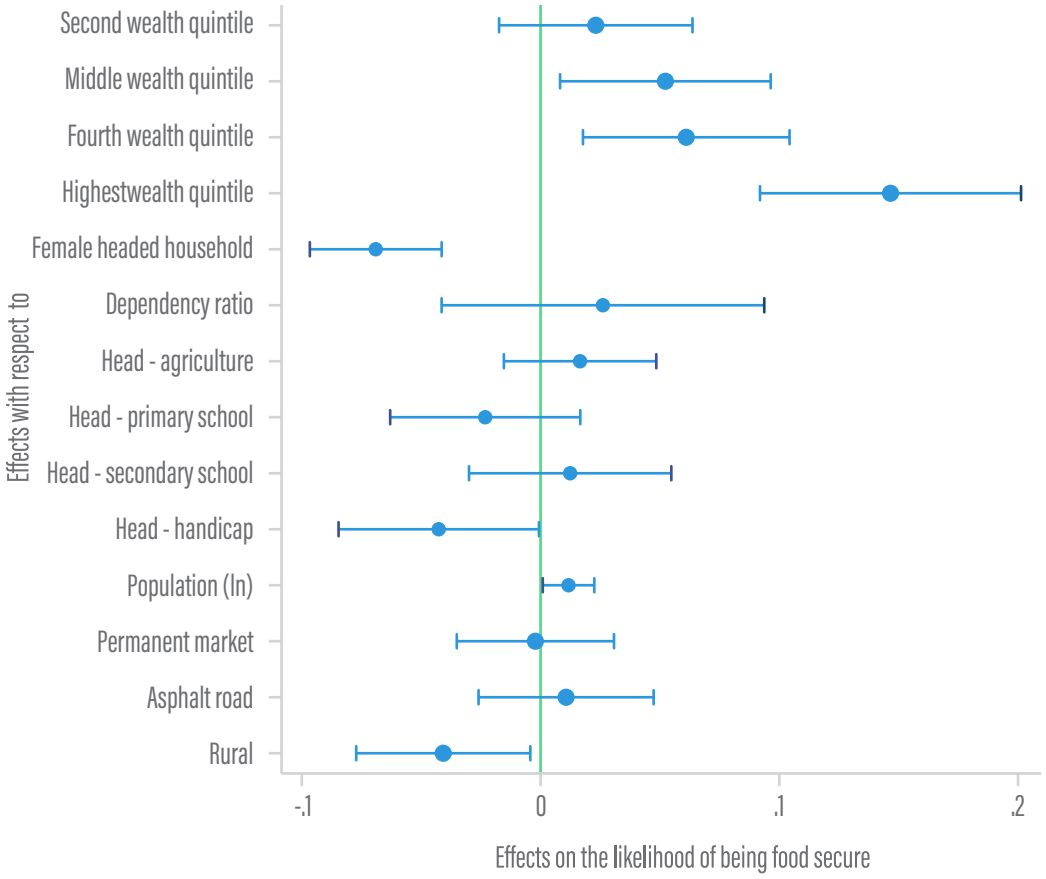
Most Chadian households suffer from severe food insecurity, especially in rural areas. The incidence of severe food insecurity among rural households is 76 percent, compared with 63 percent or urban households. However, both mild and moderate food insecurity are more prevalent in urban areas. Nationwide, just 8 percent of the population is food secure, but this share ranges from 7 percent in rural areas to 14 percent in urban centers (Figure 4.19).

Households in the northern and central regions tend to be more food secure than households in the south. The largely agro-pastoral population of northern and central Chad raises livestock for both food and cash income, and some of the cattle produced in Chad is exported to neighboring countries like Nigeria. Households in the south primarily produce crops, including staple foods like millet and rice and cash crops like cotton. The high levels of food insecurity in southern Chad underscore the precariousness of crop production. Even households in urban N'Djamena tend to be less food secure than those in northern Chad, which likely reflects disparities in average productivity.

Figure 4.20. Average Household Food Security across Regions (0 = insecure and 8 = secure)

Source: World Bank staff calculation using data from ECOSIT 4

Figure 4.21. Correlates of Being Food Secure (logit marginal effects with 95% confidence intervals)



Source: World Bank staff calculation using data from ECOSIT 4

Notes: 'Dependency ratio' is the share of household members under age 15 years or over age 64; 'Population (ln)' is the logged population size of the village or neighborhood; 'Permanent market' and 'Asphalt road' are indicators of the presence of a market or road in the village or neighborhood.

4.5 EDUCATION, HEALTH, AND FOOD SECURITY DURING THE COVID-19 PANDEMIC

Wealthier urban households are the most likely to be food security, while rural households and female-headed households are the most likely to be food insecure. Households headed by an individual who is physically or mentally handicapped are also especially likely to be food insecure (Figure 4.21). Rural/urban disparities are also significant, but the largest gaps are between wealthier and poorer households.

Containment measures adopted in response to the COVID-19 pandemic, including school closures, have had a deeply negative impact on household welfare.[102] In an effort to stop the spread of COVID-19, the government implemented school closures on March 20th, 2020. Schools often constitute both a learning environment and safe place for students, and the suspension of school feeding programs threatens the food security of many children. As of August 2020, an estimated 132,357 children—40 percent of whom were girls—were no longer receiving meals at school.[103] An e-learning platform for secondary school students was set up in April, along with televised broadcasts in French and Arabic.[104] On June 25th schools were allowed to reopen under the conditions that they respect COVID-19 prevention measures.[105] To capture some of the emerging effects of the crisis, the World Bank collaborated with INSEED to conduct a nationally representative high-frequency phone survey targeting a subsample of 2,833 households previously included in the 2018/19 EHCVM. The first round of the survey took place between May and June 2020, and the second round followed between July and August 2020.

School closures at the height of the COVID-19 pandemic left many students without alternative learning options at home. In May 2020, close to two months after schools were closured, almost 90 percent of students were at home and reported no engagement in educational activities (Figure 4.22). This share ranged from 92 percent of students in rural areas to 72 percent in urban centers. Among those students who were able to continue their education during the school closure, the main forms of learning included home lessons with parents or private teachers or classes delivered on television or radio. All these methods were most common among urban students, though rates of online learning were low even in urban areas. Very few students received homework to keep them engaged during school closures. Overall, school closures are expected to result in higher dropout rates and increased risks of early pregnancy, as has been the case during previous emergencies.[106]

102 https://www.presidence.td/fr-synth-1111-Vendredi_le_20_mars_2020.html

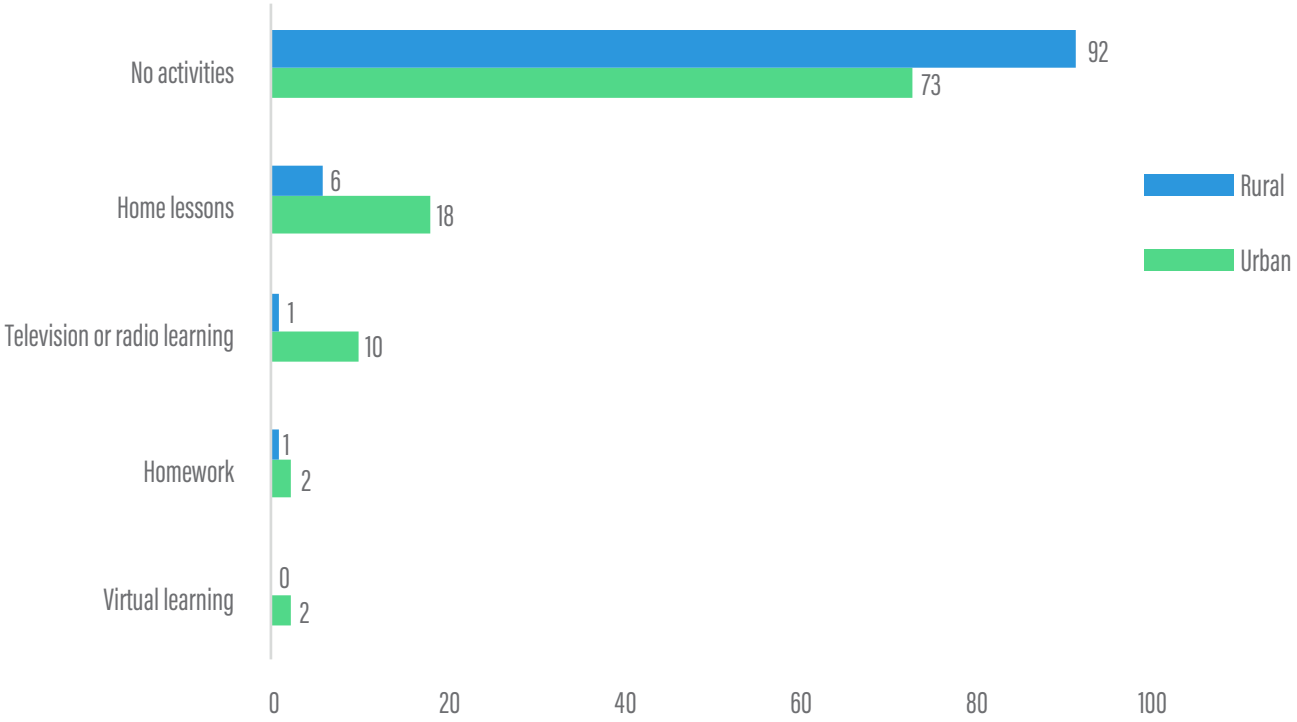
103 World Food Program, 2020b

104 UNESCO, 2020

105 https://reliefweb.int/report/chad/chad-emergency-update-external-23-june-2020

106 Hallgarten, 2020

Figure 4.22 Educational Activities during School Closures as of May 2020

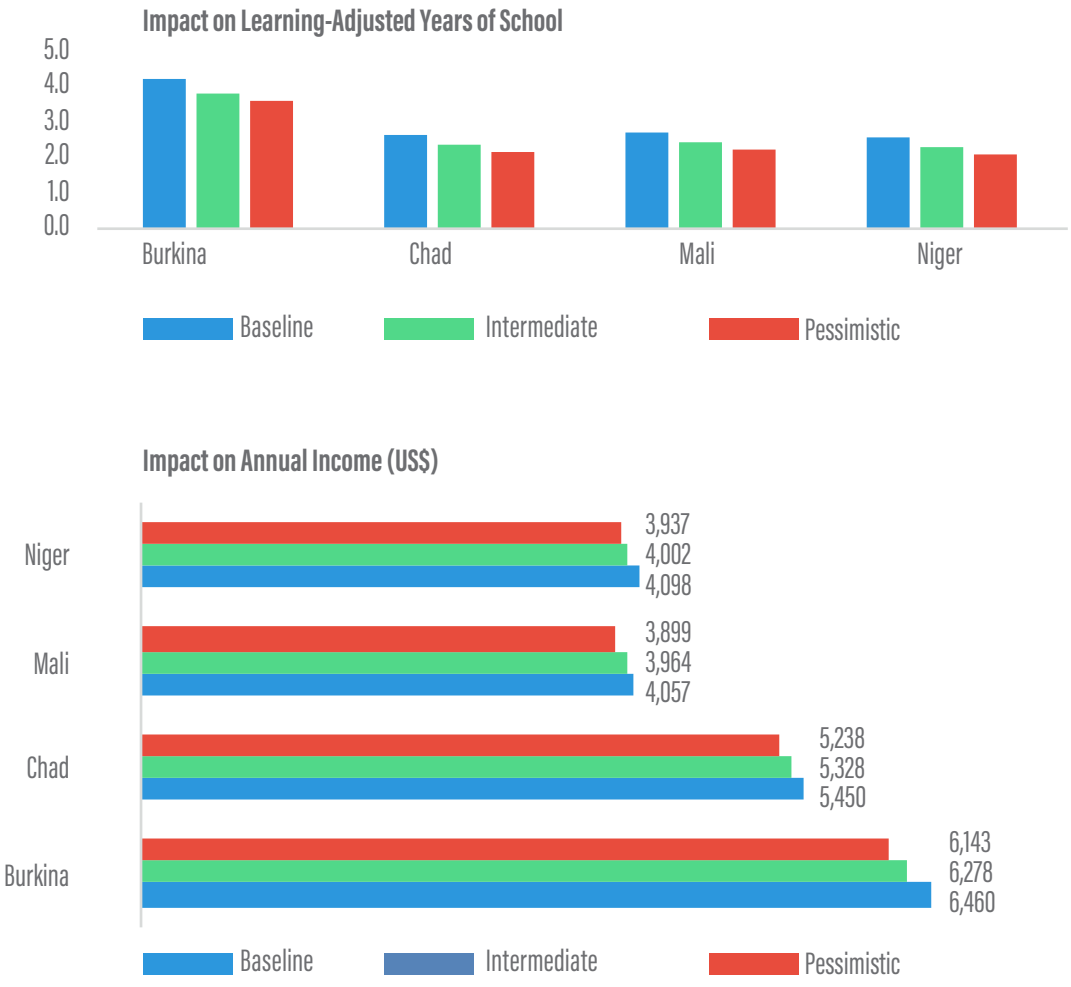


Source: HFPS May 2020

Box 3: Projected Effects of School Closures Due to COVID-19

The COVID-19 pandemic has caused extensive school closures, both worldwide and in Sahelian countries such as Burkina Faso, Chad, Mali, and Niger. While closing schools may have been effective in combating the spread of COVID-19, millions of students have been out of school for extended periods, and shocks to national education systems will likely have adverse effects on learning as well as lifetime productivity and income. The following figure presents the results of simulations based on two scenarios: the intermediate scenario assumes that schools will be closed for 40 percent of the 2020/21 academic year, while in the pessimistic scenario this share rises to 70 percent. The simulations indicate that school closures due to COVID-19 could result in a loss of between 0.3 and 0.6 learning-adjusted years of schooling in Sahelian countries, as well as a loss of future annual income of US$123.1 to US$212.1. In Chad, the projected loss in learning adjusted school years ranges from 2.2 to 2.4, and the projected loss of annual income ranges from US122 to US$212.

Figure 4.23: Projected Effects of School Closures due to COVID-19 in the Sahel

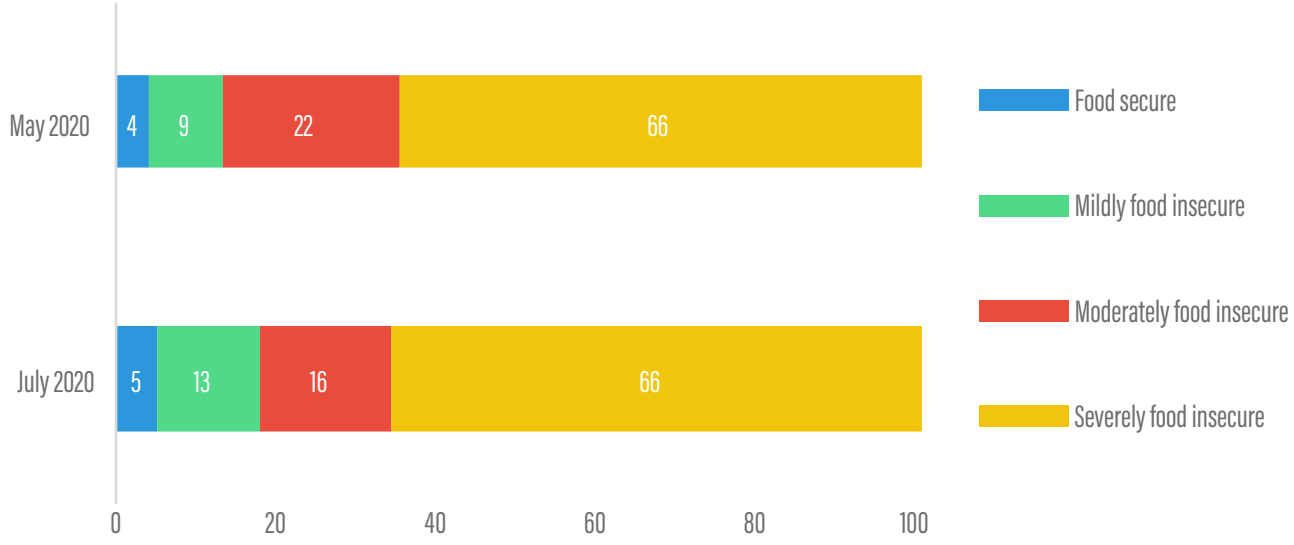


Source: Azevedo et al. (2020); HCI (2017).

The COVID-19 crisis is also likely to exacerbate stunting rates, as well as indicators of acute undernutrition (i.e., wasting), threatening to reverse the gains recently achieved in recent decades and undermine progress on human-capital formation. Estimates from the International Food Policy Research Institute and the World Bank suggest that the pandemic will push between 140 and 150 million people into extreme poverty by 2021. According to the World Food Programme, the number of people in lower-middle-income countries facing acute food insecurity will nearly double to 265 million by the end of 2020. Sharp declines are expected in access to child health and nutrition services, similar to those experienced during the 2014–16 outbreak of Ebola virus disease in West Africa.[107] A consortium of nutrition, economics, food, and health-systems researchers recently projected a pandemic-driven increase in acute malnutrition of over 14 percent worldwide, with over 22 percent of the new malnourished children being in Africa. Without adequate action, the profound impact of the COVID-19 pandemic on early life nutrition could have intergenerational consequences for child growth and development and negative long-term repercussions for education outcomes, chronic disease risks, and overall human-capital formation.

The pandemic has underscored the precarious food-security status of Chadian households, but no significant increase in food insecurity has yet been observed. The high-frequency phone survey included a food-insecurity module in each round, which captured households' experiences over the previous month.[108] These responses were used to categorize households as being food secure or mildly, moderately, or severely food insecure. In May 2020, 88 percent of respondents reported being moderately or severely food insecure, but by July this share had fallen to 82 percent (Figure 4.24). These results are broadly consistent with the findings of the 2018/19 ECOSIT 4 survey, which found that about 85 percent of households were severely or moderately food insecure.

Figure 4.24. Household Food Security during the Covid-19 Pandemic



Source: HFPS 2020

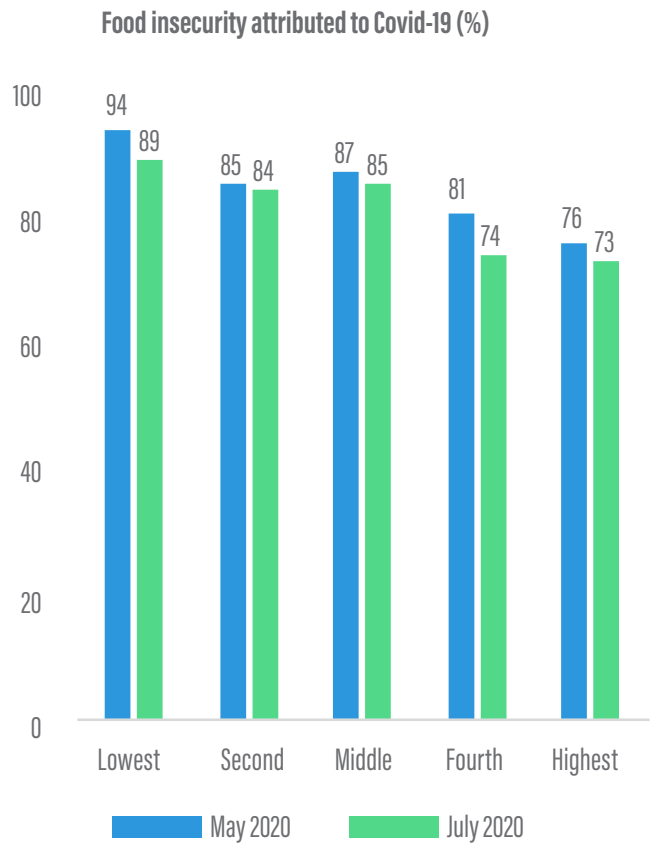
107 Headey et al. (2020) Impacts of COVID-19 on childhood malnutrition and nutrition-related mortality. The Lancet (Vol 396).

108 While the recall period differs between ECOSIT 4 (last 12 months) and the HFPS (last 30 days), a comparison nevertheless provides some useful insight into the immediate impact of the pandemic.

In the months following the onset of the pandemic, poorer households were more likely to attribute food insecurity to the crisis. Two months after the implementation of containment measures, almost 95 percent of food-insecure households in the bottom wealth quintile felt that their food insecurity was due to the crisis, versus just 60 percent of households in the top quintile (Figure 4.25). By July 2020, 90 percent of the poorest food-insecure households continued to attribute their food insecurity to COVID-19, while the share of food-insecure households in top two wealth quintiles that attributed their food insecurity to COVID-19 declined at a marginally faster rate.

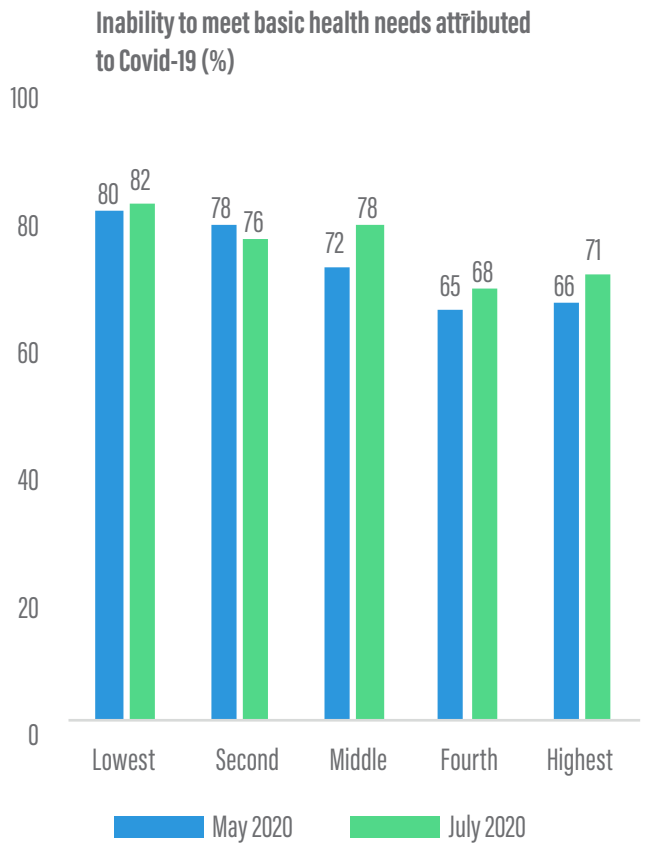
The pandemic affected households' ability to access medical treatment through its impact on incomes. Across both rounds of the high frequency survey, 80-85 percent of households reported not being able to access medical treatment due to lack of money. COVID-19 itself was not

Figure 4.25: Share of Food-Insecure Households that Attribute their Food Insecurity to COVID-19



Source: HFPS 2020

Figure 4.26: Share of Households that Attribute their Inability to Meet Basic Health Needs to COVID-19

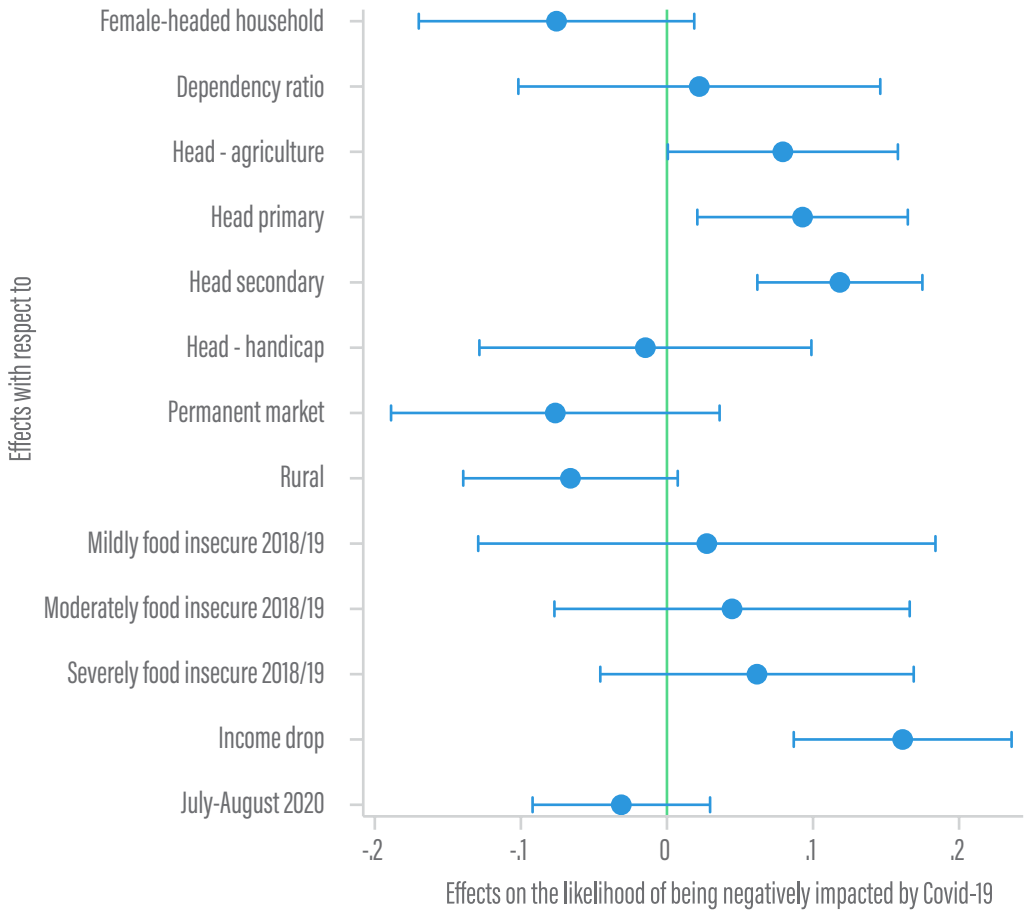


Source: HFPS May 2020

a major deterrent to accessing medical treatment. In May 2020, about 8 percent of households did not access medical treatment because they feared COVID-19, and in July no households reported that COVID-19 had negatively impacted their access to medical treatment. Households in the lower wealth quintiles were more likely to attribute their inability to meet their basic health needs to COVID-19 (Figure 4.26). Households in the higher wealth quintiles also reported that COVID-19 negatively affected their ability to attend to their basic health needs, but not to the same extent as their poorer counterparts.

Households that experienced a reduction in income were significantly more likely to face challenges meeting their basic needs due to the pandemic. The surveys indicate that a recent loss of income is positively associated with the inability to meet basic needs due to COVID-19 (Figure 4.27). By contrast, residing in a rural area significantly decreases the likelihood of being unable to meet basic needs due to COVID-19. The negative impact of COVID-19 on households' ability to meet their basic needs fell between the surveys, but the relationship is not statistically significant.

Figure 4.27 Correlates of Being Unable to Meet Basic Needs Due to COVID-19 (logit marginal effects with 95% confidence intervals)



Source: HFPS 2020

Notes: 'Dependency ratio' is the share of household members under age 15 or over age 64; 'Permanent market' is an indicator of the presence of a market in the village or neighborhood; 'Mildly', 'Moderately', or 'Severely food insecure 2018/19' refers to the household status as captured in EHCVM 2018/19, with 'Food secure' serving as the base group; 'Income drop' refers to self-reported lost income since the start of the COVID-19 crisis; and 'July-August 2020' is an indicator of the second wave of the HFPS.

4.6 CONCLUSION AND POLICY RECOMMENDATIONS

Chad faces enormous challenges, but a successful post-pandemic recovery could lay the foundation for robust and sustainable poverty reduction over the long term. Low levels of human capital are both a cause and a consequence of poverty, as weak education, health, and nutritional outcomes in one generation lead to chronic household vulnerability and underinvestment in the welfare of the next generation, limiting their lifetime productivity and hindering their ability to escape poverty. While these effects manifest at the household level, Chad's extremely low HCI scores reflect decades of conflict, instability, and weak institutional capacity at the national level, and coordinated interventions by the government and its development partners will be necessary to break the cycles of intergenerational poverty that prevent so much of Chad's population from reaching its full potential. To protect and develop Chad's human capital, policymakers must simultaneously expand the supply and improve the quality of education and health services.

As inadequate access is the most binding constraint on education in Chad, the government should consider increasing education spending to at least 20 percent of total spending, the minimum level recommended by the Global Partnership for Education. Additional investment in the sector should focus on building new schools and repairing dilapidated facilities to reduce the average distance to school. Other forms of support, such as subsidized school fees or conditional cash transfers to households in the bottom wealth quintiles, could boost enrollment rates among poor and vulnerable groups. Subsidies and transfers could be especially effective in rural areas, where the high opportunity cost of forgone family labor prevents many households from sending their children to school.

Ensuring equitable access to school will require addressing deep gender disparities in enrollment and completion rates. Although school attendance is associated with fewer hours spent on domestic work, girls continue to spend twice as much more time on household chores compared to boys. In addition, many girls denied access to education by their families due solely to their gender. An estimated 1.5 million girls in Chad are at risk of child marriage and adolescent pregnancy, and girls drop out of school at a higher rate than boys. Consequently, more than 85 percent of all Chadian girls between the ages of 10 and 19 are unlikely to reach their full potential. To change social attitudes towards the role of girls in households, communities, the labor force, and the education system, the government and its development partners should reach out to community leaders and engage in public awareness campaigns that stress the numerous benefits of female education.

Investments in early childhood development are essential to give children a chance to realize their full potential. Research has shown that school attendance among children ages 3-6 provides a critical foundation for both cognitive and social development, and preschool attendance is associated with higher chances of future enrollment in primary school as well as better problem-solving abilities, socio-emotional outcomes, and lifetime earnings.[109] Chad's low rates of preschool enrollment suggest that many children are unable to receive these benefits, and the government's objectives for the education system should include expanded access to early childhood education.

To mitigate the damage to education outcomes caused by the COVID-19 pandemic, the authorities should link social support programs to the reenrollment of school-aged children. Extended school closures threaten to undo recent

109 Martinez et al. 2012; Yoshikawa and Kabay 2015

gains in school enrollment rates. To minimize lost education opportunities, the design of cash transfer programs should incentivize the continued education of out-of-school students, especially girls. The experience of previous health emergencies, such as the West African Ebola virus disease outbreak, suggest that teachers must be prepared to assist students who have fallen behind academically during the period of school closures.

Recognizing the interdependence of education and health outcomes, the World Bank's Education Strategy 2020 prioritizes early investment in childhood education and healthcare. Health interventions in Chad should reflect the recommendations of the Human Capital Index 2020 Update, which focus on expanding health coverage and improving the quality of care, particularly among marginalized communities, and bolstering nutrition and access to sanitation. Improving the utilization of contraceptives will be essential to reduce infant and maternal mortality rates while easing pressure on the health system and enabling the country to reap the benefits of a demographic dividend.

Following the Abuja Declaration, the Government of Chad committed to increase public health spending, but actual expenditures on the health sector remain far below the Abuja target. To maximize the impact of limited resources, the authorities must carefully calibrate personnel spending and investment in health facilities while improving the deployment of health workers. Rural areas are in dire need of health staff and infrastructure, and increased access to skilled health workers could greatly reduce rates of infant and maternal mortality in rural Chad. Investments in health infrastructure and medical supplies could also build trust in the health system and reduce the prevalence of self-treatment. Targeted policies to discourage early marriage and address the low vaccination coverage rates in the north of the country could further improve health outcomes.

The outbreak of the novel coronavirus is an opportunity to build back better health systems and more resilient food systems. Currently, households bear the majority of health expenditures through direct out-of-pocket payments, and cost is a significant deterrent to accessing care. In this context, it is worth investigating the possibility of offering universal health coverage, starting with poor households.

Food security is a critical cross-cutting issue that adversely impacts a wide range of education and health outcomes. The severe food insecurity experienced by many Chadian households underscores the critical importance of increasing agricultural productivity. Despite its vast arable land, Chad does not produce enough food to meet the needs of its population, and it imports the difference. Expanded access to agricultural inputs and new technologies could boost domestic production. Special attention should be paid to female-headed agricultural households and households headed by persons with disabilities, which are among the most likely to be food insecure. The resumption of school feeding programs will also provide crucial nutritional support to children, especially in rural areas.

DATA AND KNOWLEDGE GAPS

Effective policies to reduce poverty and boost shared prosperity must be based on credible information regarding the nature and extent of poverty and inequality, as well as their root causes and social consequences. Producing this information requires data and tools to measure living standards and economic indicators at the household, regional, and national levels, ascertain whether poverty is largely chronic of transitory, and assess the impact of policy interventions on various subsets of the population.[110] Managing-for-Results (M4R) is a public-sector management approach that uses information on performance and results to improve decision making. The approach involves adopting a results-oriented reporting and assessment framework and strengthening the links between development strategies and budget processes. In this context, the ability to produce and disseminate timely and reliable information about the economy and the wellbeing of the population is regarded as a crucial component of good policies and institutions.

Chad's National Five-Year Development Plan (2016-2020) acknowledges the importance of relevant, timely, and high-quality statistics for monitoring and evaluating national policies. A situational analysis conducted for the Chad Statistical Development Project (P159434) uncovered several important weaknesses in the national statistical system. For example, ECOSIT 4 was implemented seven years after the previous national household survey, and in the interim the government and its development partners relied on projections based on outdated data to measure the progress in poverty reduction and shared prosperity. Demographic and households surveys are also infrequent, with gaps far longer than the recommended periodicity of five years. The government has implemented a multiple-indicator cluster survey to fill the gap, but these data are not yet available. Eleven years after the last census, the census data are still not publicly available, and the government has not yet started preparatory work for the next census. Household survey data must be combined with census data to estimate poverty at sufficiently disaggregated levels to improve the targeting of policy interventions. Census data are also needed to scale survey-based estimates up to the national level and make accurate inferences about poverty for the entire population.

The production of sectoral and administrative data must be strengthened. Despite the economic importance of agriculture and livestock, Chad has not conducted an agricultural census since 1974. Moreover, annual projections of agricultural production require a permanent agricultural survey, but the latest livestock survey was done in 2014 and is now obsolete. Similar data gaps affect the economically critical mining and oil sectors. In addition, the production of education and health statistics necessary to monitor

110 World Bank Group. 2015. A Measured Approach to Ending Poverty and Boosting Prosperity: Concepts, Data and the Twin Goals. Washington, DC: The World Bank Group

human capital accumulation is hindered by a lack of funding and insufficient qualified staff.

Diversifying data production is necessary to cover new areas such as enterprises, electricity, digital technologies, fragility and violence, and infrastructure. Chad lacks a permanent enterprises survey to examine the evolution of employment and the growth of the private formal and informal sectors. This information gap must be filled to ensure that policies support the structural transformation of the economy. Electricity access is a key development constraint in Chad, while the adoption of digital technologies presents vital opportunities, yet serious deficiencies in sector-level data prevent policymakers from fully understanding the dynamics surrounding electricity demand and the uptake of digital technologies.

Data constraints also hinder disaster preparedness and response. Each year, Chad faces shocks such as malaria, floods, and seasonal food insecurity that affect large numbers of households, but the lack of early warning systems to inform and guide decision-making does not allow the government to anticipate and proactively react to these situations. The COVID-19 pandemic and its deeply negative impact on household welfare and economic activity has clearly highlighted the importance of such systems.

The Chad Statistical Development Project seeks to strengthen the capacity of INSEED to collect, process and disseminate high-quality data, frequently and in a timely manner. The three basic components of the project are: (i) strengthening institutional capacity while developing human resources; (ii) improving the statistical infrastructure for a timely production of high-quality data; and (iii) improving information technology infrastructure. The results of a midterm evaluation suggest that the implementation of the project has been satisfactory thus far. Lessons from evaluations of similar projects reveal that statistical capacity-building operations that seek to transform a national statistical system tend to have high transaction costs and are slow to produce the intended results. However, the authorities should not lose sight of critical role that data quality plays in effective policymaking.[111]

111 World Bank Group. 2015.

REFERENCES

Abakar, M. F., Seli, D., Lechthaler, F., Schelling, E., Tran, N., Zinsstag, J., & Muñoz, D. C. (2018). Vaccine hesitancy among mobile pastoralists in Chad: a qualitative study. *International journal for equity in health, 17*(1), 167.

Asfaw, S., Davis, B., Dewbre, J., Handa, S., & Winters, P. (2014), "Cash transfer programme, productive activities and labour supply: evidence from a randomised experiment in Kenya", *The Journal of Development Studies, 50*(8), 1172-1196.

Baulch, B. and Hoddinott, J., (2000), "Economic mobility and poverty dynamics in developing countries", *The Journal of Development Studies, 36*(6), pp.1-24.

Calvo, C. and S. Dercon (2013) "Vulnerability to individual and aggregate poverty", Social Choice and Welfare, 41(4), p. 721-740.

Carter, M. R., & Barrett, C. B. (2006), "The economics of poverty traps and persistent poverty: An asset-based approach", *The Journal of Development Studies, 42*(2), 178-199.

Demographics and Health Survey (DHS). n.d. Stat Compiler website. Accessed September 13, 2020 at www.statcompiler.com.

Gavi (The Vaccine Alliance), (2019). Joint appraisal report. Available at https://www.gavi.org/news/document-library/joint-appraisal-chad-2019.

Gehrke, E., & Hartwig, R. (2018), "Productive effects of public works programs: What do we know? What should we know?". *World development*, 107, 111-124.

Government of Chad (GoC), (2017). Plan National de Développement (PND 2017-2021) – République du Tchad.

Government of Chad, (2010). Plan stratégique de développement des ressources humaines pour la santé au Tchad (2011-2020).

Government of Chad, (2019). Rapport sur l'état d'avancement de la mise en œuvre du Plan intérimaire de l'éducation au Tchad (PIET) au cours de l'année 2018.

Greatrex, H., Hansen, J., Garvin, S., Diro, R., Le Guen, M., Blakeley, S., Le Guen M, Rao KN, & Osgood, D. (2015). Scaling up index insurance for smallholder farmers: Recent evidence and insights. CCAFS Report No. 14.

Günther, I., Harttgen, K., (2009) "Estimating households' vulnerability to idiosyncratic and covariate shocks: A novel method applied in Madagascar", *World Development*, 37(7), 1222-1234.

Hallgarten, J. (2020). Evidence on efforts to mitigate the negative educational impact of past disease outbreaks. K4D Helpdesk Report 793. Reading, UK: Education Development Trust. Available at https://www.gov.uk/research-for-development-outputs/evidence-on-efforts-to-mitigate-the-negative-educational-impact-of-past-disease-outbreaks.

Hansen, J., Hellin, J., Rosenstock, T., Fisher, E., Cairns, J., Stirling, C., ... & Campbell, B. (2019), "Climate risk management and rural poverty reduction", *Agricultural Systems*, 172, 28-46.

Hoddinott, J., Quisumbing, R., (2003) "Methods for Microeconometric Risk and Vulnerability Assessments", *Social Protection discussion Paper Series*, No. 0324, World Bank.

Hoddinott, J., (2006), "Shocks and their consequences across and within households in rural Zimbabwe", *The Journal of Development Studies*, 42(2), 301-321.

International Monetary Fund (IMF), (2010). Chad: poverty reduction strategy paper. IMF Country Report No. 10/230. Available at https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Chad-Poverty-Reduction-Strategy-Paper-24073

Jensen, N. D. & C. B. Barrett (2017). "Agricultural Index Insurance for Development." *Applied Economic Perspectives and Policy*, 39.2, pp. 199-219.

Martinez, S., S. Naudeau, and V. Pereira. 2012. The promise of preschool in Africa: A randomized impact Evaluation of early childhood development in rural Mozambique. World Bank: Washington, D.C.

Mills, A., Kurowski, C., Wyss, K., & Abdulla, S. (2010). *Human Resources for Health: Requirements and Availability in the Context of Scaling-Up Priority Interventions in Low-Income Countries* (No. id: 2386).

Obiang-Obounou, B. W., & Fuh, M. E. (2020). The State of Maternal and Infant Health and Mortality in Chad. *African Journal of Reproductive Health*, 24(1), 26-34.

OCHA, (2019). Chad humanitarian situation overview. Available at https://www.humanitarianresponse.info/en/operations/chad/infographic/tchad-aper%C3%A7u-de-la-situation-humanitaire-novembre-2019

PASEC (Progamme d'Analyse des systèmes éducatifs de la confemen), (2014). Education system performance in Francophone sub-Saharan Africa. Available at http://www.pasec.confemen.org/wp-content/uploads/2015/12/Rapport_Pasec2014_GB_webv2.pdf

Sahel Adaptive Social Protection Program: Annual Report 2019. Available at http://documents.worldbank.org/curated/en/680361585895594749/Sahel-Adaptive-Social-Protection-Program-Annual-Report-2019

Stoeffler, Q., Carter, M., Guirkinger, C., & Gelade, W. (2020). "The spillover impact of index insurance on agricultural investment by cotton farmers in Burkina Faso." NBER Working Paper w27564.

UNESCO, (2020). National learning platforms and tools. Available at https://en.unesco.org/covid19/educationresponse/nationalresponses

UNHCR, (2020). Chad emergency update – external. Available at https://data2.unhcr.org/en/documents/download/77305

United Nations Children's Fund (UNICEF), (2016). Maternal and newborn health disparities – Chad. Available at https://data.unicef.org/wp-content/uploads/country_profiles/Chad/country%20profile_TCD.pdf

US Department of State, (2018). Lake Chad Basin: Ongoing food security and displacement crisis. Available at https://hiu.state.gov/#AF,U1780

World Bank, (2018). The Human Capital Project. World Bank: Washington, D.C. Available at https://www.worldbank.org/en/publication/human-capital.

World Bank, (n.d.) Tchad - Francophone Africa Results Monitor – Basic education.

World Bank, 2019. Chad public expenditure analysis – Fiscal space for productive social sectors expenditure.

World Bank, (2020a). *The Human Capital Index 2020* update: Human capital in the time of COVID-19. World Bank: Washington, D.C. Available at https://elibrary.worldbank.org/doi/abs/10.1596/34432.

World Bank, (2020b). World Bank Data Bank. Accessed 25 September 2020 at https://data.worldbank.org/indicator

World Food Programme (WFP), (2020a). WFP Chad country brief – August 2020. Available at https://reliefweb.int/report/chad/wfp-chad-country-brief-august-2020

World Food Programme (WFP), (2020b). Global monitoring of school means during COVID-19 school closures. Available at https://cdn.wfp.org/2020/school-feeding-map/?_ga=2.23544890.1608590319.1587311560-1934460547.1538727870

World Health Organization (WHO), (2019). Available at https://www.who.int/gho/maternal_health/countries/tcd.pdf?ua=1

Yoshikawa, H., and S. Kabay. 2014. The Evidence Base on Early Childhood Care and Education in Global Contexts. Background paper commissioned for the EFA Global Monitoring Report 2015, Education for All 2000-2015: Achievements and Challenges. UNESCO: Paris, France.

Zimmermann, L. (2014), "Public works programs in developing countries have the potential to reduce poverty" *IZA World of Labor*

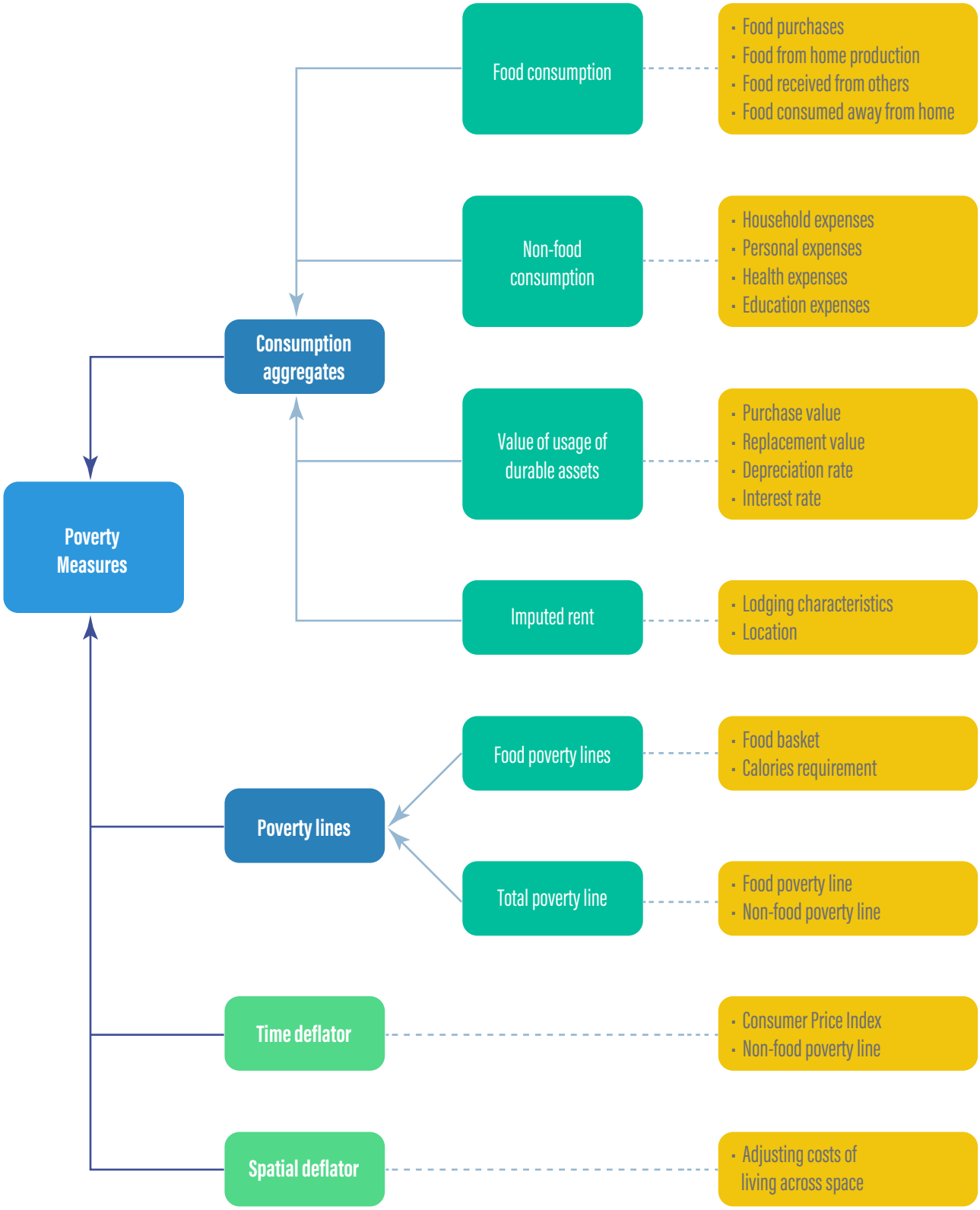
ANNEX A: TECHNICAL NOTE ON POVERTY MEASUREMENT BASED ON ECOSIT 4 (2018/19) DATA

The main objective of this Harmonized Living Conditions Household Survey (EHCVM) is to build capacity in the design, implementation, processing and analysis of survey data for poverty assessment. The households survey was conducted in a sample of 7,500 households in the 23 administrative regions of Chad. The sampling method used for the data collection is a two-stage stratified survey. At the first stage, 625 enumeration areas were randomly selected based on their size. An enumeration was then made in each enumeration area before randomly selecting 12 households from the list of enumerated households. In some enumeration areas, household replacements have been made to compensate for refusals of response or absences from households. A maximum of two replacements was allowed per enumeration area.

In order to obtain information on the community in which the households live and the prices that are applied in their markets, a Community questionnaire and three price records of the main products were carried out in each enumeration area. Ecosit 4 (2018/19) data were collected in two waves, the first from May to July 2018, the second from January to April 2019. Each wave collected half the sample. A break of five months has been observed between the two periods. The two-wave approach was chosen in order to take into account of the seasonality of consumption (both in terms of habits and levels of consumption).

Poverty measurement is the process of generating poverty indicators from survey data. Poverty measurement involves three steps: (i) constructing an indicator for measuring welfare; (ii) constructing a poverty line; and (iii) aggregating the data to produce poverty indicators. This note explains the methodological choices made for the measurement of poverty. The first section explains the approach used to construct the consumption aggregate since **the welfare indicator used is normalized annual per capita household consumption**. The second section explains the methodological approach used to construct the poverty line. The third section analyzes the transition from the consumption aggregate to the welfare indicator by applying different deflators. Lastly, initial results are briefly presented in the fourth section.

Figure A1 summarizes the components of poverty measurement.



1. CONSUMPTION AGGREGATE

The consumption aggregate represents annual household consumption. It is calculated by aggregating food consumption, non-food consumption in non-durable goods and services, the use value of durable goods, and the imputed rent of owner-occupied and rent-free households.

Food consumption is measured over the last seven days (the reference period) preceding the enumerator's visit. It is the sum of household food consumption at home (purchases made and actually consumed, self-consumption of the household's own production, and gifts received and actually consumed) and meals taken away from home. In this survey, food consumption in the household is measured in quantities and meals taken outside the household are reported as values. Food consumption within the household is annualized by multiplying the quantities consumed by 365/7.

The trickiest question therefore concerns the valuation of household food consumption (purchases, auto-consumption and gifts). The survey is designed to use two price vectors: the unit values of the products purchased, and the prices recorded in the markets of the localities where the sampled households live. The first set of information (unit values) is available if the product was purchased by the household within 30 days prior to data collection. When a product was purchased during this period, in addition to providing information on consumption broken down into purchases, auto-consumption, and gifts, the questionnaire also provides information on the last purchase (quantity purchased and corresponding value), which makes it possible to derive the unit value of acquisition. If the product was purchased more than 30 days before the interviewer's visit, the value of the purchase is not provided and therefore no unit value can be obtained. Obviously if consumption of the product within the household comes exclusively from auto-consumption and gifts, no unit value is available either.

Moreover, since consumption is reported in non-standard units (NSU) during data collection, we must also find a way of converting these NSUs into standard units (SU) before applying prices. Obviously, if the data on NSUs is of average or poor quality, this also affects the quality of the consumption data obtained after valuation.

THREE SCENARIOS HAVE BEEN TESTED TO VALUE FOOD CONSUMPTION WITHIN THE HOUSEHOLD

Scenario A: Unit values combined with market prices. For a given product, when a household purchased the product during the last 30 days prior to the enumerator's visit, the valuation of consumption (including auto-consumption and, if applicable, gifts) is calculated using the unit value of acquisition. In this case, there is generally no need to convert quantities into SUs provided the unit of acquisition and the unit of consumption are the same, which happened here in two thirds of cases. If the units are different, conversion to SUs is necessary before consumption can be valued.[112] For households that did not purchase the product within the last 30 days prior to data collection, valuation is based

112 The data collected has ¬¬the following characteristics: for two-thirds of all consumption observations, the unit of consumption and the unit of acquisition are the same (it is therefore not useful to use NSUs); for about 6 percent of all observations, the two units differ, and for 26 percent of all observations, only the unit of consumption is available as there have been no acquisitions in the last 30 days.

on market prices. This is done sequentially. Consumption is first valued using the average price calculated by regional and residential area; if the price is available at this geographical level for this product, the calculation ends. If the information is missing at the previous level, the average price calculated at the level of the Agro-Ecological Zone (AEZ) and place of residence is used.[113] If information is still missing at this level, the price calculated by place of residence (urban or rural) at the national level is used. If the information is missing at the previous level, the average price for the region is used followed by the average price for the AEZ, and finally the national price. It is important to note that all prices are calculated by wave. In other words, Wave 1 prices are not used to value the quantities of a household surveyed in Wave 2 and vice-versa.

Scenario B: Market prices only. In this case, consumption of a given product is first valued using the average price calculated for the region/residential area; if the price is available at this geographical level for this product, the calculation is ends. If the information is missing at the previous level, the average price calculated at the level of the Agro-Ecological Zone (AEZ)/ residential area is used. If information is still missing at this level, the price calculated by place of residence (urban or rural) at the national level is used. If the information is missing at the previous level, the average price for the region is used followed by the average price of the AEZ, and finally the national price. As before, it should be noted that all prices are calculated by wave. It is also important to note that if the choice is made to value quantities by market price, the conversion factors from NSUs to SUs must always be used.

Scenario C: Unit values only. This scenario consists of using unit values exclusively instead of prices. For a given product, when a household has acquired the product by purchase in the last 30 days before the survey agent's visit, the valuation of consumption (including auto-consumption and, if applicable, gifts) is calculated using the unit value of acquisition, as in Scenario A. For households that have not purchased the product in the last 30 days prior to collection, valuation is calculated using the unit values of households that have purchased the product. A vector of unit values is constructed using all possible combinations of product and unit of acquisition. The sequence of the quantity valuation process is the same as in the previous scenario, the only difference being that market prices are replaced by unit values. As information on the product or unit combination is used, conversion factors for converting NSUs to SUs are not needed.

On the basis of these two assessment criteria, it follows that Scenario B should not be selected. Meanwhile, further work is being done using Scenarios A and C. Since the quantities valued are the same for all three scenarios, the weakness of Scenario B lies in the quality of the price data, which may not take sufficient account of differences in product quality. The other possible difficulty with Scenario B is the use of NSUs, another data source that necessarily introduces noise. This will play a role in the choice between Scenarios A and C. Since the latter has the advantage of not using NSUs, this is the scenario chosen here.

113 An AEZ consists of a grouping of regions. This variable was created to be used in the construction of poverty lines and has proved useful in that the use of a single region does not always give robust results because the number of observations may be too small.

Meals taken away from home. Consumption of meals taken away from home is given in terms of value for the last seven days before the interviewer's visit to the household. It is provided for each individual (for meals taken individually) and for the household as a whole for meals taken collectively by several household's members. The total value declared by the household is annualized by multiplying it by 365/7.

At the end of the above valuation process, consumption taken within the household is added to the meals taken away from home to give the total food consumption of the household.

Non-food consumption. Non-food consumption of non-durable goods and services (including education and health) is measured in value terms over a reference period of 7 days, 30 days, 3 months, 6 months, and 12 months depending on the anticipated frequency of consumption of each type of good. The value reported during the reference period is multiplied by a factor taking into account the frequency, or 365/7, 12, 4, 2, and 1, respectively. The important point is to define durable goods as well as exceptional expenditure in order to exclude them in the aggregation of non-food consumption. Durable goods are defined as means of transportation (car, motorcycle, bicycle, etc.), household appliances (television, refrigerator, freezer, oven, washing machine, dishwasher, air conditioner, music system, radio, fans, etc.), large pieces of furniture (sofa and armchair set, dining table and chairs, bookcase, other cupboards, etc.), and electronic appliances and other goods (computer, telephone, mobile phone, cameras, musical instruments such as guitar or piano, motorized gardening equipment, valuable jewelry and watches, carpets, etc.). These goods are excluded from the calculation of food consumption and will be calculated by use value instead. Expenditure on festivities and ceremonies as well as pilgrimages, which are considered exceptional expenditure, are also excluded. The only case in which holiday expenditure is used is for expenditure on clothing and footwear for religious holidays such as Christmas, New Year, Easter, end of Ramadan, Tabaski, etc. The reason for this choice lies in the fact that the clothing acquired during these holidays is real household consumption and not prestige or conspicuous expenditure, which amounts to a transfer to other households. It is also important to stress the classic debate over whether expenditure on education (school fees, costs of supplies, etc.) and health (consultations, medical examinations, medication, hospitalization) constitutes investment in human capital or consumption. The choice was made to include them, as has long been the practice in WAEMU member countries. Nevertheless, expenditure on therapeutic medical devices (crutches, wheelchairs, dentures, prescription glasses, etc.) was excluded from the consumption aggregate. Even if these items were to be included, they would be treated like durable goods.

Use value of durable goods. Durable goods are those that render services to the household over a long period of time after their acquisition. For these goods, the use that is made of them is considered consumption by the household. It is therefore necessary to estimate this consumption, which is called "use value." All goods regarded as durable goods have been defined above. In addition, real estate (land, buildings) and goods mainly intended for economic production (dugout canoes and outboards, hunting rifles, etc.) were ignored.

For goods regarded as durable, the use value is a function of the acquisition value, the age of the goods, the inflation rate, the real interest rate, and economic depreciation. The acquisition value and the age of the good were provided

during the survey, an annual inflation rate of 1% and a real interest rate of 2% were used for all durable goods, and the only unknown parameter was the depreciation rate. For each good and each household owning it, if *vrempla* is the value of the asset replacement cost, *vacqui* is the acquisition value, and age the age of the asset in whole years, the formula for calculating the depreciation rate (*depret*) is as follows:

$$depret = 1 - (\frac{vrempla}{vacqui})^{1/age}$$

The median depreciation rate (*mdpret*) of the asset for all households is then calculated. Finally, if s12q03 is the number of goods of a given type owned by the household and s12q08 is the acquisition price of such goods, the use value of a given good (*depan*) is obtained by applying the following formula:

$$depan = s12q03 * s12q08 * (1.01^{age}) * (mdpret + 0.02)$$

The sum of this variable (*depan*) for all assets owned by a household provides the aggregate of the use value of the household's durable goods.

It is important to note that adjustments are made to the data before calculation: (i) for goods less than one year old, age was assumed to be 0.5; (ii) for goods older than 20 years (less than 3% of observations), age was limited to 20 years; (iii) when the number of goods was not reported and other information was present, the number of observations of the good was imputed by the mode value; and (iv) the acquisition value of outliers was adjusted before proceeding with the calculations (see adjustment of outliers below).

Imputed rent of owner-occupied households. The final component of the consumption aggregate is the imputed rent of owner-occupied and rent-free households. For households, housing is an investment good; when a household has built a dwelling, it consumes it by occupying it. The general approach for estimating imputed rent is the econometric approach. In some cases, where the number of observations was too small, an alternative approach was chosen, which is explained below.

The econometric approach is based on the following principle: since some households are renters, a hedonic housing function is estimated for these households, and this function is used to impute a notional rent to owner-occupied and rent-free households. The explained variable of the model is the logarithm of the rent, the explanatory variables typically being: type of dwelling, number of rooms, type of walls, type of roof, type of floor, type of toilet, presence of electricity in the dwelling, presence of running water in the dwelling, mode of garbage disposal, mode of sewage disposal, and other community variables

such as the existence of a paved road in the locality, the most common mode of transportation in the locality, etc. The model is estimated using the stepwise procedure, which consists of gradually introducing the variables into the model and retaining only those that are significant.

To account for differences in the housing market, the model is estimated separately for the country's capital city, other urban areas, and rural areas. In the capital and other urban areas, the econometric approach is systematically implemented. In rural areas, the housing market is tight, as shown by the low number of renter households in the samples. Thus, the econometric approach cannot produce satisfactory results in rural areas. An alternative approach is used. This consists of calculating the median rent of tenants according to the number of rooms, and this rent is imputed to owner-occupied households occupying a dwelling with the same number of rooms. Here, given the small number of tenant households, the number of rooms variable is recoded into three modalities, for example (1 room, 2 rooms, and 3 or more rooms)

Outlier adjustment. It is always difficult to distinguish between what is an outlier (abnormally high or abnormally low value) and what is simply an atypical value. Improper outlier adjustment can reduce real inequalities in the population. For this reason, adjustments should be made with caution. Here, adjustments were made in two stages: abnormally low values, and abnormally high values. Values that are too low are defined as zero food or zero non-food consumption. Household consumption was calculated according to four main consumption functions: (i) food consumption, including meals taken away from home; (ii) non-food consumption without use value of durable goods and imputed rent; (iii) use value of durable goods; and (iv) imputed rent. Households with a *zero i* or a *zero ii* component were removed from the databases. The logic is simple: it is unlikely that a household has zero food consumption; rather, this household did not complete the interview (in cases of a one-person household, where the householder is often absent) or refused to complete it. Similarly, a household cannot have zero annual non-food consumption, whatever its standard of living. It is necessary to buy even basic goods for everyday consumption (household soap, matches, etc.). As a second step, an adjustment was made for abnormally large values. Contrary to the previous case, this adjustment is made per consumption item. The logarithm of the consumption and the interquartile range are then calculated. A value was considered abnormally large if it is greater than the median of the logarithm of consumption plus 2.5 times the interquartile range (this value is called the "maximum allowed"). These values are adjusted by replacing the value with the maximum allowed (or "trimming"). This choice is made to minimize the impact on inequality.

2. POVERTY LINE

The poverty line is the value of the welfare indicator that allows individuals to satisfy their minimum vital needs. The approach used to construct the poverty line is that of the cost of basic needs.[114] A poverty line is constructed in two steps: (a) calculating the food poverty line; (b) deriving a total poverty line by applying to the food line a share of non-food expenditure.

With regard to the food poverty line, a basket of food items providing each individual with 2,300 kilocalories (which is within the range of the internationally accepted standard for food consumption) is determined. The valuation of this basket provides the food poverty line. Three factors are important in carrying out this task: (i) the reference population for determining the basket; (ii) how the basket is constructed; and (iii) the price vector used to value the basket.

On the first point, the reference population must be households around the poverty line. The objective is to have a reference population that has, as much as possible, the consumption habits of households that are neither too poor nor too well-off. Given that the poverty lines are around 40% in the subregion, the interval from the second to third and the seventh to eighth decile is an acceptable range. Deciles 3 to 8 were used for all countries.

Having adopted a reference population, a national basket was constructed covering 85% of the most consumed food products in this reference population, excluding meals away from home.[115] The basket was constructed based not on nominal expenditure but on annual expenditure for each product adjusted by the spatial deflator (see the calculation of the spatial deflator in Section 3). This ensures that differences in prices do not affect the procedure for constructing the poverty line. Before finalizing the basket, it was verified that it represented at least 70% of the food consumption in each region or Agro-Ecological Zone (AEZ). To obtain the food line, the basket was valued using unit values from the consumption records, the same unit values that were used to value food consumption. These unit values are filled in during the survey as different non-standard consumption units (bottle, basin, plate, heap, etc.). The unit values collected in NSUs are then converted to SUs using the conversion factors from the NSU survey that took place before the main data collection.

114 Ravallion, Martin. 1998. Poverty lines in theory and practice (English). Living standards measurement study (LSMS) working paper ; no. LSM 133. Washington, D.C. : The World Bank.

115 Meals taken outside of the household cannot be used in the construction of the poverty line. The reason is that the process requires a correspondence between quantities consumed and calorie intake, and this information is not available for meals taken outside.

Two non-food poverty lines were calculated, and these led to two overall poverty lines. However, the non-food poverty lines were not calculated directly; instead the total poverty line is calculated using the share of food consumption of households around the food poverty line. The first option consists of determining the non-food component of the poverty line as the share of non-food consumption of households whose total consumption is equal to the poverty line. The second is to determine the non-food component of the food poverty line as the share of non-food consumption of households whose food consumption is equal to the food poverty line. The second solution clearly gives a higher value than the first.

For the first of the two poverty lines (*zref_min*), households around the food poverty line are defined as those with total consumption within plus or minus 10% of the food poverty line; if there are no households in this range, households within plus or minus 20% of the food poverty line are used. If we call *zali* the previously calculated food poverty lines, and *alpha_min* the share of household food consumption whose total per capita consumption is just equal to the food poverty line as defined above, the minimum poverty line is given by:

$$zref_{min} = zali * (2 - alpha\_min)$$

For the second of the two thresholds (*zref_max*), households around the food poverty line are defined as those with food consumption within plus or minus 10% of the food poverty line; as before, if there are no households in this range, households falling within plus or minus 20% of the food poverty line are used. If we call *alpha_max* the share of household food consumption whose per capita food consumption is just equal to the food poverty line as defined above, the maximum non-food poverty line is given by:

$$zref_{max} = zali/alpha\_max$$

3. HOUSEHOLD COMPOSITION, TEMPORAL AND SPATIAL DEFLATORS, AND INDICATORS OF WELFARE

The consumption aggregate is not an indicator of welfare because it does not allow for a fair comparison between households. Households are of different sizes and compositions and face different prices depending on when the data was collected and where household members live. The welfare indicator must therefore take all these factors into account.

Household composition and size. The first element to consider is the size and composition of households. Here, household composition was ignored and only size was taken into account. Household composition should be reflected by an equivalence scale, and there is no consensus regarding the best approach to deriving an equivalence scale. Moreover, virtually all countries concerned have adopted the practice of only taking household size into account. Thus the consumption aggregate is divided by household size to yield annual per capita consumption. Nevertheless, for the purpose of carrying out sensitivity tests such as ranking regions in terms of poverty levels, two equivalence scales were calculated since it is easy to produce poverty figures using either one.

Time deflator. The second element to consider is the time at which the data is collected in the household. Nine months elapsed between the start of data collection and completion of this process. Data collection for the first wave took place in several of the countries immediately following the harvest, and data collection for the second wave took place in the period well away from the harvest. During the collection period, consumer prices changed. Consumption was normalized using a time index. To do this, the national household final consumer price index is an effective tool. Chad has regional indices that could have been used as part of this process, but their coverage is limited as they tend to focus on Ndjamena, with secondary cities and rural areas less well represented.

To calculate time deflators, if we call IPC_i the consumer price index at month i, i=1, ..., n the period of n collection months, we can calculate IPC as the average index during the collection period by:

$$IPC = \frac{1}{n}\sum_i^n IPC_i$$

The time deflator for each collection month is given by:

$$\text{def}\ \_temp_i = IPC_i / IPC$$

It was pointed out above that the time deflator is applied to the annual consumption of each product before the construction of the poverty line. Thus, for a household k surveyed in month i, the annual expenditure of product m (*depan*) is normalized by the following formula:

$$depan'_{kim} = {depan_{kim}}/{\text{def}\ \_temp_i}$$

Spatial deflator. It is advisable to also apply a spatial deflator so as to take into account disparities in the cost of living between different regions and localities in the country. A natural candidate is the regional price index, or at least the prices underlying these calculations. However, as noted above, prices collected at regional level show low coverage of small urban centers and rural areas. A test was conducted in order to use these as a deflator. As poverty rates of over 70% were obtained in some countries, the idea was abandoned. The poverty lines constructed by AEZ and area of residence were used as spatial deflators. The approach to constructing poverty lines by AEZ and area of residence was the same as that for constructing the national poverty line and the same national basket was used. This basket was valued using the average unit values of the AEZ and areas for the food poverty line. The non-food poverty line was also constructed by AEZ and area using the same approach as above. In other words, for the non-food poverty line, given that the average of the minimum and maximum poverty lines was used as the non-food poverty line, the same approach was followed. If we call *zzaej* the poverty line of the AEZ and areas j, *def_spa* the spatial deflator of the AEZ and areas j is the ratio of the threshold of AEZ or area j to the national threshold:

$$\text{def\_}spa_j = zzae_j / \; zref$$

Finally, for a household k surveyed in month i and belonging to AEZ/area of residence j, if we call $dtot_k$ the total annual consumption of the household and $hhsize_k$ the household size, the welfare measure indicator is:

$$pcexp_k = {dtot_k}\Big/{(\text{hhsize}_k * \text{def } \_temp_i * \text{def } \_spa_j)}$$

4. SYNTHESIS OF RESULTS

The indicator of poverty easiest to calculate is the incidence of poverty, which is the percentage of people living below the poverty line. The incidence of poverty depends on the chosen poverty line. Each country should have a national poverty line. This line is important for monitoring and evaluating public policies to combat poverty in the country. The line depends on national standards, including consumption preferences and the cost of living. The incidence of poverty according to the national poverty line is that used for poverty diagnoses in national documents such as development plans or poverty reduction strategies. However, this poverty incidence is not directly comparable with that of any other country because it depends on the national poverty line, which takes into account specific norms and preferences.

For international comparisons and the monitoring of the Sustainable Development Goals (SDG), international poverty lines are more appropriate. The extreme poverty line is US$1.90 per person per day at 2011 purchasing power parity (PPP). Here, this line was converted in FCFA taking into account the increase in the cost of living as measured by inflation between 2011 and 2018. It is important to note that the first SDG target (Eradicating Extreme Poverty by 2030) uses the above extreme poverty line.

The ECOSIT 4 survey is important for Chad. The survey was designed not only to produce poverty indicators but, more importantly, to generate data for in-depth analytical work designed to assess poverty in its many dimensions. On the basis of the production of the poverty figures, one of the objectives of the project has been achieved; it is now a matter for the countries concerned to add value to the data. Nevertheless, it is important to stress that survey data is never perfect, especially in African countries, where the level of literacy remains average. In this project, the price data is of average quality. An assessment of the survey will allow for lessons to be learned from this first round in the work in order to improve the next one.

ANNEX B: SURVEY-TO-SURVEY IMPUTATION METHODOLOGY

The survey to survey imputation follows the methodology proposed by Elbers, Lanjouw, and Lanjouw (2003). It is a two stages methodology. In the first stage, a model of log per capita household consumption is estimated based on the 2018 EHCVM data, the survey for which the welfare indicator is available. The welfare indicator is regressed on a set of explanatory variables including demographic, labor, and housing characteristics. These explanatory variables are selected such that they are available and comparable over the two surveys, the EHCVM and the DHS (used at the second stage). The list of the explanatory variables included in the regression is provided in Table 1 below. These explanatory variables are selected from a larger list given the significance of their parameter in the regression model.

The first stage model accounts for the design of the household survey. It allows the clustering of households and their dependence on one another within a cluster, the primary sampling unit of the two surveys. As a result, the stochastic error component of the model can be decomposed into a cluster-specific effect and a household specific-effect. The parameters of the model are estimated through Generalized Least Square (GLS) to account for heteroscedasticity. The model is given by

$$\log y_{ij} = \alpha + \beta X_{ij} + \epsilon_{ij}$$

With log y_{ij} the log per capita consumption and X_{ij} a set of characteristics of household i in cluster j. The error term is composed of two independent components, that is $\epsilon_{ij}=\mu_j+\varepsilon_{ij}.\mu_j$ is a cluster specific error, and ε_{ij} is a household specific or idiosyncratic error term. The regression results are reported in Table B.2 below.

In the second stage, the estimated parameters of the first stage model are used to impute household consumption in the 2014 DHS survey. This is possible since the same explanatory variables used for the estimation are also available in the DHS survey. This step accounts for the stochastic nature of the parameters, especially the error component. Indeed, an imputed value of consumption for each household is the sum of predicted consumption and error term. The latter is randomly drawn from the empirical distribution of the stochastic error. This imputation is repeated 100 times, and at each time, poverty indicators are estimated. The mean and the standard deviation over the 100 simulations are treated as the point estimate of poverty and its standard error.

Table B.1 : Summary statistics for households and communities

Variables	Year	Mean	Standard error
Share of dependent	2014	0.572	0.0028
	0.870	0.875	0.884
Household has electricity	2014	0.089	0.0100
	2018	0.094	0.0075
Household size	2014	7.879	0.0967
	2018	6.883	0.0815
Roof is in straw	2014	0.695	0.0175
	2018	0.643	0.0158
Household has a car	2014	0.027	0.0033
	2018	0.020	0.0025
Household has a radio	2014	0.439	0.0116
	2018	0.228	0.0090
Squared household size	2014	80.533	2.7574
	2018	59.467	1.9730
Household has no toilet	2014	0.690	0.0182
	2018	0.645	0.0169
Number of people per room	2014	3.407	0.0329
	2018	3.112	0.0475
Household has a well	2014	0.717	0.0139
	2018	0.747	0.0145

Variables	Year	Mean	Standard error
Household has a TV	2014	0.092	0.0099
	2018	0.063	0.0057
Household head is female	2014	0.172	0.0062
	2018	0.180	0.0068
Household head has a primary education level	2014	0.227	0.0101
	2018	0.149	0.0086
Household members aged 15-16	2014	3.201	0.0498
	2018	2.837	0.0430
Household has flush toilet	2014	0.015	0.0024
	2018	0.016	0.0028
Household head has a secondary education level	2014	0.160	0.0074
	2018	0.135	0.0083
Banco wall	2014	0.114	0.0084
	2018	0.656	0.0153
Ground floor	2014	0.869	0.0103
	2018	0.914	0.0073
Has refrigerator	2014	0.023	0.0040
	2018	0.024	0.0030
Household members aged 65+	2014	0.161	0.0062
	2018	0.128	0.0062
Age of household head	2014	44.187	0.2130
	2018	43.808	0.2358
Wall is in concrete	2014	0.215	0.0133
	2018	0.027	0.0032

Table B.2 : GLS and OLS regression results of per capita consumption

Variables	bGLS	bOLS
Age of household head	-0.002	-0.001
Household head is female	-0.100	-0.102
Household head has a primary education level	-0.037	-0.091
Household has a well	-0.086	-0.092
Household has electricity	0.169	0.195
Number of people per room	-0.041	-0.028
Share of household members aged 15 to 64	-0.046	-0.053
Share of household members aged 65+	0.057	0.063
Roof made in mud	-0.121	-0.070
Household has a TV	0.137	0.152
Household has flush toilet	0.161	0.209
Household has no toilet	-0.067	-0.079
Roof is in straw	-0.168	-0.185
Household has a car	0.549	0.590
Household has a radio	0.167	0.172
Household has refrigerator	0.192	0.137
Share of dependent	-0.679	-0.724
Household size	-0.081	-0.076
Squared household size	0.002	0.002
zone	-0.091	-0.072
_cons	14.162	14.044

ANNEX C: MULTIDIMENSIONAL POVERTY IN CHAD

Multidimensional poverty is an expansive measure of wellbeing that extends beyond income per capita. The multidimensional poverty index (MPI) described below tracks deprivation along six dimensions: (i) education, (ii) health, (iii) childhood and youth, (iv) access to basic services, (v) housing conditions, and (vi) assets (Table C.1). The six dimensions are equally weighted, and all indicators are equally weighted within their respective dimensions. The MPI score is the product of the incidence of deprivation (H) and the average intensity of deprivation (A). More specifically, H represents the share of the population that is deprived under at least one-third of the six dimensions of the MPI, and A is the extent of the deprivation experienced by deprived households.

Table C.1 : MPI : Dimensions, Indicators, Deprivation, and Weights

Dimension	Indicator	Definition of Deprivation	Weight
Education	Years of schooling	Household members over age 15 have an average of less than nine years of schooling	1/12
		Any household member over age 15 years cannot read and write	1/12
Children and youth	School attendance	Household has at least one child between age 6 and 16 not attending school	1/18
	Child labor	Household has at least one child between age 7 and 17 with fewer completed years of schooling than the national average	1/18
		Household has at least one child between age 12 and 17 who works	1/18
Access to basic services	Improved cooking fuel	Household uses solid fuels and biomass (e.g., charcoal, wood, etc.) for cooking	1/24
	Improved water source	Household lacks access to an improved drinking-water source (piped water, borehole, public taps/standpipes, protected well)	1/24
	Improved sanitation	Household's sanitation facilities do not include flush toilets or latrines	1/24
	Electricity	Household lacks access to an electricity source (grid, generator, solar)	1/24

Dimension	Indicator	Definition of Deprivation	Weight
Housing conditions	Improved floor	Floor made of natural or low-quality materials, including mud, wood, straw, metal sheet, sand, dung, etc.	1/24
	Improved wall	Walls made of natural or low-quality materials	1/24
	Improved roof	Roof made of natural or low-quality materials	1/24
	Critical overcrowding	Four or more individual per room	1/24
Health	Healthcare access	At least one household member required healthcare in the past 30 days but did not seek care from a physician, specialist, or any health institution	1/18
	Health specialist	At least one household member experienced an illness in the last 30 days and did not seek specialized services	1/18
	Waste management	Household disposes of domestic waste by natural or rudimentary means, including incineration or open dumping	1/18
Assets	Modern asset ownership	Household does not own more than one modern asset (radio, TV, telephone, bike, motorbike, refrigerator, computer, or animal cart) and does not own a car or truck	1/6

Source: World Bank staff calculation using data from ECOSIT 4
Note: HH=household

C.1 INCIDENCE AND PROFILE OF MULTIDIMENSIONAL POVERTY

Multidimensional poverty is widespread in Chad. About 89 percent of the population is deprived in at least one-third of the MPI's six dimensions of wellbeing. Multidimensional poverty rates higher for women than men, and poor women suffer more intense deprivation than their male counterparts (Table C.2). Multidimensional poverty rates vary by location, ranging from 39 percent in N'Djamena to 78 percent in other urban centers and reaching 97 percent in rural areas. Moreover, the rural poor suffer more intense deprivation than their counterparts in N'Djamena and in other urban areas.

Educational deprivation is the largest contributor to Chad's high MPI scores, followed by inadequate access to basic services. Educational deprivation contributes 21 percent to overall multidimensional poverty in Chad, and inadequate access to basic services contributes almost 20 percent. Greater investment in education infrastructure and basic services could substantially reduce multidimensional poverty, especially in rural areas.

Table C.2: Multidimensional Poverty in Chad, 2018

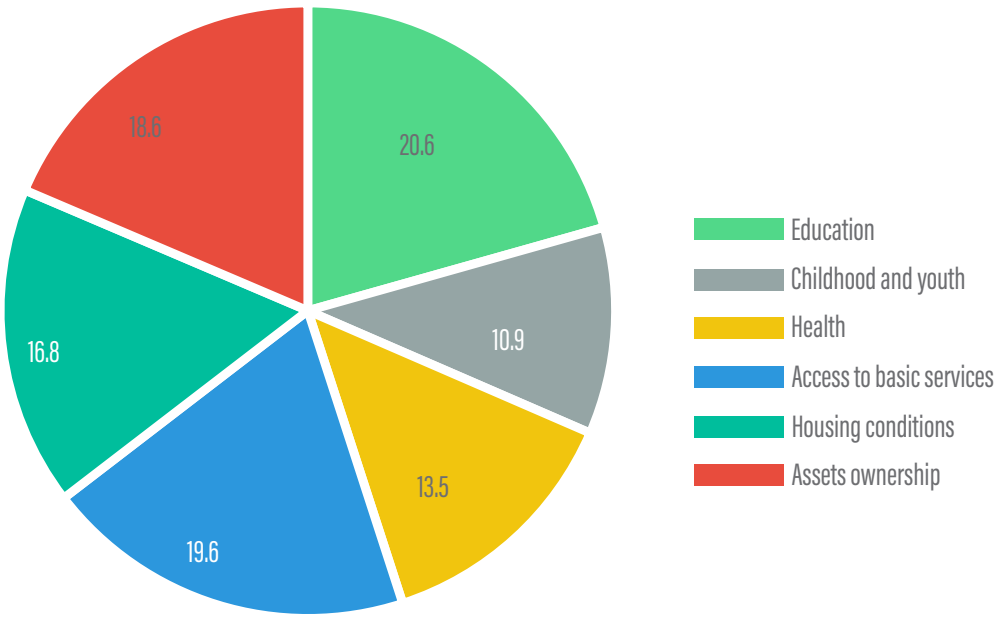
		MPI	Headcount Rate	Average Intensity
Chad		58.7	88.8	66.1
Gender	Female	62.8	91.5	68.7
	Male	57.7	88.2	65.5
Location	N'Djamena	18.2	38.6	47.2
	Other Urban	43.3	77.9	55.6
	Rural	66.8	97.3	68.7

Households headed by administrative or service workers are less likely to experience multidimensional poverty than are households headed by agricultural workers. Most agricultural workers live in rural areas with limited access to infrastructure and services, education, healthcare, and quality housing. Moreover, many smallholder farmers and rural laborers are also poor in monetary terms, which prevents them from acquiring modern assets. As a result, households headed by agricultural workers face intense deprivation and are at high risk of multidimensional poverty. Households headed by manufacturing, construction, or transportation workers also have high multidimensional poverty rates, as these sectors often employ unskilled informal workers at low wages in relatively costly urban areas (Figure C.1b).

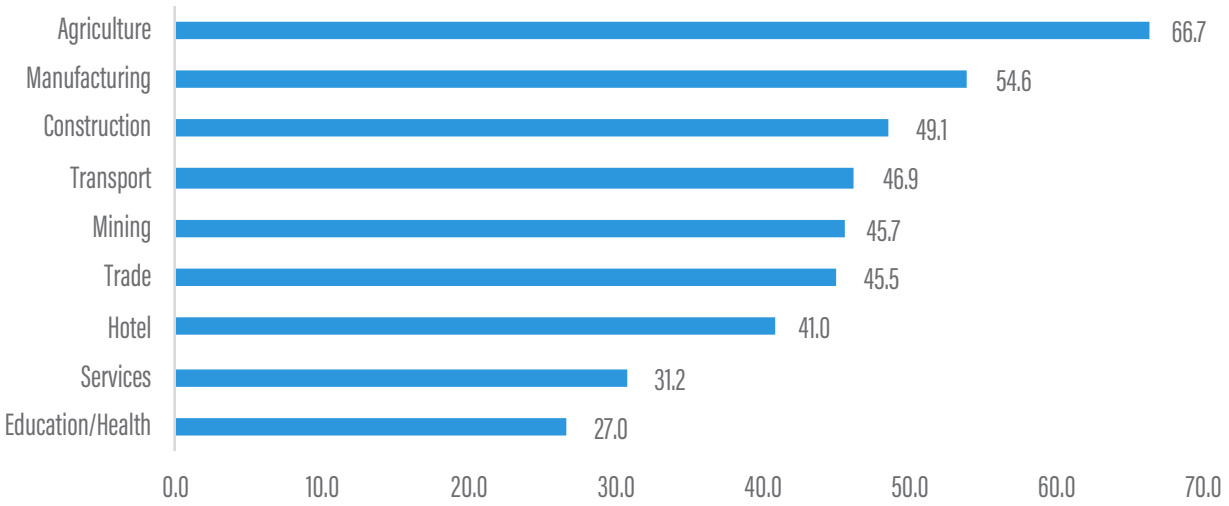
Educational attainment is strongly associated with multidimensional poverty. MPI scores range from 65.8 percent among households headed by a person with no education to 11.8 percent among households headed by a person with university education. Moreover, low levels of educational attainment are also correlated with more intense deprivation: MPI intensity ranges from 69 percent among multidimensionally poor households headed by a person with no education to 42 percent among those headed by a person with a university education.

Figure C.1: Multidimensional Poverty in Chad

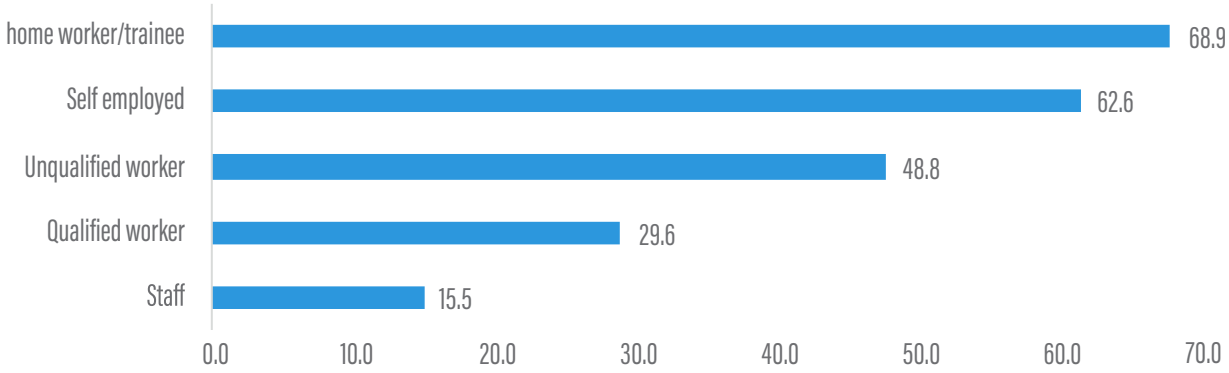
(a) MPI Decomposition



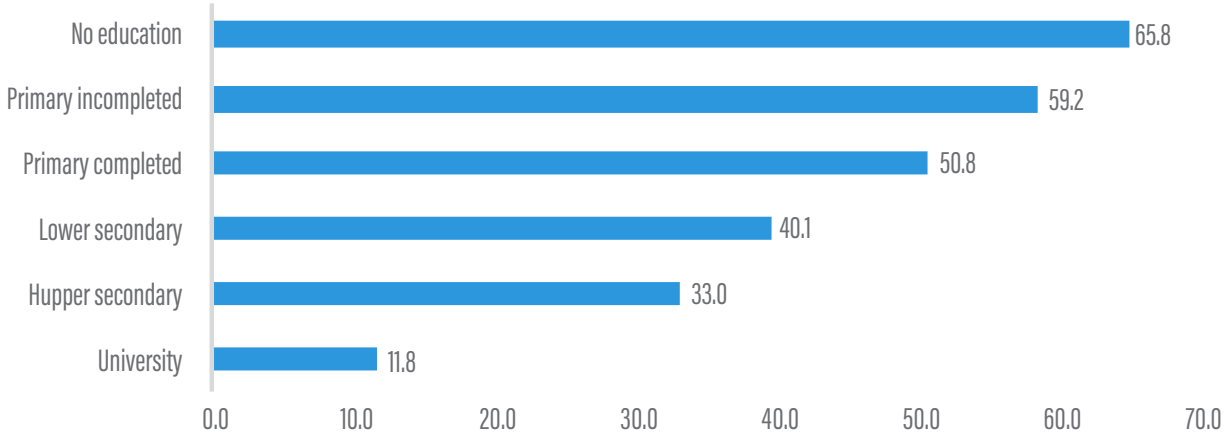
(b) MPI by Economic Sector of Household Head



(c) MPI by Employment Status of Household Head



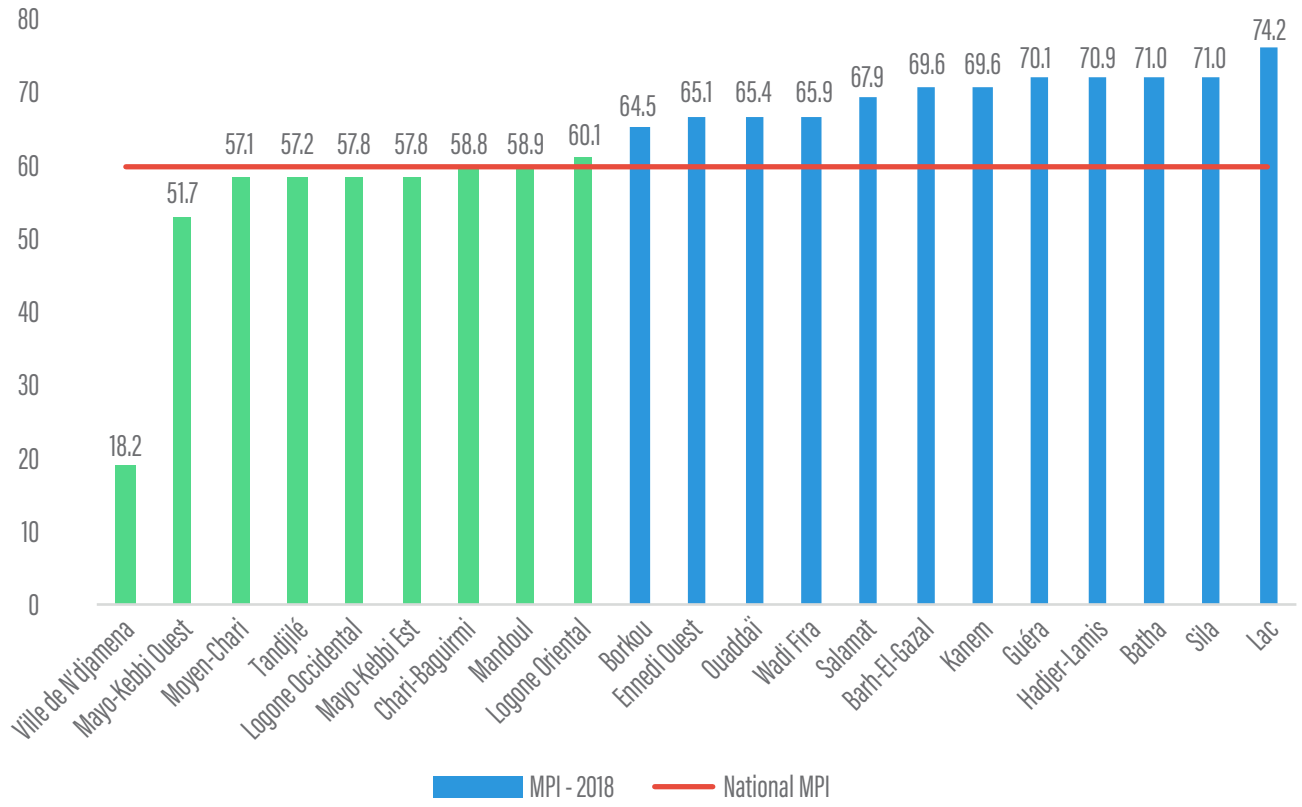
(d) MPI by Education Level of Households Head



Source: World Bank staff calculation using data from ECOSIT 4

The incidence and intensity of multidimensional poverty vary across regions. The MPI headcount poverty rate is lowest in N'Djamena, while the rate in the Soudanian zone is below the national average, and the rate in the Saharan zone is above it. The Lac Region has the highest MPI poverty rate, followed by the Sila Region. MPI poverty rates appear to be correlated with the intensity of multidimensional poverty: deprivation is most intense in the Lac Region and least intense in N'Djamena. Education is the main contributor to multidimensional poverty in all regions except Logone, Mandoul, Mayo-Kebbi, Ouaddaï, and Tandjilé, which suggests that the government's strategy for reducing multidimensional poverty should prioritize investments in education. In addition, the authorities should invest in basic services, as inadequate service access contributes substantially to multidimensional poverty in all regions.

Figure C.2: Multidimensional Poverty Rates by Region



Source: World Bank staff calculation using data from ECOSIT 4

C.2 OVERLAPPING DIMENSIONS OF POVERTY

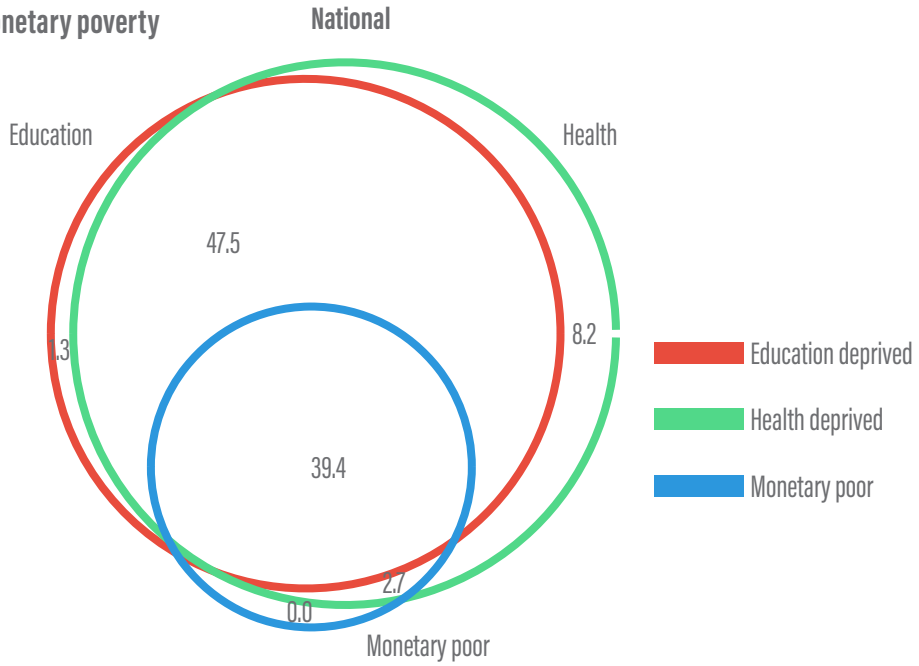
Almost all Chadians in poor households experience deprivation in basic education and health. Just under 93 percent of the poor population is considered deprived in indicators of both education and health. Members of poor households who suffer from educational and health deprivation represent about 40 percent of Chad's total population. The large overlap between poverty status and deprivation in education and health indicators highlights the pro-poor impact of investment in social services. Maximizing the impact of limited fiscal resources will require integrated interventions designed to simultaneously improve the supply of both education and health services.

About 78 percent of the poor population is deprived in asset ownership and access to essential services. The remaining 22 percent also lack access to basic services but live in households that own several modern assets such as mobile phones or vehicles. Due to the near-total overlap between poverty and deprivation in health and education, interventions targeting poor households that own few assets and lack access to basic services would address multiple dimensions of poverty as measured by both human and physical capital accumulation. These households represent almost one-third of Chad's total population.

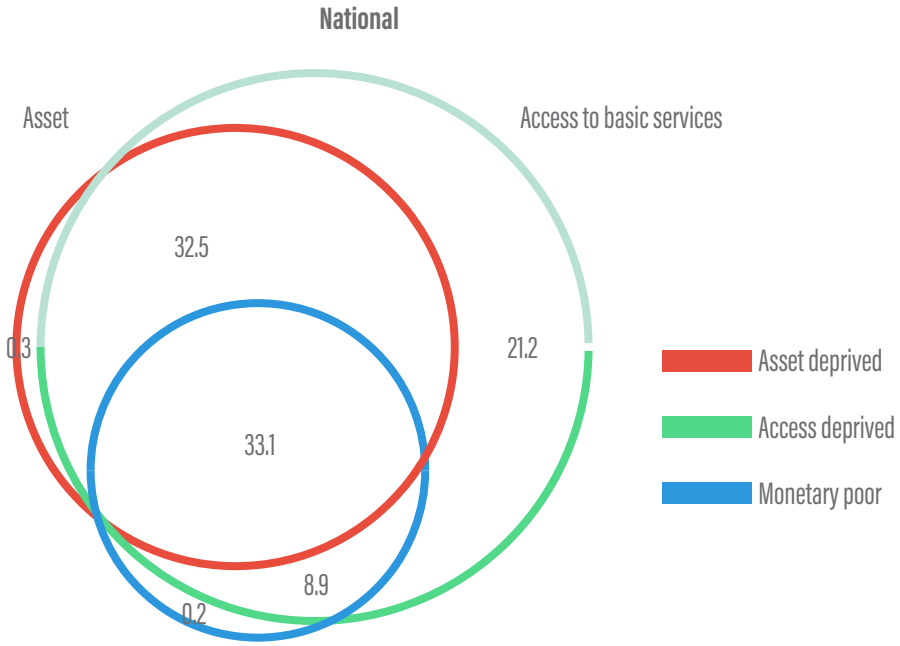
Educational deprivation is closely correlated with deprivation in the childhood and youth dimension of poverty. Two-thirds of people from poor households, or 29.5 percent of the total Chadian population, are deprived in these two dimensions of poverty. Almost one-quarter of people from poor, education-deprived households, or about 10 percent of the population, are not deprived in the childhood and youth dimension of poverty. Nevertheless, the substantial overlaps between poverty, education, and health and between poverty, education, and childhood and youth development suggest that policies designed to improve human capital should systematically integrate multiple dimensions of deprivation, especially childhood and youth development.

Figure C.3 : Overlapping Dimensions of Poverty

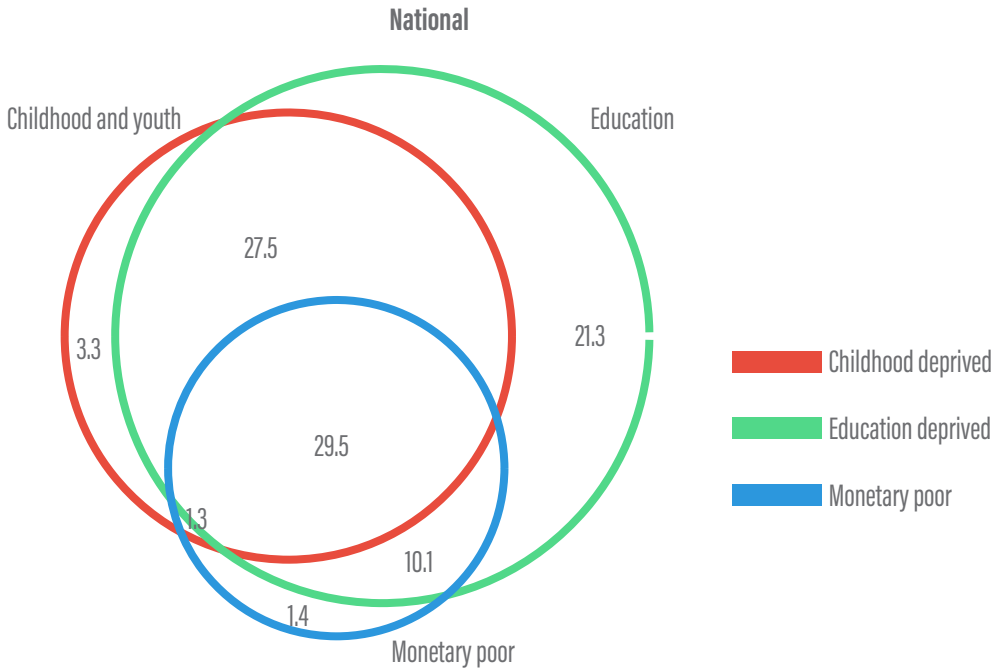
(a) Education, health, and monetary poverty



(b) Access to basic services, asset ownership, and monetary poverty



(c) Education, monetary poverty, and childhood and youth



C.3 TRENDS IN MULTIDIMENSIONAL POVERTY

While the incidence of multidimensional poverty declined between 2003 and 2018, much of the country continues to face severe deprivation. The national MPI score fell from 70.3 percent to 58.7 percent over the period, while the MPI headcount poverty rate declined by 8.7 percentage points (Table C.3). Meanwhile, the intensity of multidimensional poverty fell by 6 percentage points, from 72.1 percent in 2003 to 66.1 percent in 2018, indicating that living conditions improved among households experiencing multidimensional poverty. Multidimensional poverty reduction accelerated over the period, and the national MPI score fell faster between 2011 and 2018 than between 2003 and 2011. Moreover, the decline in MPI poverty rates was significant at all poverty thresholds (Figure C.4).

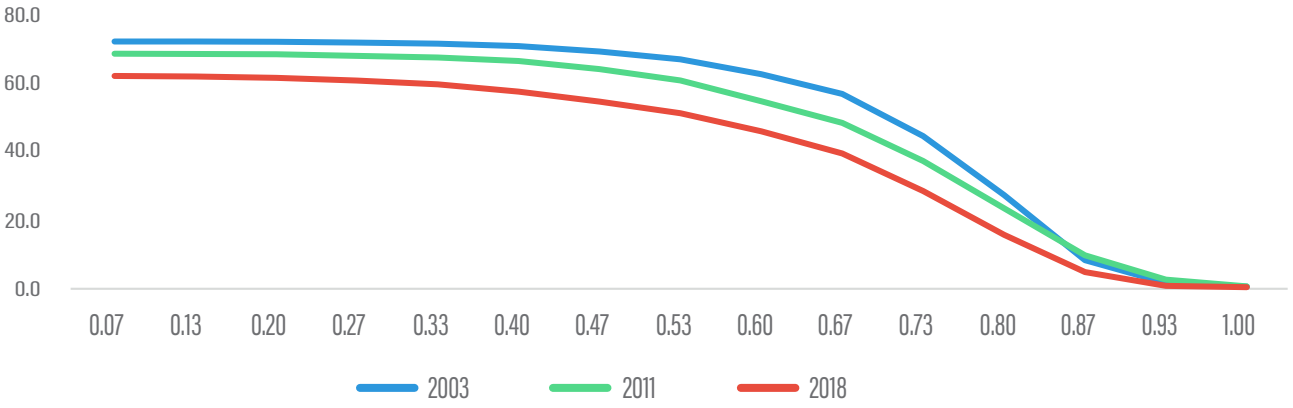
The decline in MPI scores reflected significant progress in improving housing conditions and asset ownership among the country's poorest households. The material quality of housing and the rate of asset ownership are the two MPI indicators that experienced the largest gains over the last 15 years. Between 2003 and 2018, the share of multidimensionally poor households with low-quality walls and roofs declined by 20 percentage points and 13 percentage points, respectively, and the share that owned at least some modern assets increased by 17 percentage points (Figure C.5).

Table C.3 : Multidimensional Poverty in Chad in 2003, 2011 and 2018

	MPI	H	A
2003	58.7	97.5	72.1
2011	62.8	95.2	69.6
2018	57.7	88.8	66.1
Change 2003-2011 (in percentage points)	18.2	-2.2	-2.5
Change 2011-2018 (in percentage points)	43.3	-6.4	-3.6

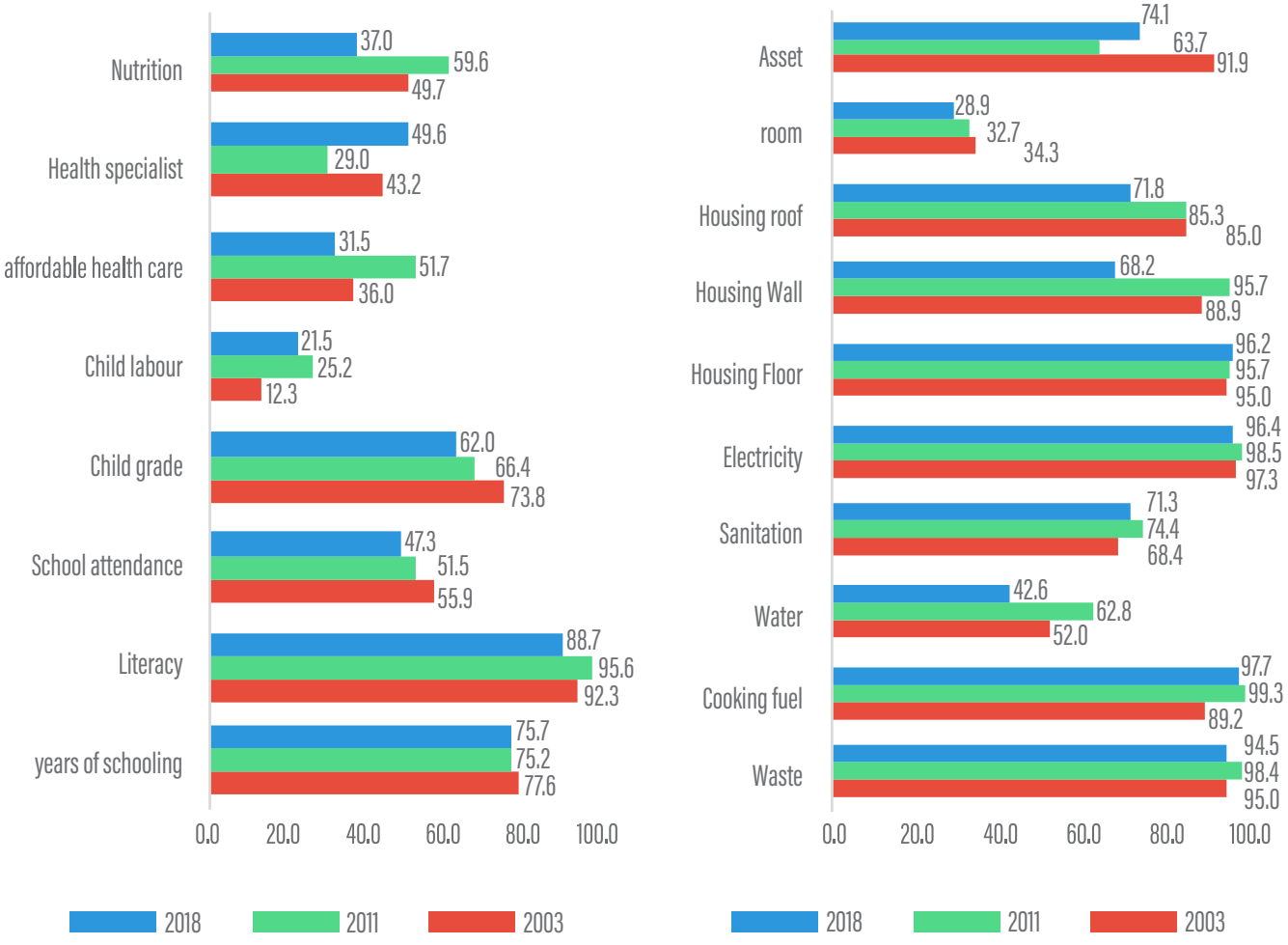
Source: World Bank staff calculation using data from ECOSIT 4

Figure C.4: MPI Headcount Poverty Rates at Different Poverty Thresholds



Source: World Bank staff calculation using data from ECOSIT 4

Figure C.5: Deprivation by Indicator among Multidimensionally Poor Households, 2003, 2011, and 2018



Source: World Bank staff calculation using data from ECOSIT 4

Pro-poor nutrition and education policies also contributed to the decline in multidimensional poverty. The share of multidimensionally poor households suffering from challenges related to nutrition, school attendance, and grade repetition fell significantly between 2003 and 2018. While education indicators improved among multidimensionally poor households, Chad's poor population continued to face high levels of deprivation in terms of years of schooling (75.7 percent) and literacy rates (88.7 percent) in 2018.

Progress in improving access to basic services among multidimensionally poor households has been mixed. The deprivation rate for healthcare fell by 4.5 percentage points between 2003 2018, but this improvement was more than offset by a drop in access to health specialists, resulting in an overall deterioration in the health component of the MPI. While the deprivation rate for access to improved water fell by 9.3 percentage points, the deprivation rate for sanitation and cooking fuel increased. Finally, the deprivation rate for electricity declined by a mere 1 percentage point, highlighting the persistent structural constraints on electricity access in Chad.

Gains in multidimensional poverty have been concentrated in N'Djamena. Between 2003 and 2018, the capital's MPI headcount poverty rate fell by half, while the average intensity of multidimensional poverty dropped from 53.6 percent to 47.2 percent (Table C.4). While MPI poverty rates also fell in other urban areas during the period, poor urban households outside the capital suffered more intense deprivation in 2018 than in 2003. MPI headcount poverty rates and the average intensity of multidimensional poverty have improved more slowly in rural areas, which remain the poorest parts of the country.

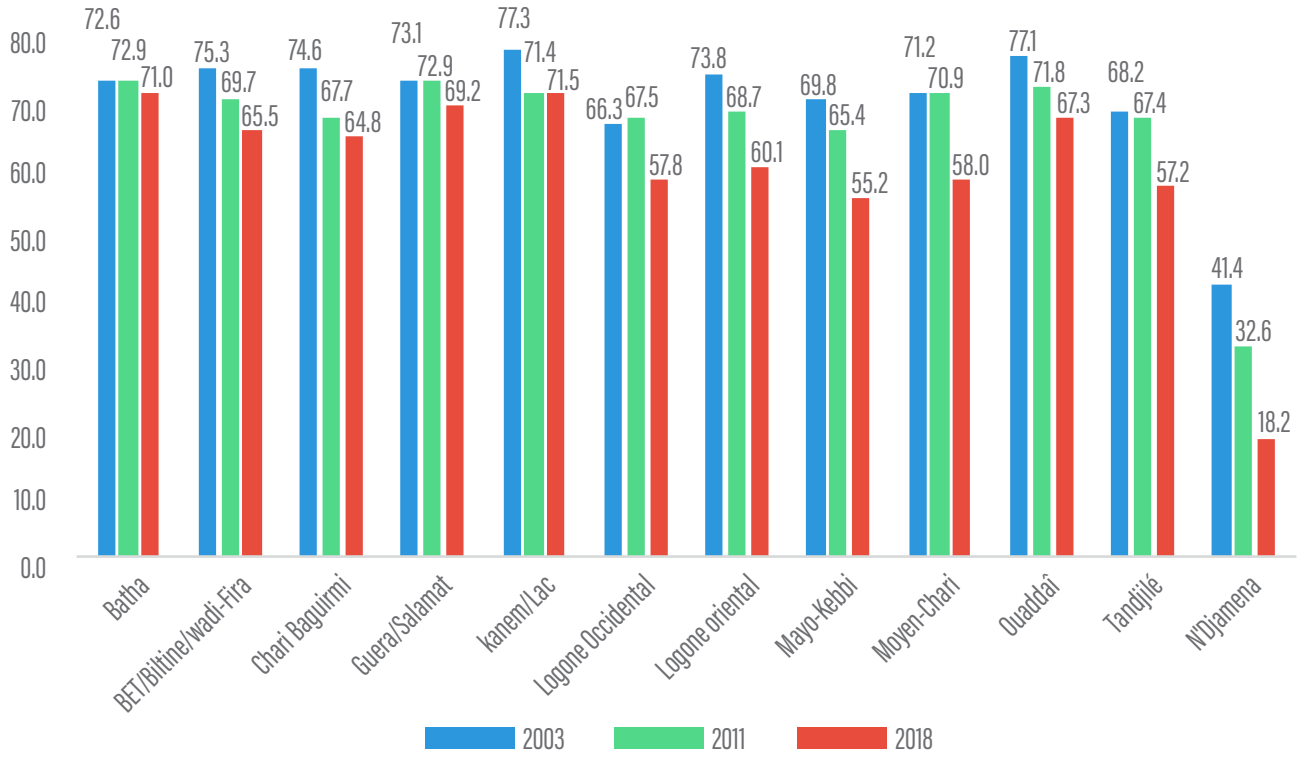
Table C.4 : Multidimensional Poverty in Urban and Rural Areas

	2003			2011			2018			Absolute change 2003-2018		
	MPI	H	A	MPI	H	A	MPI	H	A	MPI	H	A
N'Djamena	41.4	77.2	53.6	32.6	65.7	49.6	18.2	38.6	47.2	-23.2	-38.6	-6.4
Other Urban	46.5	86.7	53.6	49.2	85.0	57.8	43.3	77.9	55.6	-3.1	-8.8	2.1
Rural	73.5	99.5	73.9	71.8	99.5	72.2	66.8	97.3	68.7	-6.7	-2.2	-5.2

Source: World Bank staff calculation using data from ECOSIT 4

Both the MPI headcount poverty rate and the intensity of multidimensional poverty have declined across all regions of Chad over the last 15 years. Regions that experienced the highest rates of multidimensional poverty reduction, including N'Djamena, Logone Oriental, Mayo-Kebbi, and Moyen-Chari, also experienced a significant decline in the intensity of deprivation (Figure C.6 and Table C.5). These regions are home to most of the country's poor population: 12 percent of multidimensionally poor households are in Mayo-Kebbi; 9.6 percent are in N'Djamena; 7 percent are in Logone Oriental; and 5 percent are in Moyen-Chari. The Batha Region is home to just 2 percent of multidimensionally poor households, but it has the second highest MPI headcount poverty rate in the country. Batha experienced the smallest decline in the MPI poverty rate observed between 2003 and 2018, and the intensity of multidimensional poverty remained virtually unchanged. Chad's poorest region, Lac, is also one of the most conflict-affected areas of the country, and it has experienced no significant improvements in its MPI indicators since 2011.

Figure C.6: Multidimensional Headcount Poverty Rates by Region



Source: World Bank staff calculation using data from ECOSIT 4

Table C.5 : Multidimensional Poverty Indicators by Region

	2003				2011				2018				Absolute change 2003-2018		
	Pop. share	MPI	H	A	Pop. share	MPI	H	A	Pop. share	MPI	H	A	MPI	H	A
Batha	6.5	72.6	99.5	73.0	3.7	72.9	98.8	73.8	4.2	71.0	97.5	72.9	-1.6	-2.0	-0.2
BET/Biltine/Wadi-Fira	4.3	75.3	99.2	76.0	5.6	69.7	98.7	70.7	7.2	65.5	96.5	67.9	-9.8	-2.7	-8.0
Chari Baguirmi	10.0	74.6	100.0	74.6	11.8	67.7	99.8	67.9	10.2	64.8	95.5	67.8	-9.8	-4.5	-6.8
Guéra/Salamat	6.7	73.1	99.2	73.7	7.8	72.9	99.1	73.6	6.7	69.2	97.6	70.9	-3.9	-1.6	-2.8
Kanem/Lac	8.7	77.3	100.0	77.3	8.4	71.4	99.0	72.1	9.3	71.5	99.4	72.0	-5.8	-0.6	-5.3
Logone Occidental	7.0	66.3	97.0	68.3	6.8	67.5	96.3	70.1	6.3	57.8	90.5	63.9	-8.5	-6.4	-4.5
Logone Oriental	7.9	73.8	99.9	73.9	8.1	68.7	98.5	69.8	7.1	60.1	93.9	64.0	-13.7	-6.0	-9.9
Mayo-Kebbi	12.1	69.8	99.5	70.1	13.8	65.4	95.4	68.5	12.2	55.2	91.1	60.6	-14.5	-8.4	-9.5
Moyen-Chari	11.8	71.2	98.1	72.6	11.3	70.9	97.6	72.6	11.1	58.0	90.4	64.2	-13.2	-7.7	-8.4
Ouaddaï	10.1	77.1	99.8	77.3	9.1	71.8	96.5	74.3	10.0	67.3	93.2	72.2	-9.8	-6.5	-5.1
Tandjilé	7.3	68.2	97.8	69.7	5.5	67.4	98.6	68.4	6.1	57.2	93.3	61.3	-11.1	-4.5	-8.5
N'Djamena	7.6	41.4	77.2	53.6	8.2	32.6	65.7	49.6	9.6	18.2	38.6	47.2	-23.2	-38.6	-6.4

Source: World Bank staff calculation using data from ECOSIT 4

ANNEX D: DRIVERS OF POVERTY REDUCTION

To explore the basic factors behind the decline in poverty, changes in household consumption have been decomposed into (1) improvements in household characteristics or *endowments*, such as more education of the head of the household, ownership of assets, and access to employment opportunities and basic services; and (2) changes in the rewards or *returns* that they get for those characteristics like returns to education, assets productivity, and return or profit to business. The two components have themselves been decomposed to identify specific attributes that contribute to changes in consumption, and the decomposition has been applied to each decile of the consumption distribution to understand differences in the patterns of change for different income groups.

The approach is based on the Recentered Influence Function (RIF) and unconditional quantile regression method proposed by Firpo, Fortin, and Lemieux (2009), in which traditional Oaxaca-Blinder decompositions are applied to the consumption distribution by percentile. This makes it possible to assess the amount of poverty reduction attributable to changes in the endowments of households and the amount due to changes in the Chadian economy and economic returns to people's endowments:

$$\hat{Q}_\theta^i - \hat{Q}_\theta^{i'} = \left\{\hat{Q}_\theta^i - \hat{Q}_\theta^*\right\} + \left\{\hat{Q}_\theta^* - \hat{Q}_\theta^{i'}\right\} = \left(\bar{X}^i - \bar{X}^{i'}\right)\hat{\beta}_\theta^{\,i} + \bar{X}^{i'}\left(\hat{\beta}_\theta^{\,i} - \hat{\beta}_\theta^{\,i'}\right)$$

where $\hat{Q}_\theta$ is the θth unconditional quantile of log real per adult monthly household consumption, $\bar{X}$ the vector of characteristics averages, and $\hat{\beta}_\theta$ the estimate of the unconditional quantile partial effect. Superscripts i, i' and * designate respectively the final year (2018 or 2012), initial year (2012 or 2007), and counterfactual values.

$\hat{Q}_\theta^* = X^{i'}\hat{\beta}^i$ is the counterfactual quantile of the unconditional counterfactual distribution; it represents the distribution of welfare that would have prevailed if the relationship between endowments and consumption had remained constant over time. It is used to determine which changes in endowments could have helped to reduce poverty, and how poverty reduction could have changed as a result of a changing relationship between consumption and endowments. Changes in return to endowments represents the variation of the conditional correlation between a given endowment and consumption over time. The decomposition works as follows:

Table D.1 : Detrminants of change in consumption 2011-2018 at national and Rural level (Endowment and Returns effects)

	Extreme poor		Poor		Middle class		Richest	
	Chad	Rural	Chad	Rural	Chad	Rural	Chad	Rural
Total	0.808***	0.697***	0.480***	0.494***	0.408***	0.434***	0.271***	0.218***
Endowments	0.117	-0.018	0.269**	0.298*	0.230**	0.210	0.196	0.032
Head employed	0.012*	0.016*	0.007	0.002	0.009*	0.004	0.007	0.003
Head second job	0.022***	0.028***	0.017***	0.026***	0.006	0.008	0.008	0.030***
Head self employed	0.032**	0.034	0.015	0.036	0.004	0.003	0.009	-0.051

Head farm employment	-0.039***	-0.044**	-0.026***	-0.041***	-0.027***	-0.028**	-0.026**	-0.026
Livestock	0.008***	0.007***	0.007***	0.010***	0.005***	0.007***	0.007***	0.010***
Head nonfarm employment	-0.004	0.002*	0.003	0.001	0.004*	0.002	0.003	0.003
Head education	0.001	0.001	0.003*	0.004	-0.003	0.001	0.005***	0.001
Own mobile phone	0.143***	0.110***	0.135***	0.106***	0.096***	0.089***	0.102***	0.010
Own car/motorcycle	0.000	-0.001	0.001	-0.001	0.001*	-0.001	0.007*	-0.001
Access to electricity	0.001	0.000	0.005**	-0.001	0.006***	-0.000	0.023***	0.007***
Access to improved water	0.002*	0.000	0.003***	0.002*	0.004*	0.002**	0.006***	0.004**
Share of workers in the HH	0.007***	0.008***	0.008***	0.005**	0.004**	0.004**	0.010***	0.006*
Returns	**0.692*** **	**0.715*** **	**0.212*** **	**0.195**	**0.178**	**0.224**	**0.075**	**0.185**
Head employed	-0.039	0.037	0.016	-0.064	0.001	-0.045	-0.089	-0.443***
Head second job	0.002	0.007	0.028**	0.027	-0.012	-0.001	-0.007	-0.001
Head self employed	0.028	0.032	-0.023	0.013	-0.024	-0.018	-0.035	-0.146**
Head farm employment	-0.025	-0.083	-0.025	0.008	-0.018	0.035	0.046	0.451***
Livestock	0.001	-0.001	0.003*	0.005	-0.000	0.002	0.005***	0.005
Head nonfarm employment	-0.037**	-0.012*	-0.016	-0.003	-0.001	0.003	0.054***	0.045***
Head education	-0.086***	-0.047**	-0.040***	-0.067***	-0.012	-0.018	0.005*	-0.016
Own mobile phone	0.018***	0.014***	0.012***	0.007*	0.001	0.002	-0.002	-0.053
Own car/motorcycle	-0.001	0.005	0.003	0.003	0.011**	0.004	0.024***	0.023**
Access to electricity	0.006	0.004*	0.003	0.002	0.002	0.001	0.004	0.004*
Access to improved water	0.009	0.005	0.002	0.006	0.001	-0.001	0.023***	0.015*
Share of workers in the HH	0.042*	0.008	0.058***	0.052	0.053***	0.063**	0.070***	0.080*

Source: ECOSIT3 and ECOSIT4.
Note: *Extreme poor* are population groups in the bottom 10 -20 percent of the distribution; the *poor* are in the third-fourth decile; *middle class* are in the fifth decile, and the *richest* are in the top decile.
*** Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.**

Table D.2 : Detrminants of change in consumption 2011-2018 at Ndjamena and other urban level (Endowment and Returns effects)

	Extreme poor		Poor		Middle class		Richest	
	Other Urban	Ndjamena	Other Urban	Ndjamena	Other Urban	Ndjamena	Other Urban	Ndjamena
Total	**0.537*** **	**0.311*** **	**0.444*** **	**0.236*** **	**0.403*** **	**0.211*** **	**0.266*** **	**0.304*** **
Endowments	**0.264*** **	**0.563***	**0.137*** **	**0.373***	**0.150*** **	**0.262**	**0.034**	**-0.078**
Head employed	-0.010	0.003	0.005	0.002	0.012	0.012	-0.024	-0.011
Head second job	0.022*	0.000	0.017*	-0.000	0.005	-0.001	-0.015	-0.005
Head self employed	0.042*	-0.003	0.037**	-0.002	0.018	-0.000	-0.005	0.001
Head farm employment	-0.045***	0.006*	-0.052***	0.003	-0.025***	0.003	0.017	-0.002
Livestock	0.008**	0.001	0.007**	0.001	0.005**	0.000	0.002	-0.000
Head nonfarm employment	0.014*	0.004	0.003*	0.002	0.010**	-0.001	0.018**	0.004
Head education	0.002	0.002	-0.001	0.003	-0.003	0.004	0.003	0.005
Own mobile phone	0.297***	0.287**	0.167***	0.092	0.143***	-0.022	0.053	0.163
Own car/motorcycle	0.001	0.010***	0.001	0.013***	0.000	0.022***	-0.009	0.040***
Access to electricity	0.003	0.044**	0.002	0.021*	0.003	0.038***	0.003	0.052**
Access to improved water	-0.006*	0.028***	-0.006***	0.032***	-0.003	0.019***	-0.000	0.021**
Share of workers in the HH	0.016**	0.010**	0.014***	0.007**	0.010**	0.008**	0.038***	0.019***
Returns	0.274***	-0.252	0.307***	-0.137	0.253***	-0.051	0.232***	0.382
Head employed	0.078	0.089	-0.100	-0.022	-0.028	0.034	-0.129	0.204*
Head second job	-0.009	-0.018*	-0.023*	-0.004	-0.023**	-0.012**	-0.016	-0.012
Head self employed	0.054	-0.026	0.068***	0.013	0.033	0.016	-0.014	-0.012
Head farm employment	-0.022	-0.031***	-0.028	-0.021***	-0.009	-0.011*	0.042	-0.013
Livestock	-0.002	0.001	-0.001	0.001	0.000	-0.001	-0.001	-0.003
Head nonfarm employment	0.019	0.047*	-0.022***	0.021	-0.000	0.003	0.041*	-0.018
Head education	-0.068**	0.025	-0.037*	-0.037	-0.024	0.070***	-0.035	0.060*
Own mobile phone	0.047***	0.005	0.024***	-0.021	0.021***	-0.040**	-0.002	0.022
Own car/motorcycle	-0.023*	0.032***	-0.003	0.018**	0.003	0.030***	0.026***	0.058***
Access to electricity	0.007	0.017	-0.003	-0.020	0.004	0.004	-0.006	0.044
Access to improved water	-0.001	0.017	-0.004	-0.031	-0.003	-0.034*	-0.014	0.006
Share of workers in the HH	0.038	0.023	0.052**	-0.018	0.040*	-0.001	0.114***	0.026

ANNEX E: VULNERABILITY AND SHOCKS

I. ESTIMATING VULNERABILITY TO POVERTY

Vulnerability estimation follows the methodology in Gunther and Harttgen (2009), which is an extension of that proposed by Chaudhuri (2002). Chaudhuri's methodology is based on two main assumptions. The first is that the unexplained part (error term) of a consumption model captures the impact of household-specific and community-specific shocks on consumption. And the second hypothesis is that the error term is correlated with observable household and community characteristics. The extension consists of incorporating multilevel analysis to Chaudhuri's methodology. The multilevel analysis has two advantages. It allows decomposing the shocks to consumption into a household component and a community component. Also, it accounts for the hierarchical structure of the data and thus corrects for inefficient estimators.

The extended methodology consists of a two steps estimation procedure. In the first step, a multilevel model of log per capita household consumption is estimated on a set of community and household characteristics. Besides, the model includes interactions between household and community characteristics as explanatory variables. But, only the interaction terms for which the coefficients are significant (at the 10% level) are kept in the final multilevel model which is given by

$$\log c_{ij} = \beta_{00} + \beta_{01}Z_j + (\beta_{10} + \beta_{11}Z_j)X_{ij} + u_{0j} + u_{1j}X_{ij} + e_{ij}$$

With $\log c_{ij}$ the log per capita consumption and X_{ij} a set of characteristics of household i in community j. e_{ij} reflects the unexplained variance in consumption across households, while the two error terms, u_{0j} and u_{1j}, are level two residuals capturing the unexplained variance in consumption across communities. Z_j is a set of community characteristics, and $Z_j X_{ij}$ is a set of interaction terms for which β_{11} is significant. The final list of explanatory household and community variables included in the model with their descriptive statistics is given in Table 1 below.

The model described in the first step allows estimating two types of error terms, a household level error, e_{ij}, capturing the idiosyncratic shocks and community level errors, u_{0j} and u_{1j}, capturing the covariate shocks. In the second step, the squared of the error terms are regressed on a set of household and community characteristics. That is

$$e_{ij}^2 = \theta_0 + \theta_1 X_{ij} + \theta_2 Z_j + \theta_3 X_{ij} Z_j$$

$$u_{0j}^2 = \tau_0 + \tau_1 Z_j$$

$$(u_{0j} + e_{ij})^2 = \theta_0 + \theta_1 X_{ij} + \theta_2 Z_j + \theta_3 X_{ij} Z_j$$

This two steps procedure allows estimating the expected mean as well as the idiosyncratic, covariate, and total variances of households' consumption. The regression results are reported in Table B.1 below.

The estimates of the multilevel model are then used to measure vulnerability. More specifically, the probability of a household falling below the poverty line is computed given the assumption that consumption is log-normally distributed. That is the probability $\hat{P}$ is computed as:

$$\hat{P}(\log c_{ij} < \log z \,|X, Z) = \phi\left(\frac{\log z - \log \hat{c}_{ij}}{\sqrt{\hat{\sigma}_{ij}^2}}\right)$$

With z the poverty line, $\hat{c}ij$ the estimated expected mean consumption and $\hat{\sigma}_{ij}^2$ the idiosyncratic consumption variance.

A household is considered vulnerable when the above probability is higher or equal to 20%. Moreover, the current framework allows decomposing vulnerability into two sources, poverty and risk. The former, poverty induced vulnerability, is defined as the category of households for which the expected mean of consumption is already below the poverty line. The latter, risk induced vulnerability, captures the group of households having their consumption above the poverty line but a probability of falling below the poverty line higher than the threshold of 20%.

Table E.1 : Summary statistics for households and communities

Individual level characteristics	National	Urban	Rural
Area of residence	0.8		
Household size	6.9	7.4	6.7
Living in capital city	0.1	0.4	
Squared age of household head	2099.4	2215.4	2061.9
Proportion of household members aged between 0 and 14	0.5	0.5	0.6
Household headed by a female	0.2	0.2	0.2
Household head works in agriculture	0.7	0.2	0.8
Household head is unemployed	0.1	0.1	0.1
Household head has a higher education level	0.0	0.1	0.0
Assets score	0.0	1.2	-0.4
Total cattle owned by household	8.0	4.2	9.3
Household head has a bank account	0.1	0.2	0.0
hhi (diversity of food item)	0.1	0.1	0.2
Log of food consumption expenditure	11.9	12.4	11.8
Community level characteristics			
Proportion of household head working in agriculture	0.7	0.2	0.8
Proportion of firm owner household head	0.8	0.6	0.9
Proportion of household head having a bank account	0.1	0.2	0.0
infrastricture score	0.0	0.7	-0.2
Availability of electricity network	0.1	0.5	0.0
Availability of drinking water network	0.2	0.5	0.1

Table E.2 : Regression results of per capita consumption (two-level model)

Variables	(log) Per capita expenditure	
Household size	-0.010***	(0.001)
Residence in rural areas	-0.026	(0.021)
capital	-0.273***	(0.015)
Square age of household head (years)	-0.000***	(0.000)
Number of children under 14	-0.220***	(0.012)
Female-headed household	-0.031***	(0.006)
Works in agriculture/livestock/fishing (HH head)	-0.027***	(0.007)
Unemployed (HH head)	0.007	(0.008)
head_tertedu	0.036**	(0.011)
Asset index	0.050***	(0.006)
Number of cattle	0.001***	(0.000)
HH has a bank account	0.074***	(0.012)
HHI (diversity of food items)	-0.512**	(0.161)
(log) Annual per capita food consumption	0.772***	(0.005)
% working in agriculture	-0.115***	(0.027)
% enterprise owner	-0.032	(0.035)
% bank account	-0.005	(0.062)
Infrastructure index	0.001	(0.001)
Electricity in a community	0.011	(0.012)
Drinking water in a community	0.028**	(0.010)
% working in primary sector * asset score	0.133***	(0.013)

Variables	(log) Per capita expenditure	
% working in primary sector * rural area	0.131***	(0.031)
% bank owner * food diversity	1.406***	(0.352)
% bank owner * household size	-0.013*	(0.006)
% electricity in the community * asset score	-0.014*	(0.006)
% enterprise owner * food diversity	0.442*	(0.177)
Var(e)	0.031	
R^2(0)	0.889	
#Obs(HH)	7265.000	
Var(u)	0.007	
R^2(1)	0.960	
#Obs(Community)	606.000	

Standard errors in parentheses

* p<0.05 ; ** p<0.01; *** p<0.001

II. VULNERABILITY TO POVERTY ACROSS REGIONS

There is high regional disparity in vulnerability to poverty in Chad with vulnerability rate varying from 70 percent to 10 percent across regions. The highest rates of vulnerability to poverty, above 60%, were registered in Tandjilé, Mandoul, Mayo-Kebbi Ouest, Guéra and Mayo-Kebbi Est (***Figure A-1***). Households in Ennedi (11%) and N'Djamena (10%) exhibited the lowest vulnerability rates in the country. The trend across regions was largely similar when considering poverty rates. In effect, the five regions with the highest vulnerability rates also displayed poverty rates hovering around 60% while in N'Djamena less than 15% of household were below the poverty line. The difference of more than 10% between the poverty and vulnerability rates in Logone Occidental, and Kanem indicates that many of the currently non-poor households are likely to fall into poverty in the event of a shock. Across all the regions, covariate shocks induced vulnerability rates are moderately greater than idiosyncratic shocks induced vulnerability (Figure E.1).

Figure E.1. Vulnerability rates vary considerably across regions

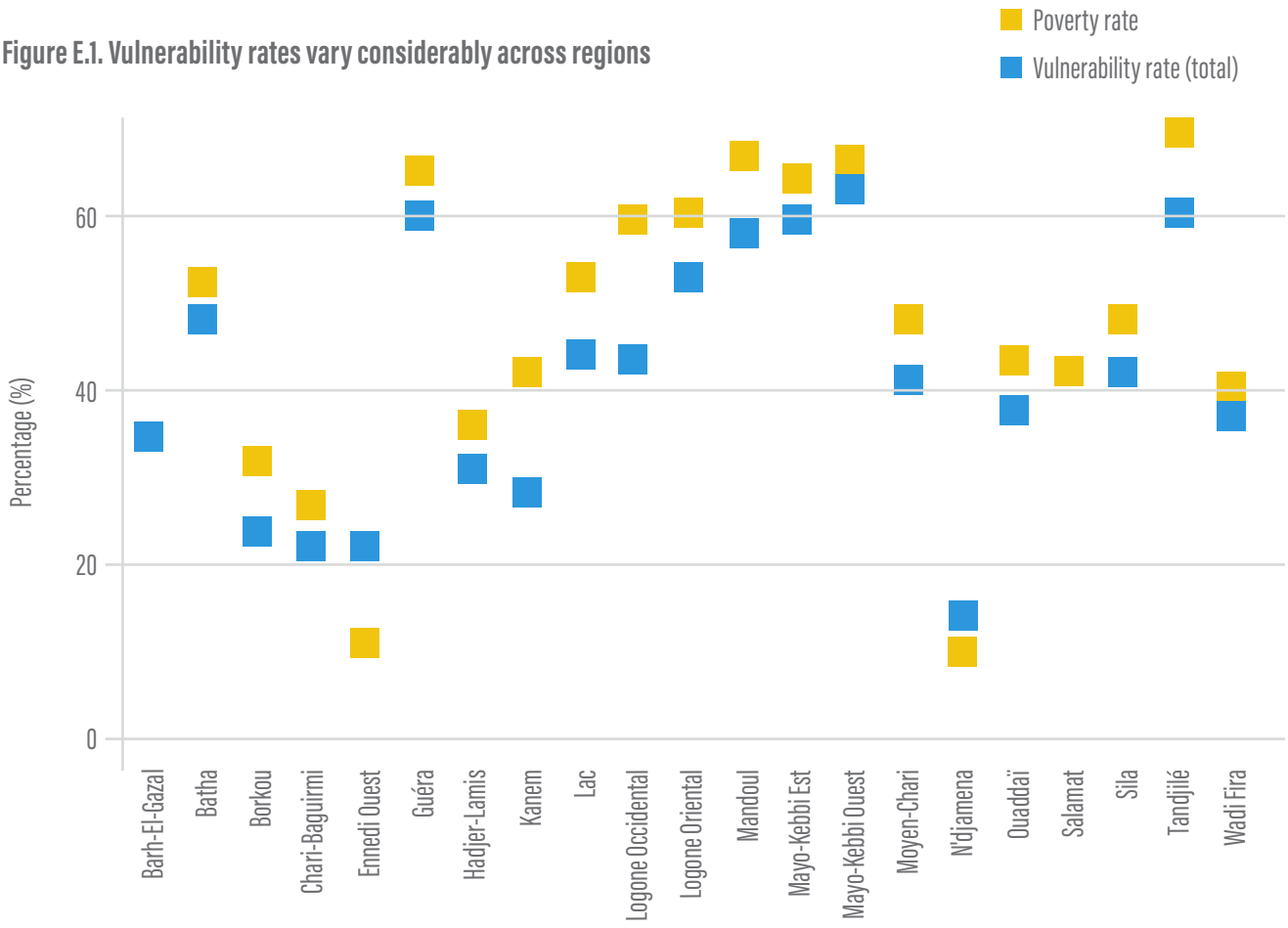
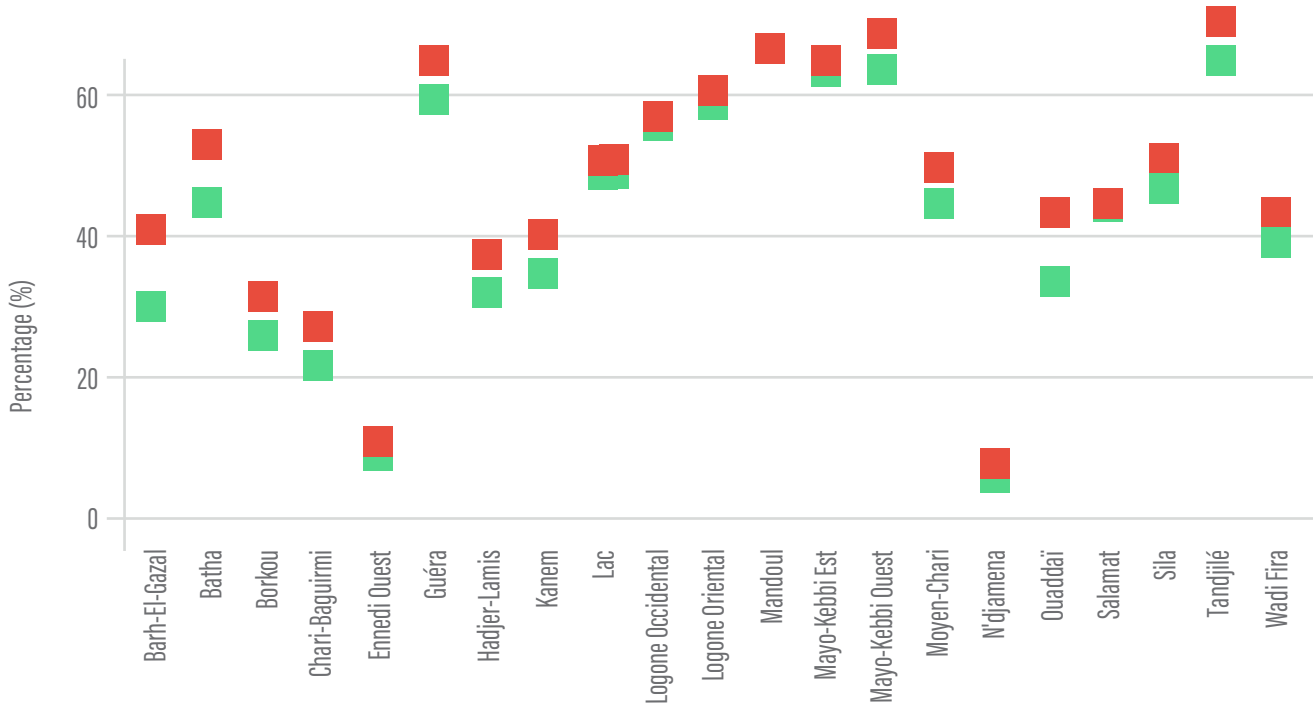


Figure E.2. Covariate shocks induced vulnerability is prevalent across regions

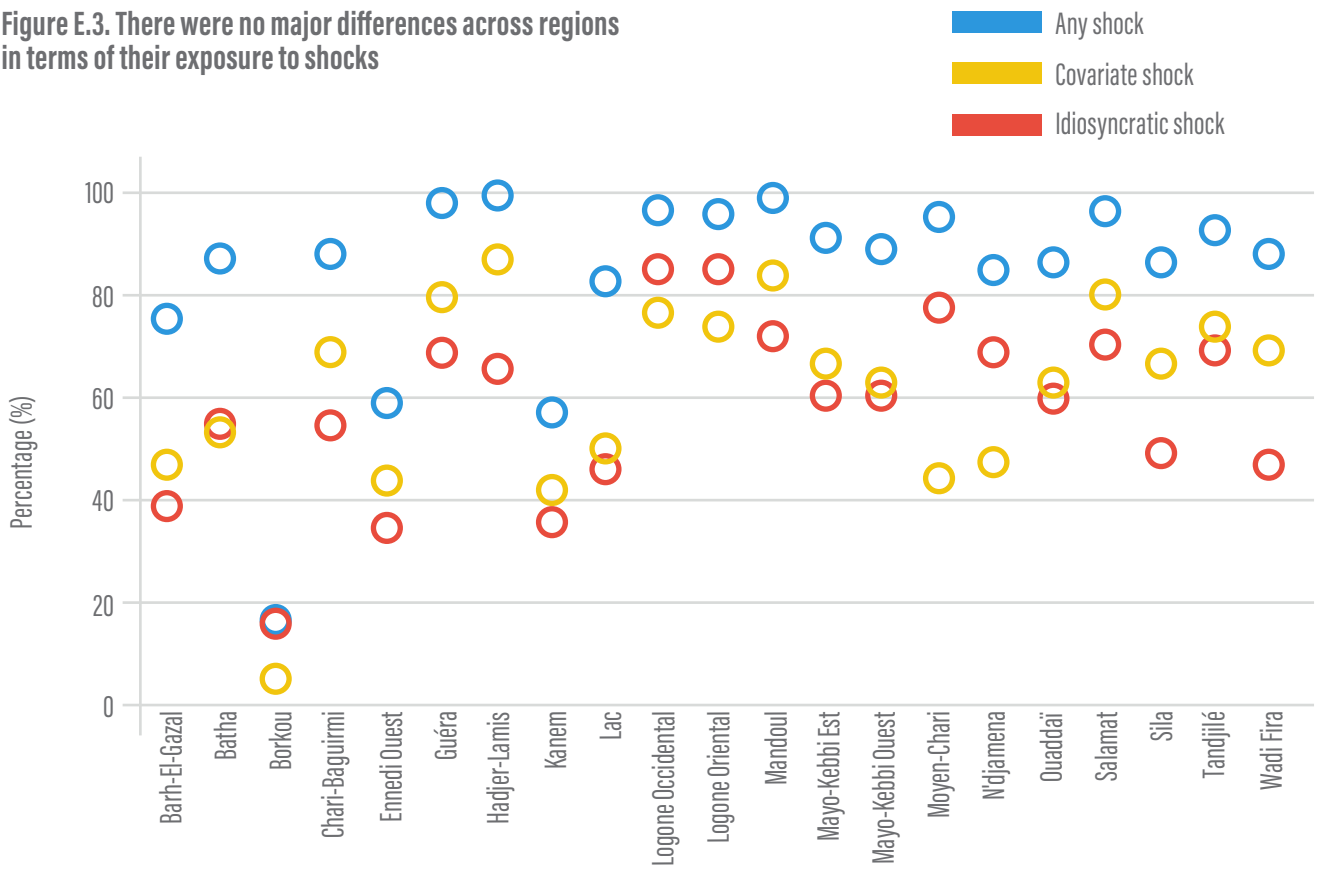


Risk-induced vulnerability was more pronounced across regions in Chad. The share of households affected by risk induced vulnerability ranged from 8% to 60% while poverty induced vulnerability rates fluctuated between 3% and 10%. This indicates that for many households with sufficient human and capital endowments, future exposure to shocks increases their likelihood of falling into poverty. Households in Logone Oriental and Mayo-Kebbi Est more often faced risk induced vulnerability than poverty induced vulnerability. On the other hand, their peers in Ennedi Ouest, Borkou and N'Djamena were more exposed to poverty induced vulnerability compared to risk induced vulnerability.

III. EXPOSURE TO SHOCKS ACROSS REGIONS

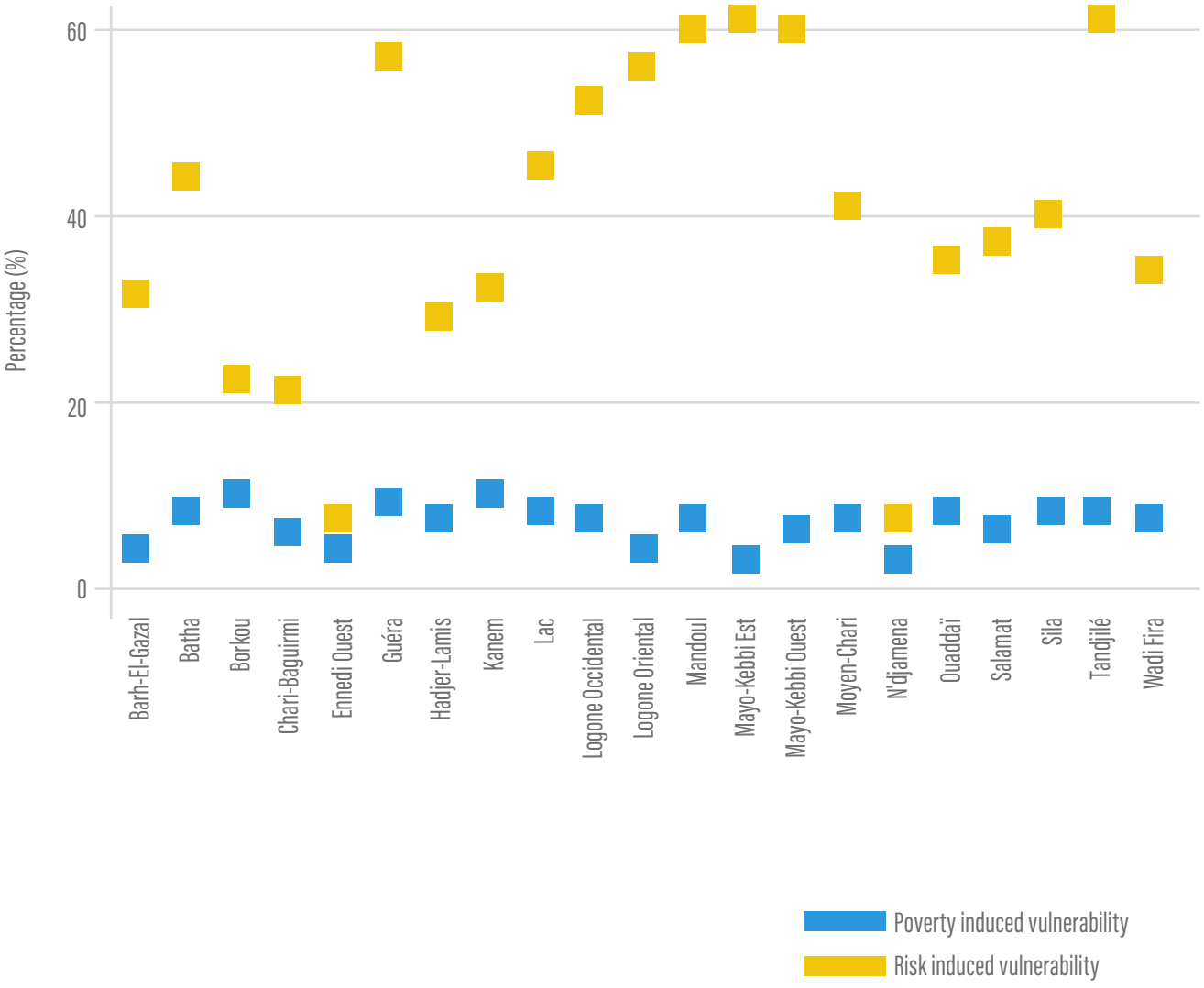
Regions across Chad were relatively similar in terms of their exposure to shocks. More than 80% of households in 17 out of the 21 regions were exposed to shocks (*Figure E.3*). Among the three regions the most impacted by the occurrence of shocks, namely Hadjer-Lamis (99.5%), Mandoul (99%), and Guéra (98%), the incidence of covariate shocks was greater than idiosyncratic shocks. This was not however a generalized pattern among the regions exhibiting a high rate of exposure to shocks. Indeed, between 95% and 97% of households in Logone Occidental, Logone Oriental and Moyen-Chari who experienced shocks were more vulnerable to idiosyncratic shocks compared to covariate ones.

Figure E.3. There were no major differences across regions in terms of their exposure to shocks



ANNEX F: ADDITIONAL DATA ON VULNERABILITY IN CHAD

Figure F.1 Risk induced vulnerability across regions



Source: EHCVM 2018/19

Table F.1 Proportion of households exposed to shocks

Shocks	National	Urban	Rural
Severe illness or injury of a HH member	39%	38%	40%
Drought / irregular rainfall	24%	11%	27%
Death of a HH member	23%	26%	22%
High food prices	20%	25%	19%
Theft of money, assets, production or other goods	13%	18%	11%
farmer-pastoralist conflict	11%	5%	13%
Flooding	10%	11%	10%
High rate of crop disease	9%	4%	11%
High rate of animal disease	8%	3%	9%
Locust attacks or other pests	6%	2%	7%
Divorce/separation	5%	7%	4%
Other shocks	4%	4%	4%
Fire	4%	3%	4%
High input prices	3%	1%	4%
Important output price drop	2%	1%	3%
Bankruptcy of nonfarm enterprise	2%	4%	2%
Important loss of nonfarm income	2%	2%	2%
Loss of wage employment	2%	5%	1%
Armed conflict/violence/insecurity	1%	1%	1%
Important loss of salary incomes	1%	3%	0%
End of regular transfers from other HHs	1%	1%	1%
Landslide	0%	0%	0%

Table F.2 Proportion of female and male headed households exposed to shocks

Shocks	Male headed	Female headed
Severe illness or injury of a HH member	39%	41%
Death of a HH member	21%	28%
Drought / irregular rainfall	24%	24%
High food prices	21%	18%
Divorce/separation	3%	11%
farmer-pastoralist conflict	12%	10%
Theft of money, assets, production or other goods	13%	10%
Flooding	11%	9%
High rate of crop disease	10%	6%
High rate of animal disease	9%	5%
Locust attacks or other pests	6%	4%
Other shocks	4%	3%
Bankruptcy of nonfarm enterprise	2%	3%
Fire	4%	3%
High input prices	4%	2%
End of regular transfers from other HHs	1%	2%
Important output price drop	3%	1%
Important loss of nonfarm income	2%	1%
Loss of wage employment	2%	1%
Armed conflict/violence/insecurity	1%	1%
Important loss of salary incomes	1%	1%
Landslide	0%	0%

Table F.3 Proportions of households exposed to shocks following the outbreak of the coronavirus by residence zones

	National	Urban	Rural
High food prices	69%	50%	75%
Illness of an income earner in the household	18%	14%	19%
Bankruptcy of nonfarm enterprise	14%	18%	13%
Loss of wage employment	8%	18%	5%
High input prices	8%	5%	8%
Theft of money, assets, production or other goods	6%	6%	5%
Death of an individual who sends money to the household	5%	5%	5%
Bad harvest owing to lack of labor	4%	1%	5%
Death or disability of an active adult household member	4%	5%	4%
Other	3%	4%	2%
Important output price drop	2%	2%	2%
Loss of an important acquaintance	1%	2%	1%
Locust attacks or other pests	0%	0%	0%

Table F.4 Proportions of households exposed to shocks following the outbreak of the coronavirus by poverty status and gender of the head of household

	Non poor households	Poor	Female headed	Male headed
High food prices	66%	73%	65%	69%
Illness of an income earner in the household	17%	21%	18%	18%
Bankruptcy of nonfarm enterprise	14%	14%	17%	14%
Loss of wage employment	8%	7%	8%	8%
High input prices	6%	11%	8%	8%
Death of an individual who sends money to the household	5%	6%	6%	5%
Theft of money, assets, production or other goods	6%	4%	5%	6%
Death or disability of an active adult household member	4%	6%	5%	4%
Important output price drop	2%	2%	2%	2%
Bad harvest owing to lack of labor	5%	4%	2%	5%
Other	3%	2%	1%	3%
Loss of an important acquaintance	1%	1%	1%	1%
Locust attacks or other pests	0%	0%	0%	0%

Table F.5 Coping strategies following the outbreak of the coronavirus

	National	Urban	Rural	Non poor	Poor	Female headed	Male headed
Reducing consumption	27%	18%	30%	26%	29%	18%	29%
Using savings	27%	43%	22%	29%	23%	26%	27%
Help from family or friends	14%	16%	13%	15%	13%	32%	11%
Selling livestock	9%	2%	11%	7%	11%	5%	9%
Buying cheap food	8%	7%	8%	7%	8%	7%	8%
Did nothing	4%	7%	4%	4%	5%	4%	5%
Selling food stock	3%	1%	3%	3%	3%	1%	3%
Renting/pawning land	2%	1%	2%	2%	3%	2%	2%
Selling durable goods	2%	2%	2%	1%	3%	2%	2%
Selling agricultural assets	1%	0%	2%	1%	1%	1%	1%
Reducing education/health expenses	1%	0%	1%	1%	0%	0%	1%
Taking a loan	1%	2%	1%	1%	1%	0%	1%
Practicing dry season agriculture	0%	0%	1%	0%	0%	0%	1%
Help from government	0%	0%	0%	0%	0%	1%	0%
Seeking supplementary income	0%	0%	0%	0%	0%	1%	0%
Others	0%	0%	0%	0%	0%	0%	0%
Increase in fishing	0%	0%	0%	0%	0%	0%	0%
Selling assets	0%	0%	0%	0%	0%	0%	0%
Help from NGOs	0%	0%	0%	0%	0%	0%	0%
Engaging in spiritual activities	0%	0%	0%	0%	0%	0%	0%
Children below 15 started working	0%	0%	0%	0%	0%	0%	0%
Unemployed household members started working	0%	0%	0%	0%	0%	0%	0%

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