Poverty and Vulnerability in the Ethiopian Lowlands: Building a More Resilient Future

The World Bank Group and the UK's Department for International Development

2019

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Abbreviations and Acronyms

ABE	Alternative Basic Education
ACLED	Armed Conflict Location and Event Data project
AE	Adult equivalent
AEZ	Agro-ecological zones
AfDB	African Development Bank
AFP	Chatham House Africa Programme Briefing Papers
ANC	Ante-natal care
ANDP	Afar National Democratic Party
ANOVA	Analysis of Variance test
ARRA	Agency for Refugee and Returnee Affairs
ASAL	Arid and Semi Arid Lands
AU	African Union
AWD	Acute Waterborne Disease
BG	Benishangul-Gumuz
BORESHA	Building Opportunities for Resilience in the Horn of Africa Programme
CAPE	Centre for Aid and Public Expenditure—Overseas Development Institute
CARE	Cooperative for Assistance and Relief Everywhere
CBHI	Community-based health insurance
CGAP	Consultative Group to Assist the Poor
CHIRPS	Climate Hazards Group InfraRed Precipitation with Stations data
CMI	Christiam Michelsen Institute
COMESA	Common Market for Eastern and Southern Countries
CSA	Central Statistical Agency
DFID	Department for International Development
DHS	Demographic and Health Survey
DPL&P	Drought-prone lowlands and pastoral
DRS	Developing Regional States
EB	Ethiopian Birr
EC	Ethiopian Calendar
ECHO	European Civil Protection and Humanitarian Aid Operations

EDC	Economic development corridor
EEU	Economic Empowerment Unit
EFY	Ethiopian Fiscal Year
EHAIA	Ethiopian Horticultural and Investment Agency
ELAP	Ethiopia Land Administration Program
EMIS	Education Management Information System
ENDF	Ethiopian National Defense Forces
ENSO	El Niño–Southern Oscillation
EPRDF	Ethiopian Peoples' Revolutionary Democratic Front
ESDS	Education Service Delivery Strategy
EVI	Enhanced Vegetation Index
FBO	Faith Based Organization
FDI	Foreign Direct Investment
FMD	Foot and Mouth Disease
FMOH	Federal Ministry of Health
GCM	Global Climate Model
GDP	Gross Domestic Product
GEID	General Education Inspection Directorate, Minsitry of Education
GEQIP	General Education Quality Improvement Project
GFDRR	Global Facility for Disaster Reduction and Recovery
GoE	Government of Ethiopia
GPLM	Gambella People's Liberation Movement
GTP II	Growth and Transformation Plan II
HAZ	Climate Hazard Group
HC	Health centers
HCE	Household Consumption-Expenditure
HCES	Household Consumption-Expenditure Survey
HCI	Human Capital Index
HD	Human Development
HEA	Household economy analysis
HEP	Health Extension Program
HEW	Health Extension Worker
HFA	Humanitarian Food Assistance
HICES	Household Income, Consumptions and Expenditure Surveys
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
HLF	High-level Forum
HP	Health posts
HRD	Humanitarian Requirement Document
HRP	Humanitarian Response Plan
HSNP	Household Safety Net Program
HSTP	Health Sector Transformation Plan
ICP	Incident Command Post
ICRAF	World Agroforestry Center
ICT	Information and Comunications Technology
IDP	Internally Displaced Person

IDS	Institute of Development Studies
IEC	Information, Education and Communications
IGAD	Intergovernmental authority on development
IGC	International Growth Centre
IGFT	Intergovernmental Fiscal Transfer
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IP	Industrial Parks
IPCC	Intergovernmental panel on Climate Change
IUCN	International Union for Conservation of Nature
LAPSSET	Lamu Port and Lamu—Southern Sudan—Ethiopia Corridor
LIFT	Land Investment for Transformation
LULC	Land Use and Land Cover
MDG	Millenium Development Goals
MFI	Micro Finance Institutions
MHNT	Mobile Health and Nutrition Teams
MNCH	Maternal, Newborn and Child Health
MNT	Mobile Nutrition Teams
MODIS	Moderate Resolution Imaging Spectroradiometer
MoE	Ministry of Education
MoFEC	Ministry of Finance and Economic Cooperation
MoH	Ministry of Health
MoWIE	Ministry of Water, Irrigation and Electricity
MPI	Multi-Dimensional Poverty Index
NDVI	Normalized Difference Vegetation Index
NEAEA	National Education Assessment and Examinations Agency
NER	Net Enrollment Rate
NGO	Nongovernmental Organization
NWoW	New Way of Working
OLF	Oromo Liberation Front
ONLF	Ogaden National Liberation Front
OOPS	Out-of-pocket spending
OPD	Outpatient Services
OPHI	Oxford Poverty & Human Development Initiative
OPM	Oxford Policy Management
OSSREA	Organisation for Social Science Research in Eastern and Southern Africa
OWNP	One WASH National Program
PBF	Performance Based Financing
PCDP	Pastoral Community Development Project
PFM	Public Financial Management
PFSA	Pharmaceuticals Fund and Supply Agency
PHCU	Primary Health Care Unit
PNC	Post-natal Care
PRIME	Pastoralist Areas Resilience Improvement and Market Expansion

PSA	Pharmaceuticals Supply Agency
PSN	Productive Safety Net
PSNP	Productive Safety Net Program
PTA	Parent Teacher Association
RBH	Regional Bureau of Health
RDA	Regional Development Association
RIF	Reproductive Maternal and Neonatal Health Innovation Fund
RMNCH	Reproductive Maternal and Neonatal Health and Child services
RVF	Rift Valley Fever
SAM	Severe acute malnutrition
SBCC	Social and behavioral change communication
SDG	Sustainable Development Goals
SDI	Spatial development initiative
SLE	Center for Rural Development
SNNP	Southern Nations, Nationalities and Peoples
SNNPR	Southern Nations, Nationalities and Peoples Region
SOS	SOS Sahel (an NGO)
SPLA	Sudan People's Liberation Army
SR	Sub-Recipient
SRS	Somali Regional State
SST	Sea surface temperature
SWReGAP	Southwest Regional Gap Analysis Project
TA	Technical assistance
TBA	Traditional birth attendants
TFR	Total fertility rate
THDRS	Transform Health in Developing Regional States
TLU	Tropical Livestock Unit
TVET	Technical and Vocational Education Training
U5MR	Under-five Mortality Rate
UN	United Nations
UNDP	United Nations Development Program
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children's Fund
US	United States
USAID	United States Agency for International Development
USD	United States Dollar
VSLA	Village Savings and Loans Associations
WaSH	Water, Sanitation and Hygiene
WB	World Bank
WIDE	Well-being and Ill-being Dynamics in Ethiopia
WISP	World Initiative for Sustainable Pastoralism
WLRC	Water and Land Resource Center, Addis Ababa University
WMS	Welfare Monitoring Survey
YL	Young Lives

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Overview

Introduction

This study responds to a request in March 2018 by the Ministry of Finance and Economic Cooperation (MoFEC), to the World Bank and DfID to carry out a study of the lowlands with a view to strengthening the resilience of lowland populations to external shocks. It builds on previous work undertaken by the United Nations (UN) in examining practical ways to end humanitarian need in the lowlands (see HLF Concept Note, 2018),[1] but goes beyond this original study to describe the interplay of factors contributing to the poverty and vulnerability[2] of Ethiopia's lowland populations and to make recommendations to improve the effectiveness of current humanitarian and development responses.

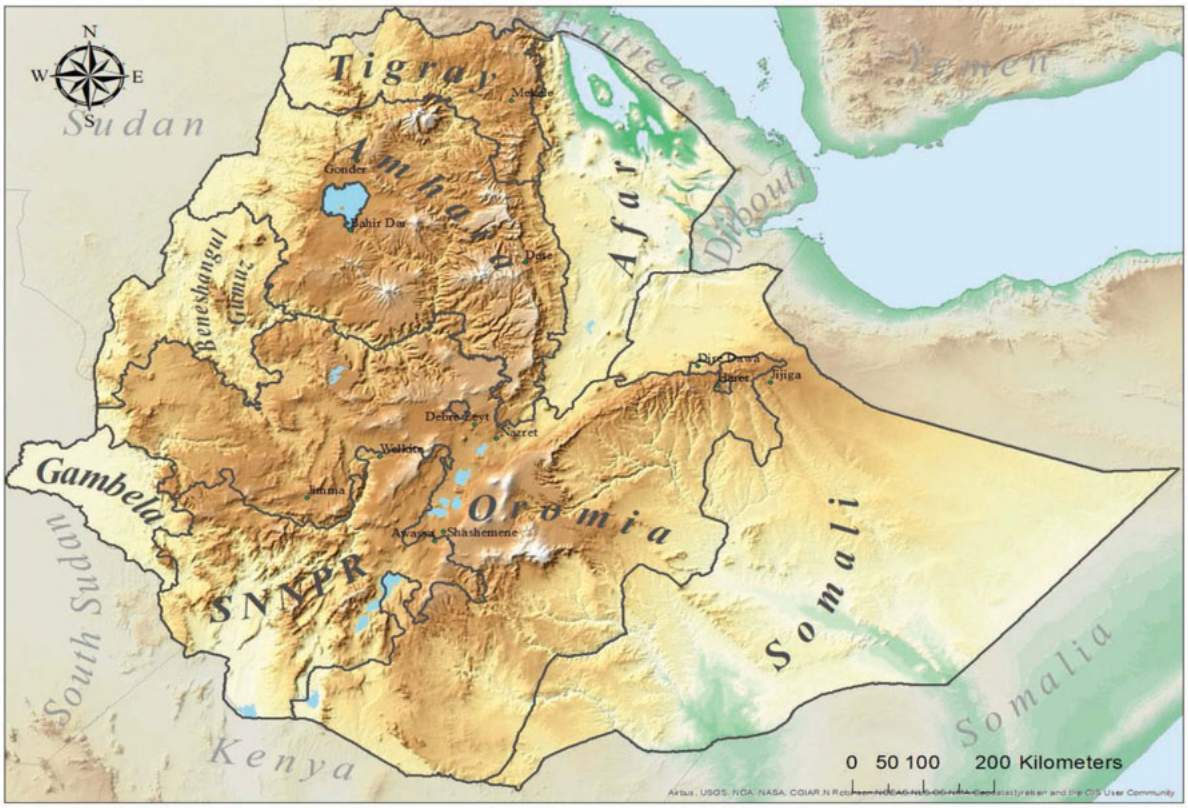
This overview synthesizes the nine self-standing chapters of the report that examine different dimensions of poverty, vulnerability, and resilience to shocks in the Ethiopian lowlands. People's resilience to shocks is generally affected by three important factors: the level of their exposure, their sensitivity to the shock, and their coping capacity (De Haan, 2016; Cervigni and Morris, 2016). Building resilience is about ensuring that households can respond to shocks without losing access to sustainable livelihoods and depleting their assets to the point of no recovery.

To identify a policy agenda fostering resilience in the lowlands, the report adopts an analytical framework with three main features. First, the livelihood system of the population in the lowlands is examined in detail for the purpose of providing a better understanding of the patterns of behavior observed and the factors that are associated with the prevalence of poverty at a given point in time and changes in poverty over time. Second, a distinction is made between the poverty status of a household at a given point in time and the vulnerability of a household to poverty, which is about the likelihood of a household being poor in the future. This distinction between poverty and vulnerability is particularly useful for the development of a safety net system that reduces the need for recurrent humanitarian appeal by supporting not only the chronically poor but also being able to expand to include new beneficiaries during (and contact after) droughts, and long-term development interventions. Third, emphasis is placed on understanding the different sources of household vulnerability in the lowlands, how these sources of vulnerability have evolved over time, and how the capacity of households to cope with changes has evolved. An understanding of the causes of vulnerability to poverty is necessary for the design of policies that increases the overall resilience of household welfare to shocks. The frequent exposure of households to droughts and other shocks in a highly variable and marginal environment has led to the development of adaptive strategies for coping with shocks, including herd diversification, human and livestock mobility, and common access to grazing resources. Changes in the availability of water, the amount of rainfall and its distribution across space and over time, the frequency and duration of droughts, the stock of human capital assets and livestock owned, declines in the availability of land for grazing, and

[1] Omzigt, Dirk-Jan, A Study on Lowland Resilience in Ethiopia—Building a More Developmental Approach to Responding to Shocks, May 2018, UNDP.

[2] Vulnerability is predictive or an ex ante measure of welfare since it refers to the prospective immediate impact of a shock (or the likelihood of being poor in the event of a future shock). Poverty is an ex post measure of welfare and an important factor that increases a household's or community's susceptibility to the impact of shocks and the ability to recover from them. In contrast, resilience is about "the speed of recovery from shocks" or the longer time path of well-being in the face of shocks, and especially the likelihood that any adverse outcomes of either risk avoidance or a realized shock do not persist for an extended period.

Map E.1: Administrative regions with highland/lowland relief



political and economic marginalization, all combined or in isolation, tend to strain the ability of hosueholds to cope with shocks. This, in turn, results in increased household vulnerability to poverty in the future, as well as their speed and ability to recover from the shocks.

Based on the preceding analytic framework, a selective policy agenda for the promotion of resilience in the lowlands is identified consisting of three pillars (elaborated in more detail in the last section of this overview):

- investing in human capital development, through improved delivery of human development services;
- developing a safety net system that can deal with short-term crises and longer term developmental needs; and
- improving the efficiency of the livestock economy while encouraging economic diversification and improving infrastructure and connectivity.

Pastoral Livelihoods in the Lowlands

Ethiopia's lowlands are home to some of the country's most vulnerable populations who depend on extensive livestock herding and/or farming in a highly variable and marginal environment. Altogether, the lowlands (below 1,500 meters) constitute over 60 percent of the country and are home to some 10–12 percent of the country's population. Administratively they cover parts of Tigray and Amhara, the four "emerging" regions of Benishangul-Gumuz (BG) and Gambella in the west, and Somali and Afar in the east and southeast, as well as parts of Oromia and SNNP regions in the south (see Map E.1). The backbone of the economies of these lowland areas is extensive livestock herding by pastoralists and agropastoralists, who constitute some 56 percent and 44 percent, respectively, of the total pastoralist population of some 6.6 million people in the country.[3] The main difference between these livelihood categories is in their degree of dependence on livestock. According to one definition, pastoralists derive 50 percent or more of household gross revenue from livestock or livestock-related activities, while agropastoralists (those who engage in both pastoralism and agriculture) derive more than 50 percent of household

[3] Atlas of Ethiopian Livelihoods (2010), based on data from the 2007 national census.

gross revenue from farming and 10–50 percent from livestock (Ellis and Swift, 1988).

Although pastoral livelihoods in the lowlands have fairly diverse forms, their basic economics consist of the simultaneous need to manage risks to financial assets (livestock) and food security in the context of shocks. Major shocks in these areas commonly refer to extreme weather events, such as droughts and floods, sharp fluctuations in the terms of trade, human and animal diseases, and conflicts between groups. These shocks are compounded by vulnerability driven by low levels of human capital, exposure to environmental factors, weak governance, and remoteness. Generally, the poorer you are in terms of both consumption and multidimensional poverty, the more vulnerable you are to these shocks, as even minor fluctuations may affect your ability to cope and recover after the shock.

Households engaged in pastoralism consume meat and milk that are sourced directly from their livestock and cereals that are sourced mainly through crop production and/or livestock sales. Prolonged drought shocks can quickly decimate livestock herds, cause crop failures, and increase food insecurity.[4] In the event of a drought, vulnerability to poverty and food insecurity increases due to livestock mortality, declines in the milk yields of animals, and increased constraints in the capacity of pastoralists to sell livestock and buy cereals. As the drought progresses, the value of livestock may also fall and the price of cereals increase, meaning less favorable terms of trade between livestock and cereals (the kgs of staple grain that could be purchased with cash earned from the sale of an animal). Herd re-constitution after a drought is a long and slow process because of the mortality rate in the female reproductive stock. In fact, reductions in herd sizes below a certain threshold and composition make it very unlikely that a pastoralist can ever recover his losses.

Despite significant falls in headcount poverty rates in the past two decades in lowland regions, largely on the back of increasing national and global livestock prices, many people continue to be trapped in chronic poverty or are vulnerable to sliding back into poverty due to insufficient income, assets (including livestock), or human capital. Some populations in the lowlands have been able to take advantage of increased global demand for livestock and livestock products and improved infrastructure and connectivity in many areas that have allowed for easier access to markets and more effective and timely humanitarian aid delivery. These changes have had both positive and negative effects on the resilience of lowland populations. For those who still have access to livestock, rising livestock prices have compensated for smaller household livestock herds. But it also means that livestock owners are increasingly dependent on the market and vulnerable to fluctuations in future terms of trade for their products. Generally, while there are fewer poor people in the lowlands than two decades ago, there are many more that are vulnerable to falling below the poverty line in the event of external shocks. Indeed, lowland populations are the most vulnerable to covariate shocks of any agroecological zone in the country. While there is a strong positive story of change—that is too often overlooked by commentators—there are also clearly winners and losers in the changes that have been taking place.

Considering the high prevalence of vulnerability to poverty, the study focuses on the challenges faced to inform the broader development policy package and promote resilience in the lowlands. The frequent exposure of households to droughts and other shocks in a highly variable and marginal environment has led to the development of adaptive strategies for coping with shocks, including herd diversification, human and livestock mobility, and common access to grazing resources. The prevailing view among observers and policy makers is that vulnerability to shocks is increasing over the long term in the lowlands.

Changes in Monetary and Nonmonetary Poverty

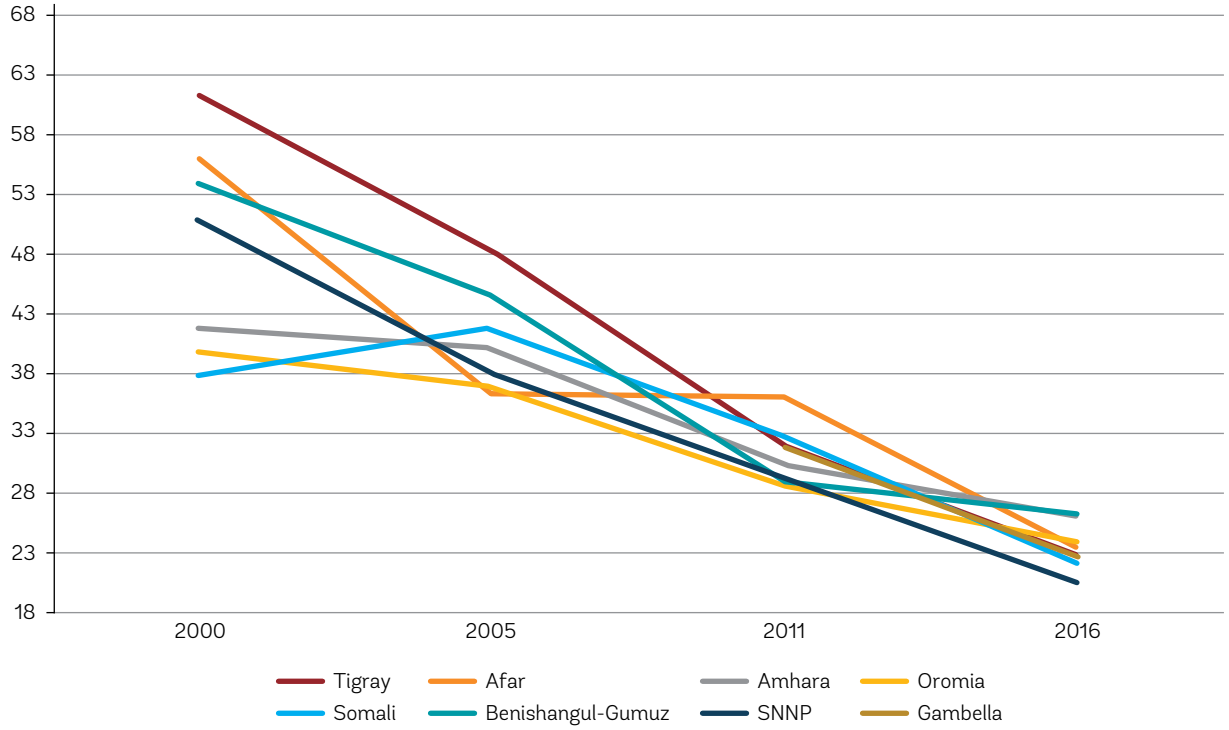
Pastoralists have done relatively well in recent years despite the 2015 drought. Poverty rates among pastoralists declined, while poverty rates among full-time farmers increased. At the same time, the severity of poverty has increased in many groups.

Poverty headcount rates in each of the eight regions of Ethiopia declined significantly between 2000 and 2016 (Figure E.1).[5] In 2000 there was

[4] Food security consists of four broad dimensions: availability, access, utilization, and stability (over time) (Barrett, 2009).

[5] An estimate of expenditure-based or "monetary" poverty is derived by comparing total (food and nonfood) household expenditures per adult equivalent against the nominal (or inflation-adjusted) poverty line per adult equivalent (AE) (3,781 Birr per AE in 2011, and 7,184 Birr per AE in 2016).

Figure E.1: Overall decline in headcount poverty by region 2000–2016 (HCE surveys)



Source: World Bank staff estimates based on the respective HCES and WMS.

a considerable diversity in the prevalence of poverty across regions, ranging between 38 percent in the Somali region and just under 63 percent in the Tigray region. By 2016 the poverty rates in all eight regions ranged between 20 and 28 percent, exhibiting a rapid convergence to a lower headcount poverty rate. With the unique exception of the Somali region where poverty seems to have increased temporarily between 2000 and 2005, poverty in all other regions has either declined rapidly or did not increase from survey to survey.

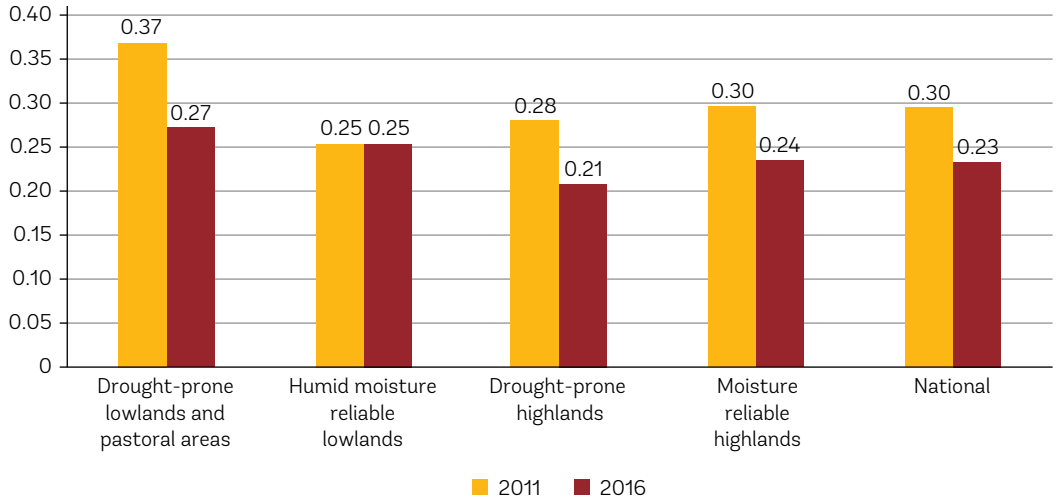
A closer inspection of the poverty headcount rate across agroecological zones between 2011 and 2016 reveals that decline in poverty in the drought-prone lowlands and pastoral (DPL&P) areas is the largest among all agroecological zones (Figure E.2).[6] The DPL&P areas had the higher poverty rate of 37 percent in 2011, but by 2016, the poverty rate was 27 percent, a decline by 10 percentage points (pp), considerably greater than the decline by 7 pp in the poverty rate at the national level. The decline in the headcount poverty rate in the DPL&P was also accompanied by a small decline in the poverty gap (distance from the poverty line) and in the severity (depth) of poverty.

The decline in the monetary measures of poverty is accompanied by declines in the value of the Multidimensional Poverty Index (MPI) in the two main regions of the drought-prone and pastoral areas, Afar and Somali, albeit from a high value of deprivation in basic services in 2011 (see Figure E.3). The Multidimensional Poverty Index constructed by Oxford Poverty & Human Development Initiative (OPHI) focuses on the combination of deprivations that simultaneously afflict a household and consists of weighted indicators on child mortality, child nutrition (measured by child weight for age), child school enrollment, completed years of schooling by adult household members, and standard of living (e.g., access to electricity, drinking water, sanitation, type of floor, cooking fuel, and asset ownership (excluding livestock).

A similar pattern is observed with respect to the change in the prevalence of stunting among children between zero and five years of age (Figure E.4). There is an increasing consensus that child height for age z scores (HAZ) provide a better measure of the nutritional status of children and of their potential welfare as adults. In a pattern consistent

[6] The country is divided into four agroecological zones: the drought-prone and pastoral lowlands (DPL&P), the moisture reliable lowlands, the drought-prone highlands, and the moisture reliable highlands following EDRI, 2009 (see Map 1.1 in Chapter 1).

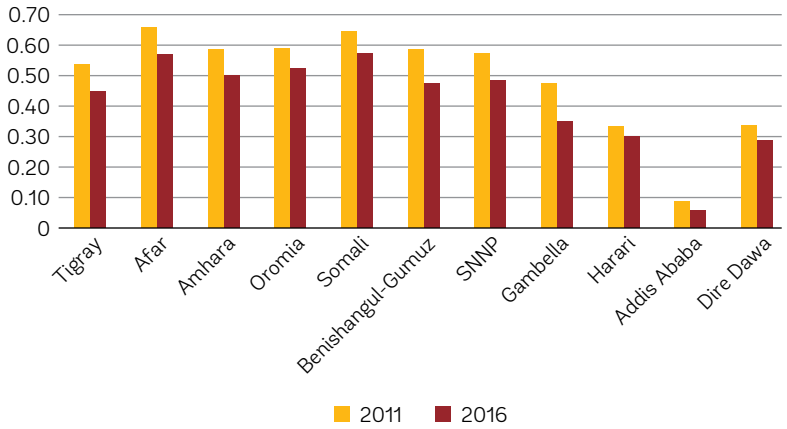
Figure E.2: Headcount poverty rate by agroecological zone: 2011 vs. 2016 (HCES)



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

Figure E.3: Multidimensional poverty index by region: 2011 vs. 2016



Source: Oxford Poverty & Human Development Initiative (OPHI) accessible at: https://ophi.org.uk/multidimensional-poverty-index/global-mpi-2018/

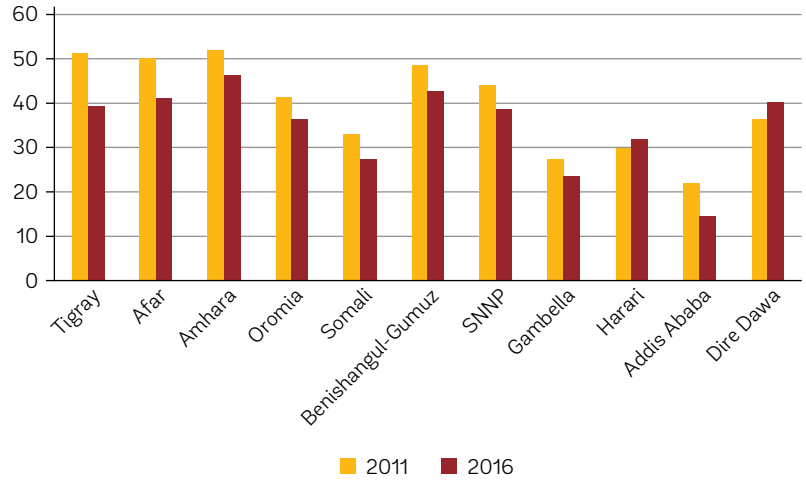
with that observed for expenditure-based poverty and the MPI, Afar and Somali regions also appear to have experienced a decline in the prevalence of stunting between 2011 and 2016.

Expenditure-based or monetary poverty rates declined in the (DPL&P) areas of Ethiopia, despite the 2015–16 El Niño triggered droughts that affected large parts of Afar and northern Somali region (see Figure E.5). In the humid moisture reliable lowlands, however, the headcount poverty rate seems to increase between 2011 and 2016, when food aid is excluded, while it remains constant when food aid is included (see Figures E.5 and E.2). The main reasons for this appear to be that food aid and lack of safety nets[7] in Gambella and Benishangul-Gumuz had much less of a cushioning effect on poverty rates (than in other lowland areas).

The declines in the prevalence of poverty in the drought-prone lowlands and pastoral areas have been accompanied by an increase in the reliance on crop production as the main source of income of households between 2011 and 2016 (Figure E.6). The share of the population (urban and rural areas combined) reporting livestock as their main

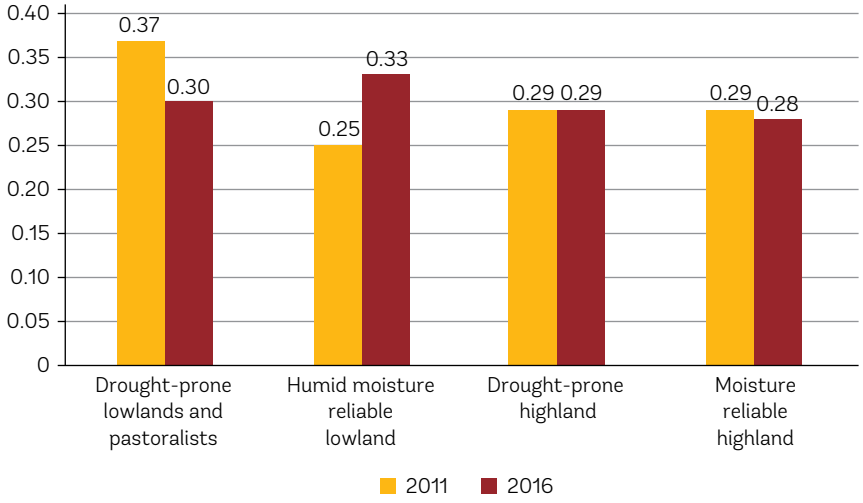
[7] PSNP is absent in Gambella and Benishangul-Gumuz.

Figure E.4: The prevalence of stunting among children 0–5 years of age by region: 2011 vs. 2016



Source: Ethiopia Demographic and Health Surveys 2011 and 2016.

Figure E.5: Trend in the poverty headcount rate without aid/donations: 2011 vs. 2016



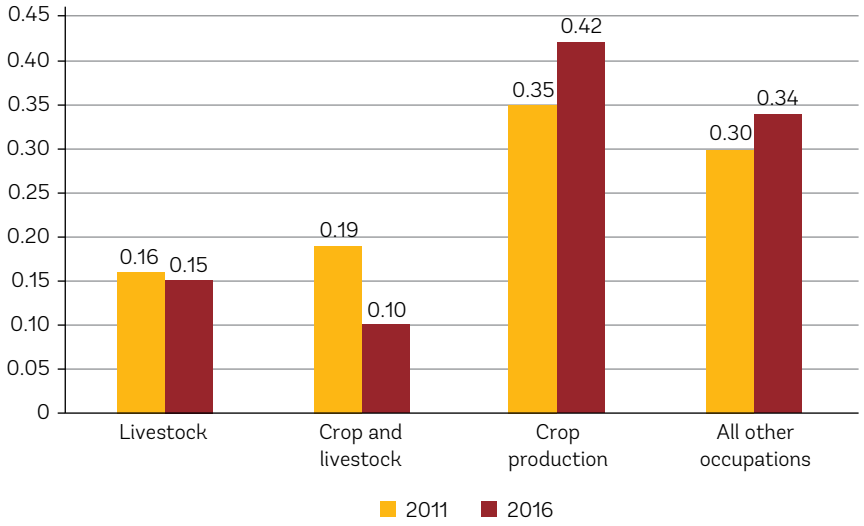
Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Notes: Poverty rates in the absence of food aid are estimated by subtracting from total household consumption all food aid and donations received either from humanitarian organizations and/or from Ethiopia's social safety net system (see Chapter 2 for more details). All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

livelihood declined only slightly, from 16.3 percent in 2011 to 15 percent in 2016, whereas the share of the population in crop and livestock almost halved, from 18. 5 percent in 2011 to 9.5 percent in 2016. Most of the population shifting away from only livestock or crop and livestock seems to be moving into full-time crop production, with the fraction of the population in crop production increasing from 35 percent in 2011 to 41.6 percent in 2016, and the rest moving into other livelihoods/occupations.

Contrary to the prevailing view, consumption-based or monetary poverty among pastoralists has declined significantly despite the drought and other shocks (see Figure E.7). In contrast, the poverty rate among farmers and agropastoralists has not changed significantly between 2011 and 2016. However, despite the reduction in their poverty rates, many pastoralists hover just above the poverty line and could become poor if they experienced serious shocks. Figure E.7 reveals that there has been a substantial reduction in the headcount poverty rate among households with livestock as their main livelihood, with the proportion of the poor population among those largely dependent on livestock decreasing from 58 percent in 2011 to 29 percent in 2016 (a reduction of 29 percentage

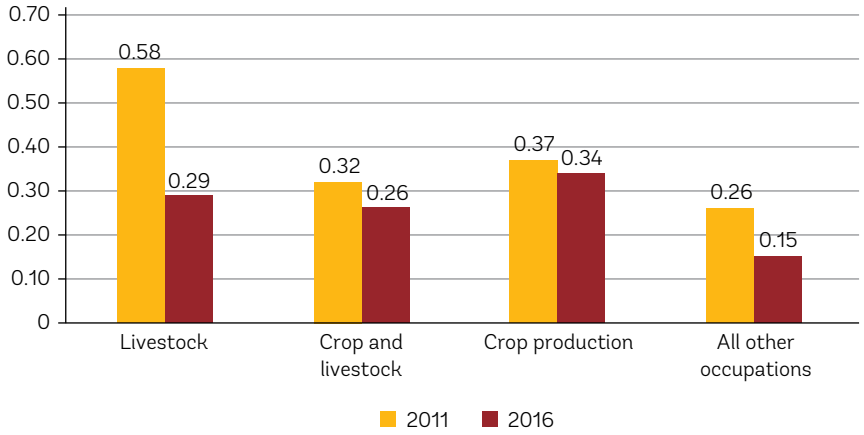
Figure E.6: Changes in the percentage of population in different livelihoods—drought-prone lowlands and pastoral areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS (urban and rural areas combined).

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

Figure E.7: Poverty rate (headcount) by livelihood—drought-prone lowlands and pastoral areas in 2011 and 2016



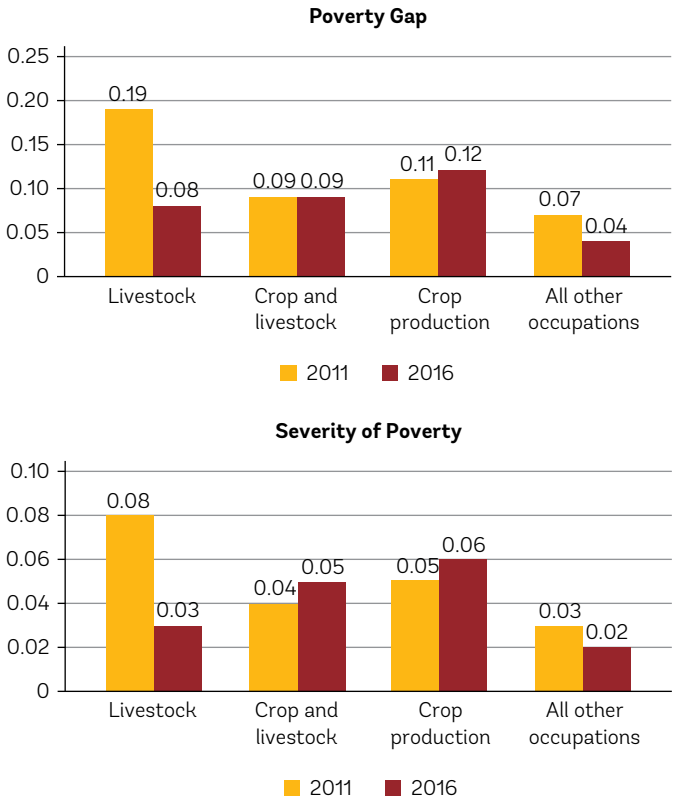
Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

points). In contrast, the headcount poverty rate in all other livelihoods appears to have declined more moderately (by 11 percentage points in all other occupations and only by 3 percentage points in crop production).

However, even though the headcount poverty rate may have declined, overall poverty has "deepened" among poor households engaged in agropastoralism (crop and livestock production) or in crop production alone. The reductions in the headcount poverty rate by livelihood are not informative as to whether the standard of living among poor households in different livelihood categories improved or deteriorated. Figure E.8 presents the poverty gap and the severity of poverty measures, with the former measuring the average distance of household expenditures from the poverty line among the poor, and the latter placing a higher weight on the poverty gap of those further away from the poverty line. Figure E.8 reveals that the depth of poverty among those engaged in crop and livestock, as well as in crop production only, increased between 2011 and 2016.

Figure E.8: Poverty gap and severity of poverty by household livelihood—drought-prone lowlands and pastoral areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

At first sight, the short-run trends in monetary poverty appear to be contradictory to the prevailing views about poverty in the lowlands. The explanation for these short-run changes in poverty lies in the fact that the terms of trade prevailing between livestock and staple grain prices were favorable to pastoralism. As elaborated in more detail in Chapter 2, the welfare of households engaged in pastoralism in the lowlands has increased due to increasing livestock prices relative to those of cereals. However, these favorable terms of trade between livestock and staple grains have not benefited all households equally. Farmers and agropastoralists, who generally have considerably less livestock (or no livestock at all) compared to pastoralists and are more dependent on sales of grains, have been less able to benefit. Despite the improved livestock prices, many agropastoralists are hovering just above the poverty line and, given the much smaller herd sizes they have today, could easily slip below the poverty line when faced with shocks.

Vulnerability

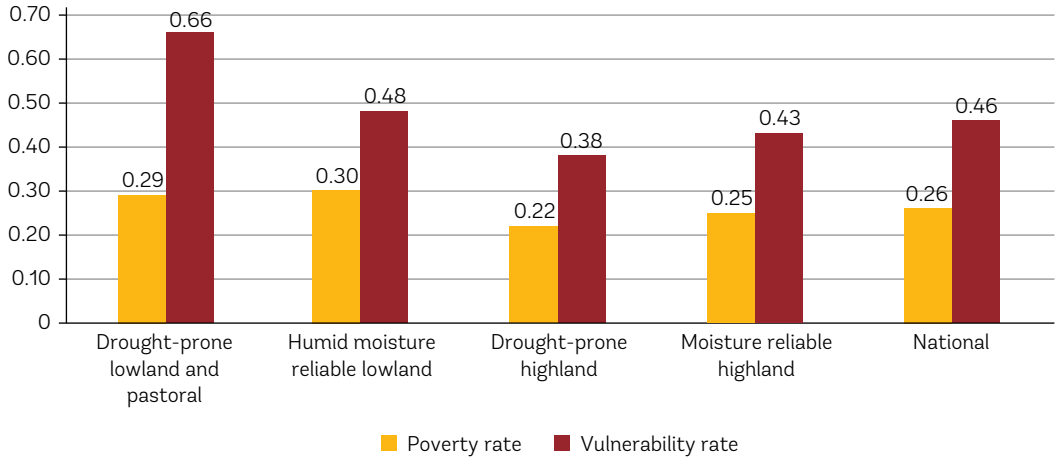
Despite significant falls in headcount poverty rates in the past two decades, too many people continue to be trapped in chronic poverty or are vulnerable to sliding back into poverty.

Efforts at building a more resilient future for the population living in the lowlands require a better understanding of the interplay of factors contributing to the poverty and vulnerability of Ethiopia's lowland populations. The familiar headcount poverty rate is not necessarily a very useful guide to the future poverty status of a household. Households in the lowlands are frequently hit by a variety of shocks resulting in high income and consumption volatility. In a context of high volatility, a household's currently observed poverty status is, therefore, unlikely to be a very good guide to a household's vulnerability to poverty, or its "poverty risk." Poverty is a backward looking or ex post measure of welfare, whereas vulnerability is predictive and indicates what might happen to a household or community exposed to a particular hazard. For example, a household may currently be nonpoor, meaning that its current level of welfare measured by consumption is above the poverty line, but in the event of a future shock, the same household may end up falling below the poverty line. Such a household may be said to be "vulnerable to poverty" even though currently it is not poor. In general, the extent of vulnerability to poverty depends on the risk management strategies of households and communities, the abilities of households to cope after the incidence of the shock (e.g., assets owned, herd size and composition of herds, social capital), and access to safety nets (e.g., PSNP).[8]

In spite of the decline in the headcount poverty rate (Figure E.2), the drought-prone lowlands and pastoral areas have the highest vulnerability to

[8] Vulnerability to poverty is related to the concept of "resilience," which concerns the longer time path of well-being in the face of shocks, and especially the likelihood that any adverse outcomes of either risk avoidance or a realized shock do not persist for an extended period. For example, a nonpoor household may be vulnerable to becoming poor due to a job loss and yet be quite resilient if the prospects for finding follow-on employment offering similar compensation are high and/or formal or informal safety net programs provide adequate support promptly. In statistical terms, a nonpoor household with high conditional variance of income might be both vulnerable (to becoming poor) and resilient (because the poverty is sufficiently short in duration, intensity, and/or likelihood (Barrett and Constas, 2014).

Figure E.9: The prevalence of poverty and vulnerability—lowlands vs. other agroecological zones in 2016



Source: Bank staff estimates based on the 2016 HCES and WMS.

poverty rates among all agroecological zones in Ethiopia (see Figure E.9). According to estimates detailed in Chapter 2 of the report, about two-thirds or 66 per cent of the population in the drought-prone lowlands and pastoral areas are either poor or at risk of becoming poor in the event of a shock in the future. In the drought-prone lowlands and pastoral areas, vulnerability due to idiosyncratic shocks is relatively more important than vulnerability due to covariate shocks, such as drought (ratio equal to 0.86). Nevertheless, of all agroecological zones in Ethiopia covariate vulnerability, such as that associated with droughts, is highest in the drought-prone and pastoral lowlands.

Sources of Vulnerability

An understanding of the causes of vulnerability to poverty is necessary for the design of policies that increase the overall resilience of household welfare to shocks. If vulnerability to poverty is associated mainly with low assets and low human capital endowments (i.e., it is **poverty-induced**), then cash transfer programs or programs enhancing the delivery of basic services facilitating investments in physical and human capital are likely to be the most appropriate. In contrast, if vulnerability to poverty is associated mainly with variability in consumption volatility caused by climatic and environmental factors (i.e., it is **risk-induced**), then an insurance type of program may be needed to increase resilience. The insurance provided would allow households to make production and investment choices based on their expected returns, rather than the potential implications of these investments on welfare.

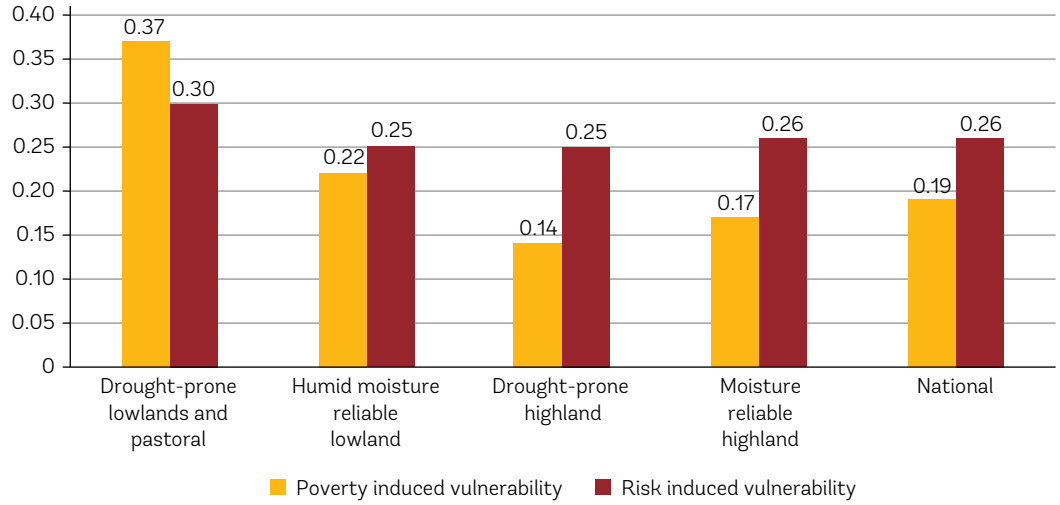
Vulnerability to poverty from low human capital or high consumption volatility is higher than in any other part of the country (see Figure E.10). Figure E.10 reveals that in the drought-prone lowlands and pastoral areas, both poverty-induced and risk-induced vulnerability are higher than in other agroecological zones.

In the lowlands, vulnerability associated with low human capital and assets (poverty-induced vulnerability) is relatively more important than vulnerability associated with climatic and environmental shocks (risk-induced vulnerability).[9] This is in sharp contrast to the other agroecological zones where the relatively more important source of vulnerability to poverty is high variability in consumption. This attests to the unique nature of the lowlands in comparison to other agroecological zones and informs the design of policies that can increase the overall resilience of household welfare to shocks.

Thus, alleviating vulnerability rather than poverty, per se, should be the primary aim of policy in the lowlands. The current focus of the safety net system in Ethiopia is primarily on the chronically poor households. Yet, many households in the lowest wealth strata across lowland areas are vulnerable or a "shock away from poverty" and

[9] In the lowlands, the ratio of the vulnerability rate that is poverty induced to the vulnerability rate that is risk induced is 1.2 (=0.37/0.30), the highest among all other agroecological zones.

Figure E.10: Sources of vulnerability in 2016—poverty induced vs. risk induced



Source: Bank staff estimates based on the 2016 HCES and WMS.

require support during droughts, as well as alternative income earning opportunities. Considering that vulnerability to poverty in the lowlands is primarily "poverty induced" (i.e., due to low assets and human capital endowments), cash transfer programs and/or programs strengthening the delivery of basic services and facilitating investments in human and physical capital are the most appropriate to the context of the lowlands.

Vulnerability to poverty in the lowlands is primarily due to low human capital and assets (including livestock).

The lowlands, especially the drought-prone lowlands, lag the highlands across a range of human development indicators (see Chapter 3 for more details). Across a range of human development outcomes, from school attendance to infant and child mortality rates, and severe acute malnutrition, the lowlands do worse than the highlands. Accessibility and quality of services are also worse.

The poor levels of education in the lowlands are also a key constraint to making progress on gender equality. Negative social norms remain a major barrier to women and girls for accessing basic services and full participation in market opportunities.

However, a deeper understanding of the long-term trends of the climatic and enviromental factors associated with vulnerability is also essential for informing the broader development policy package for increasing resilience in the lowlands.

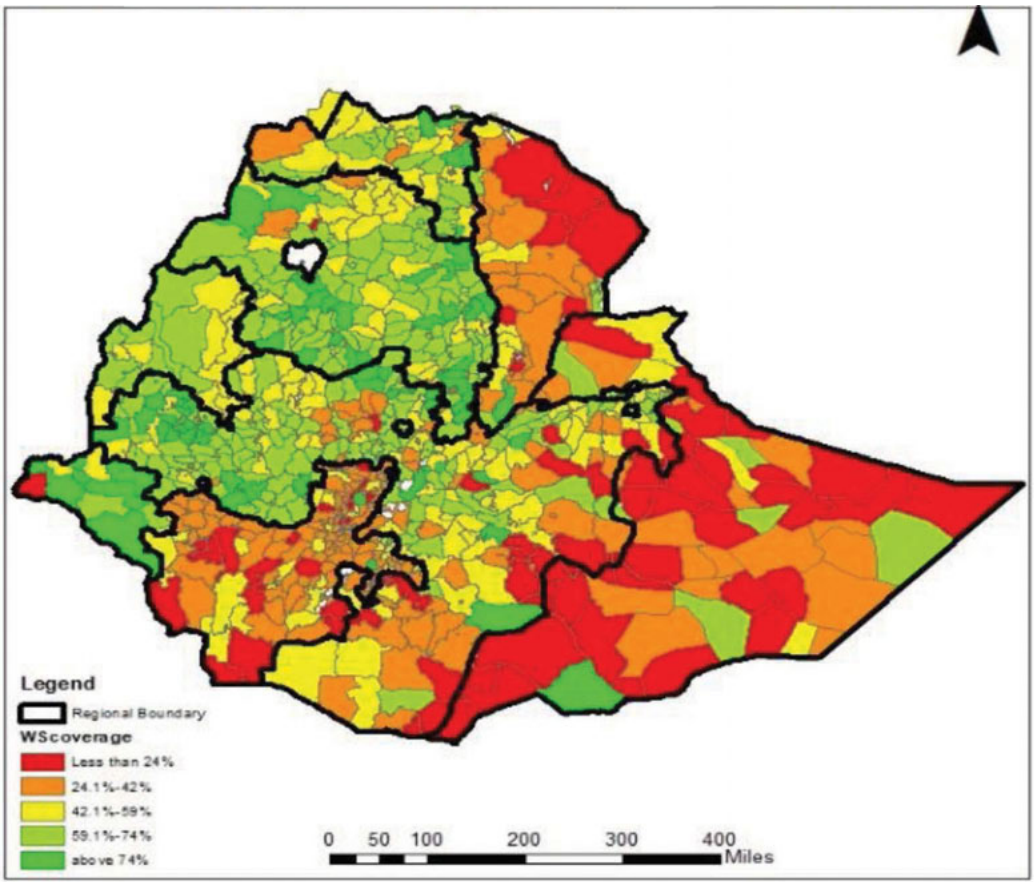
Water availability and access

Water availability is a critical component of lowland livelihood systems. However, there is a wide variety of conditions in the lowlands related to groundwater presence and availability. Large areas have brackish or salty groundwater, with high mineral content that makes it unsuitable for drinking water and most other purposes. As a result, water resources in pastoralist areas, particularly in the two regional states of Afar and Somali, are usually scarce and costly to access for the rural water supply.

Surface water is largely confined to the perennial and seasonal rivers that run through the lowlands, whereas groundwater availability varies across the lowlands. Afar state is underlain by several deep and prolific aquifers of regional importance. The high salinity of the waters in some areas, however, limits use of the water for irrigation and drinking purposes. In Somali region, by contrast, water tables in some areas run extremely deep and aquifers are low yielding. Notable areas for better groundwater potential include: (i) the Shinile area in northern Somali region, (ii) the Jerer valley, and (iii) the shallow groundwaters in the Fafan valley in the northern part of the regional state. Elsewhere in the region, groundwater of limited extent can be encountered along the banks of the major rivers. Shallow groundwater also occurs in the Ogaden zone.

Access to improved water supply and sanitation facilities in pastoralist areas of Afar, Somali, and pockets of pastoralist areas in Oromia and

Map E.2: Regional water supply coverage



SNNPR lag highland regions and the national average. Access levels for water and sanitation range from 39–61 percent, and sanitation coverage ranges from 6–21 percent, respectively, compared to 62–95 percent and 41–76 percent, respectively, in highland areas (OWNP Phase II program, November 2018). According to the Ethiopian WaSH Poverty Diagnostic study, agrarian highland *woredas* were significantly more likely to have access to improved water than agropastoralist *woredas*, by about 10 percentage points. Map E.2 highlights regional coverage rates by *woreda*.

According to a survey conducted in lowland *woredas* of Somali, Afar, and South Omo zones of SNNP regions (USAID, May 2016), 48 percent do not have access to improved drinking water sources, of which 49 percent were in Afar, 81 percent in Somali, and 15 percent in SNNP. The same survey highlighted that of the 51 percent that have access to water in Afar, 86 percent of households use water from drilled boreholes. Baseline data collected in 366 *woredas* in 2018 also indicated that 80 percent of the *woredas* in SNNP, Somali, and Afar have below the national average access coverage (53%). The same survey also suggests that there is very low sanitation coverage in Afar (23%) and Somali (5%) regions.

The lower rainfall in pastoralist and agropastoralist areas, combined with the the scarcity of potential groundwater water sources, increase the costs of accessing water. While there are shallow aquifers in the alluvial beds of many rivers, they are not perennial and may last a few weeks to a few months after the rainy season. There are also areas that have sedimentary or volcanic formations, with deep to very deep aquifers. However, some of the deep aquifers could have a meager yield or may have poor water quality, often with high mineral content and high temperatures, which may make the water unsuitable for drinking, small-scale irrigation, and even for animal watering.

The scattered settlement patterns of pastoralist and agropastoralist areas have made water service schemes expensive to maintain. Given the transient nature of some communities, the operation and maintenance of sophisticated pumping systems have been inadequate. Systems that require extensive pumping of deep groundwater

sources, for example, require diesel to operate pumps and replacement of spare parts that are often imported (electromechanical equipment, steel casing, etc.). Consequently, water investments in sparsely populated areas have fallen into disrepair due to lack of accountability, community engagement, and capacity for repairs.

The hydrology and geology in lowland Ethiopia are complex, and little is known about the quality and quantity of water resources, which makes the cost of reconnaissance before drilling expensive. Master plan studies of the different river basins focus only on significant tributaries and detail the surface water resource potential for hydropower and irrigation use. Information available about groundwater resources in the lowlands is fragmented. The hydro-geological data from drilled boreholes in the lowland areas have not been systematically collected and analyzed to assess groundwater potential to orient design and management of water service delivery.

The cost of drilling and groundwater exploitation in many of the pastoralist regions is increasingly expensive, with a technological shift toward deep boreholes and limited drilling capacities in lowland regions. Although the knowledge base to orient investment in groundwater is fragmented, the reliance on groundwater is increasing. To reverse the high rate of drilling failure or the lower than average water yield or chances of boreholes "drying up," the solution to date has been to drill deeper. Borehole drilling in lowlands is expensive and can be as high as US$291,000 per borehole, against a national median cost of US$128,000. Review of actual drilling contracts in Oromia, SNNPR, Somali, and Afar regions have revealed that the average cost of drilling a borehole ranges from ETB 4.69 million in Somali to ETB 0.44 million in Oromia. Besides the high cost of drilling, there is also a higher rate of non-functionality—according to the Ministry of Water, Irrigation and Electricity (MoWIE), the national average is 11 percent, while in some lowland regions this rate is three times higher.

As a result of these factors, water development in the lowlands needs to be undertaken with careful consideration of its wider environmental impact. Investing large sums of money into widespread bore hole drilling may not be the best way to use scarce budget resources and may do more long-term environmental harm than good.

Rainfall and droughts

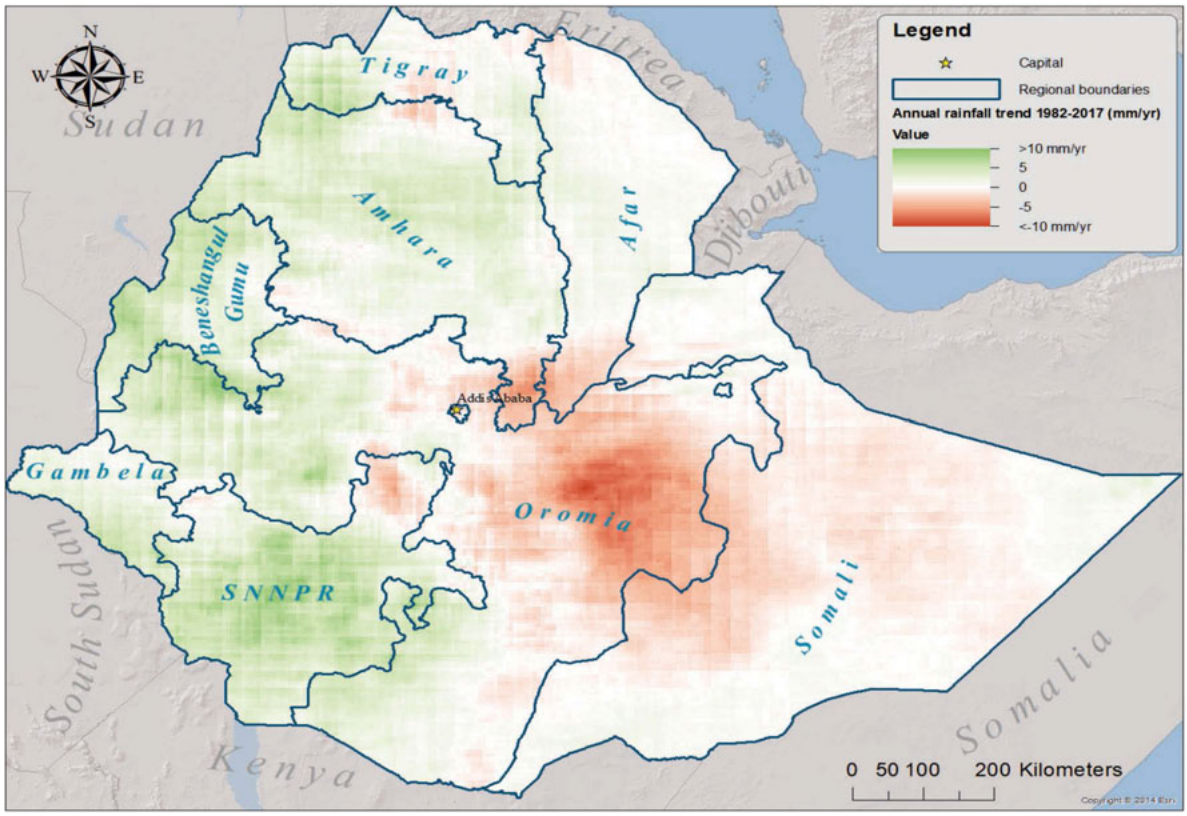
Rainfall is highly variable, both in distribution and amount. This variability is particularly marked in the arid and semiarid, drought-prone lowland areas which cover most of Afar and Somali regions and parts of Oromia and SNNP. Contrary to the conventional narrative that rainfall has been declining in past years, lowland rainfall appears to have increased slightly during the years 1982–2017, with the western lowlands showing the largest increases (see Map E.3). In some areas, including the southeastern Somali region, rainfall has declined slightly, while in other areas, such as the western lowlands of Benishangul-Gumuz and Gambella and southern lowlands in SNNPR, rainfall has been increasing. However, despite a long-term slight increase in rainfall in parts of the lowlands, rainfall is highly variable, both in distribution and amount. The high levels of interannual rainfall variability in the lowlands are too significant for people to take advantage of long-term rainfall trends, and continue to pose challenges and constrain livelihoods and opportunities for economic growth. Climate change projections also point to more frequent extreme weather events in the future.

Historically, Ethiopia's drought hot spots have occurred in the northeast, southeast, and southern lowlands (see Map E.4). Eighty-seven percent of the identified 450 drought-prone *woredas* are in lowland regions—169 of these *woredas* are also flood prone. The most recent prolonged droughts in the northern pastoral areas of Afar and the northern Somali region were in 2015–2016, and in the southern pastoral areas of southern Somali, southern Oromia, and south-west SNNP, in 2016–2017.

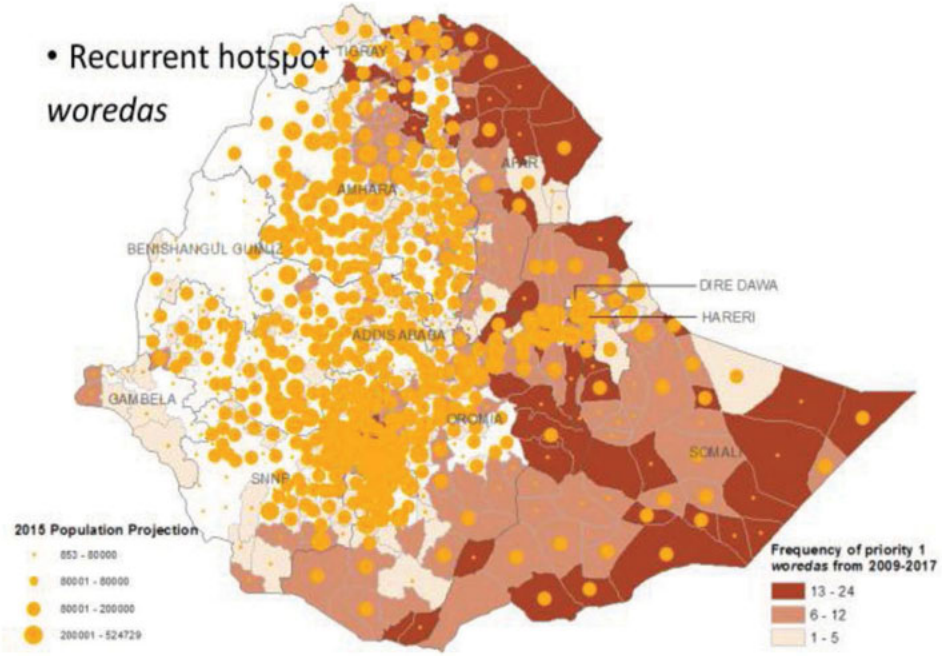
As result of these frequent droughts, the drought-prone lowlands have been consistently targeted for humanitarian aid. On average the humanitarian appeal in Ethiopia has been equivalent to 1.4 percent of GDP over the last six years; spending on safety nets (rural and urban PSNP) is less than 0.5 percent of GDP.[10] The cost of the humanitarian appeal is on average equivalent to 8.9 percent of government revenue.[11] This cost has been rising over time. Food accounts for 76 percent of these

[10] Endale, et al., Financing Social Protection in Ethiopia: A long-term perspective, OECD Development Policy Papers, February 2019, No. 15, p. 32.
[11] Omɀigt, 2018.

Map E.3: Trend in annual rainfall 1982–2017 (mm/year)

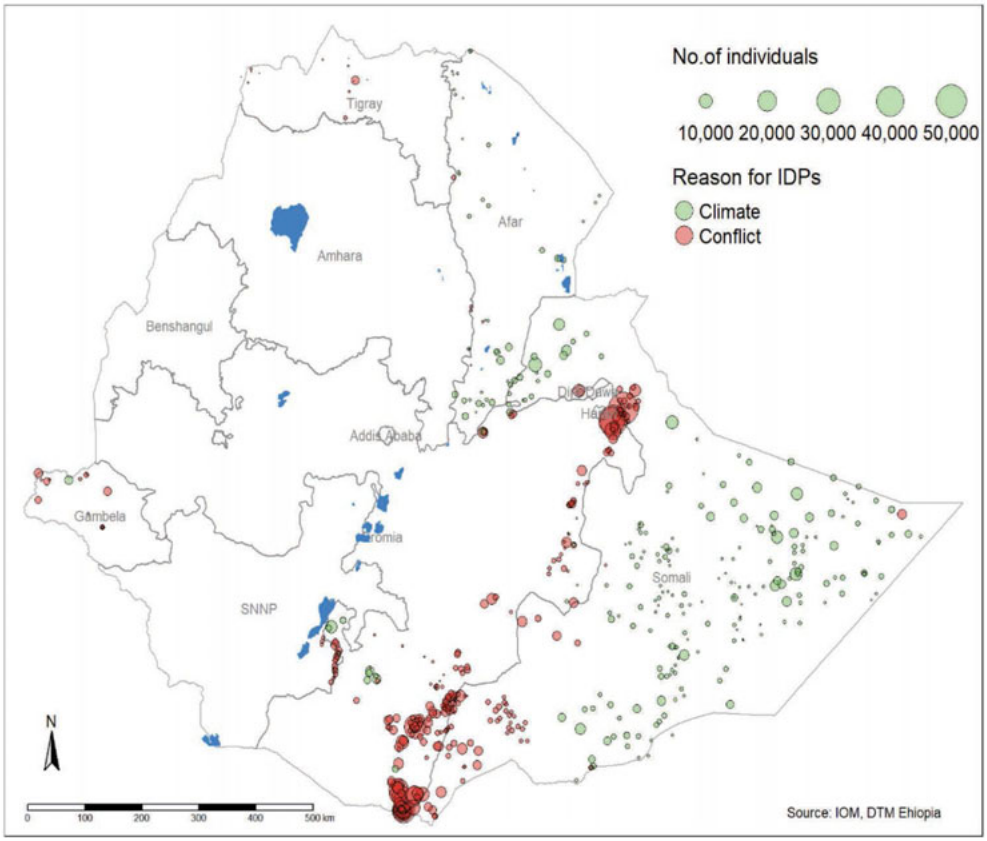


Map E.4: Drought hot spots[12]



[12] Based on UN-OCHA map. Hot spots are *woredas* in need of emergency support.

Map E.5: Internal displacement in the lowlands as result of conflict and extreme climate events (drought and floods) 2016–2018 (WB based on data from IOM)



appeal amounts, on average. Nutrition, health, and water when combined, represent a further 10 percent of the need.[13] In Somali and Afar regions, the percentage of the population reached by humanitarian food assistance or PSNP has exceeded 50 percent in 2016 and 2017. Benishangul-Gumuz and Gambella also receive repeat food aid but to much small portions of their population.

Conflict

In recent years, interethnic conflict, in addition to drought, has seen the displacement of many thousands of pastoralists and agropastoralists in the lowlands, particularly along the Somali-Oromo regional border (see Map E.5). Of the 1.5 million IDPs in the lowlands, half have been displaced by conflict, and 4 out of 10 by drought. Internal displacement in the lowlands primarily affects the Somali region (with close to 7 out 10 IDPs in the lowlands) and Oromia (with a quarter of IDPs in the lowlands). The overall effect of drought and conflicts has been to create a humanitarian crisis in some areas with large numbers of IDPs crowded into camps and dependent on food relief. With close to half of IDPs under 15, pressure is also increasing on health and education services in receiving areas. In other areas, social services have been disrupted as teachers and health staff abandoned schools. While the steep rise in the number of IDPs is recent, most are unlikely to return home soon. A majority of IDPs (85 percent) indicate preferring to integrate locally.

Ethiopia has also experienced multiple refugee crises (some more protracted, some more recent) that have put a strain on the coping capacity of national and local authorities in the lowlands. As of August 2018,[14] Ethiopia is host to 905,831 refugees and 1,964 asylum seekers. The main population groups are comprised of 422,240 refugees and asylum seekers from South Sudan; 257,283 from Somalia; 173,879 from Eritrea; and 44,620 from Sudan; as well as, 1,891 from Yemen.

[13] Attributing to largest national donor funded programs, and considering that health and nutrition are now a combined investment within the health sector.

[14] From https://data2.unhcr.org/en/country/eth

Most refugees are in Gambella (401,594), followed by Somali (256,200), Benishangul-Gumuz (62,461), and Tigray regions (43,740), with the majority of the 26 refugee camps situated in the lowlands. Refugees make up a significant proportion of the population in some regions and outnumber the local population in Gambella. While the presence of refugees brings benefits to the local population in terms of access to services and in stimulating demand for goods and services, the implications of long-term refugee hosting are being felt at the local host-community level, where their protracted presence has wrought environmental degradation and uneven service delivery between refugee and host populations, and has the potential to cause local tension. A more sustainable management of refugees that gradually provides services through national systems has the potential to enhance service delivery for refugees and host communities.

Land fragmentation and loss of access to common grazing areas

At the same time, there has been significant land fragmentation in the lowlands and a decline in access to common grazing areas, which may be undermining pastoralist coping strategies. The drivers behind many of these observed land use changes are complex and interrelated, and include the following:

- *An increase in human population and settlement* has led in many areas to increased cropping and land enclosures. According to data collected for this study, there has been almost a 1,000 percent increase in the area of settlements in the lowlands of SNNP and Afar between 1986 and 2016, and overall across the lowlands an increase of 179 percent. In terms of cropped area, the increase in parts of the lowlands has been almost as dramatic with an over 400 percent increase in Afar, nearly 300 percent in Gambella, and overall a doubling in cropped area in the lowlands, particularly in better watered areas along the highland-lowland interface.
- *The excision of key dry season grazing areas for commercial agricultural plantations* along some of the main rivers that run through the lowlands has resulted in loss of riverine forest and dry season grazing. This has particularly affected Afar and parts of Gambella and SNNP. Gambella (438,000 ha) has the highest share of concessions representing nearly 15 percent of total lowland area, covering a strip running north–south through the region. This also covers large areas of BG (245,000 ha) and SNNPR (134,000 ha) representing 5.5 percent and 2.2 percent of their respective lowland areas. In the eastern lowlands, large commercial farms are primarily located along rivers and rely on expensive irrigation; in Somali, the majority are located along the Shebelle river and along the Awash river in Afar.
- *The introduction of permanent and semipermanent water points has led to a decline in access to and quality of grazing areas.* The construction of boreholes, large surface ponds, and *birkedas* (large cement lined cisterns) in wet season grazing areas in the Haud in the Somali region and parts of Borana has led to settlement, agriculture, and range enclosure in these once seasonally exploited grazing areas. This, in turn, has led to a decline in grazing quality and availability in these areas.
- *Bush encroachment by invasive species, such as* Prosopis juliflora, is an increasing problem in parts of the lowlands, particularly in Afar, parts of Somali, and SNNPR. The presence of *P. juliflora* in Afar has increased by 42 percent between 2000 and 2016 and now covers nearly 1.2 million ha, while the portion characterized by heavy infestation (where 80 percent or more of the land is covered) is over 300,000 ha, an increase of over 600 percent from 2000 levels. Many pastoralists regard bush invasion as a more serious threat to their way of life than drought. It also appears that increasing resource competition between groups has resulted in increasing competition and conflict over access to grazing and water, and in the moist western lowlands, access to forest resources.

Political and economic marginalization, and weak governance

The vulnerability from droughts, conflicts, and diminished access to common grazing areas is compounded by vulnerability driven by political and economic marginalization, and weak governance. Since 1995 the government has sought to address this marginalization through designating the main lowland regions as 'emerging' states with additional financial benefits. Despite this recognition and the benefits it has brought, weak governance and accountability has continued to limit the development of lowland areas. The lowlands are less able to raise their own revenue, which

means that they are more dependent on the federal government, and their financial needs are significant considering the lagging human development indicators, low population density, and recurrent humanitarian shocks. Compared to the highlands, the lowlands do well in terms of per capita fiscal transfers. However, the rationale for different spending choices by lowland governments is not always clear.

Ethiopia's model of local governance is interventionist; it has been designed and implemented from the center to effect change in the regions (Vaughan, 2017). In many areas this change has been rapid and profound,[15] with interventions designed to transform socioeconomic, education, health, and cultural norms. But, in the lowland periphery, the impact of this system has been mixed.[16] Top-down decision making has led to challenges around accountability in many regions. Ethnic parties affiliated with the federal government formally govern the developing regional states, but these parties are not part of the ruling federal coalition. In some regions, disagreements between regional officials and federal officials have developed over the level and nature of federal intervention in their respective regions. State penetration in the lowlands is perceived by many lowlanders to be driven by the priorities and needs of the highland majority, and development strategies such as villagization, land appropriation, and turning pasture or cropping land into commercial farms, have not always produced their intended results, and have often come at a high cost. In many areas these approaches have further marginalized lowland peoples, while also increasing tensions between different ethnic groups, and between highlanders and lowlanders. Opening the space to greater accountability and dialogue, combined with a deeper understanding of the vulnerabilities of its inhabitants, will be key to addressing the needs of lowland populations.

Changes in Pastoral Livelihoods over the Long Term

The impacts of many of the climatic and environmental changes are manifested as a long-term decline in household herd sizes, a shift in composition of herds (keeping more browsers than grazers), a shift toward farming, and increased wealth inequality.

In Afar and Somali regions, between 2010 and 2016, herd sizes declined by more than three-quarters from 78 tropical livestock units (TLU)[17] to less than 19 TLU among the wealthiest quintile in Afar, and among Somali by more than half from 37 to just over 17 TLU (see Table E.1). In the poorest category the decline was even more dramatic, falling from 4.8 to 0.2 TLU and 1.1 to 0.2 TLU among Afar and Somali respectively, effectively forcing this group to exit pastoralism altogether.

The growing inequality in livestock ownership among households is confirmed by data collected by the International Livestock Research Institute (ILRI) in 2016. Based on livestock ownership as a critical dimension of wealth, Figure E.11 shows the share of TLUs per household by wealth quartile across the four regions. The large share of livestock owned by the wealthiest quartile is consistent

Table E.1: Mean livestock holdings, by livestock holding quintile, region, and year in tropical livestock units

Livestock holding quintile	AFAR				SOMALI			
	2010	2012	2014	2016	2010	2012	2014	2016
Poorest	4.8	1.5	0.8	0.2	1.1	0.5	0.6	0.2
2nd	13.7	4.9	2.6	1.4	4.2	3.0	3.6	1.5
Middle	25.5	8.8	5.1	3.3	7.7	7.1	7.2	3.5
4th	42.4	18.0	10.1	6.6	14.6	14.6	12.7	6.1
Wealthiest	78.5	61.7	35.6	18.9	36.7	38.7	27.5	17.1

Source: IFPRI/EDRI, 2018 Targeting Social Transfers in Pastoral Societies-Household Surveys for PSNP.

[15] Pankhurst, (Ed), Change and Transformation in Twenty Rural Communities in Ethiopia, 2017.

[16] Vaughan, Revolutionary democracy as an uncompromising political strategy: Revolutionary democratic state-building: party, state and people in the EPRDF's Ethiopia, 2012.

[17] *Tropical Livestock Units* are livestock numbers converted to a common unit. Conversion factors are: camels = 1.4, cattle = 1, sheep = 0.1, goats = 0.1.

Figure E.11: Distribution of livestock wealth in TLU by household quartile and by region (based on ILRI survey data 2016)

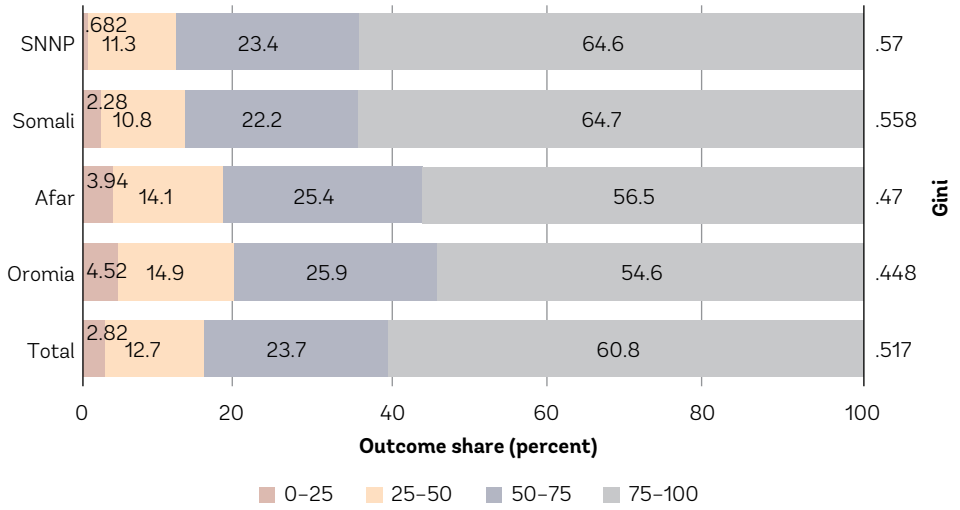


Table E.2: Mean share of total household income (%) (ILRI survey data)

	Afar	Oromia	Somali	SNNP
Livestock income	67	63	52	43
Livestock product income	1	1.7	2.6	7.7
Income from income generating activities	3	7	31	14
Crop income	4.8	1	2.7	28
PSNP income	14	21	3	0.0
Wage income	9.5	5.7	8.6	7.4
Household with share of livestock income >50% (%)	76.0	71.0	55.0	52.0

across all four regions and is confirmed by the findings of other case studies.

Despite the smaller household livestock herds, livestock continues to be an important source of income for many, thanks to the increased price of livestock. However, with reduced livestock assets, susceptibility to shocks has also increased.

Despite growing inequality and falling household herd sizes, livestock continue to dominate sources of income in all the drought-prone regions and, according to ILRI data, represent 67 percent of mean household income in Afar, 63 percent in Oromia, 52 percent in Somali, and 43 percent in SNNP regions (see Table E.2).[18] The ILRI data confirm the growing importance of the government's Productive Safety Nets Program or PSNP, as an important source of income in Afar (14 percent) and Oromia (21 percent), but less so in Somali and in SNNP regions, although it is increasing in importance in the Somali region. Wage employment is of modest importance in all areas but income generation is particularly important among Somalis providing 31 percent of household income in the region (see Table E.2 for breakdown).

Promoting Resilience in the Lowlands: The Components of a Broader Development Policy Package

To address the needs of lowland populations, government needs to address the primary sources of fragility and vulnerability in the region. PSNP and recurrent humanitarian interventions may alleviate the symptoms but cannot address the primary causes of this vulnerability identified above. The analysis in this report identifies a selective policy

[18] While important, the study also showed that the value of livestock sales was more significant for wealthier households, with an average of 70 percent of all household income coming from livestock. Income from livestock was much lower for the poorest quartile with only 17.5 percent and 28.8 percent of sales in SNNP and Afar regions, respectively.

agenda for the promotion of resilience in the lowlands with the following three pillars:

- investing in human capital development through improved delivery of human development services;
- developing a safety net system that can deal with short-term crises and longer term developmental needs; and
- improving the efficiency of the livestock economy while encouraging economic diversification.

Each one of these pillars is elaborated in more detail below.

Human capital development

Building resilience in the lowlands requires a large investment in human capital through effective and accountable basic services. The analysis in this report suggests that overall, there needs to be a much stronger focus on improving the human capital in the drought-prone lowlands. Without a focus on improving the human capital, there will be little chance to break the cycle of vulnerability. With respect to investments in human capital, important policy considerations emerging from this study include:

- the allocation of more on-budget resources for human development in the lowlands;
- the introduction of more results-based approaches;
- the introduction of Specific Purpose Grants, targeted to regions/*woredas* with low human development outcomes; and
- the alignment of civil servant incentives and pay to results; and
- the recentralization of some local and regional functions to higher levels and review mechanisms of local planning enforcement and sectoral budget allocation in view of national targets.

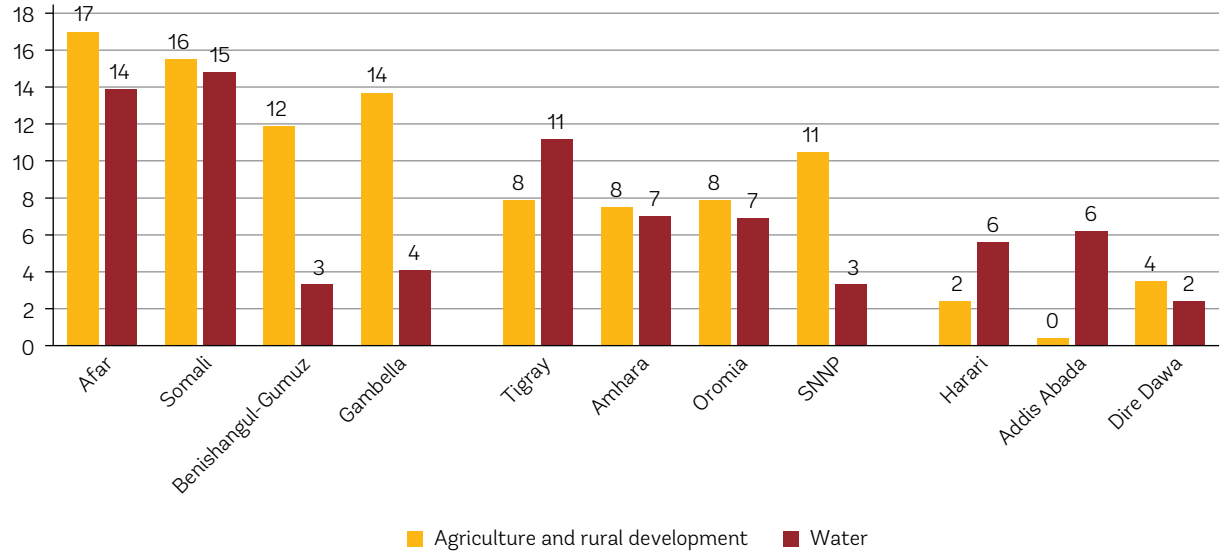
Limited human capital is also a binding constraint to growth and gender equality in the lowlands. The lowlands are an area of economic disadvantage which will require additional investment (public and private) and government support to fully participate in growth. Key areas include support to extensive and mobile pastoralism, supporting connectivity and investing in human capital without which many people will be unable to participate in the benefits of growth. The main barrier to growth in the lowlands and greater gender equality is the limited human capital of lowland populations. The biggest return on investment in the lowlands would be in improving the human capital of its population.

The delivery of human development services in the lowlands is limited by a confluence of factors, including low population densities, inefficiencies with the Intergovernmental Fiscal Transfer System, lack of operating and capital budgets, low prioritization by some regional governments, inadequate number of and insufficiently skilled professionals, and the lack of incentives and accountability structures to deliver human development outcomes. In the decentralized system, the mandate to deliver basic services rests largely with *woredas*. Due to the challenging circumstances in the lowlands, including climatic conditions, low population density, and settlement patterns, sectoral ministries have developed specific strategies and approaches for delivery of human development services in the lowland areas—especially for reaching pastoral populations. However, these strategies remain largely untested. Compared to the large human capital needs, regions and *woredas* tend to allocate too little of their budgets for health and education sectors, with minimal resources available for capital and operational costs. Afar and Somali regions have predominantly focused on investments in water and rural development due to increased drought to the relative neglect of education and health (see Figures E.12 and E.13). In constrast, Gambella and Benishangul-Gumuz have preferred to allocate expenditures to education and health (see Figure E.13).

These differences in regional allocations extend to capital allocations from the MDG/SDG grants regional governments receive to boost the capital expenditures. For example, Afar and Somali regions allocated their entire MDG/SDG budget to the water sector in EFY 2012, meaning that health and education did not benefit from these resources. In contrast, Amhara region, in addition to the already high 43 percent of its regional expenditures going to human development, is spending 22 percent of its MDG/SDG on human development infrastructure. Benishangul-Gumuz and Gambella are spending a commendable 23 percent and 38 percent, respectively, on the human development sectors.

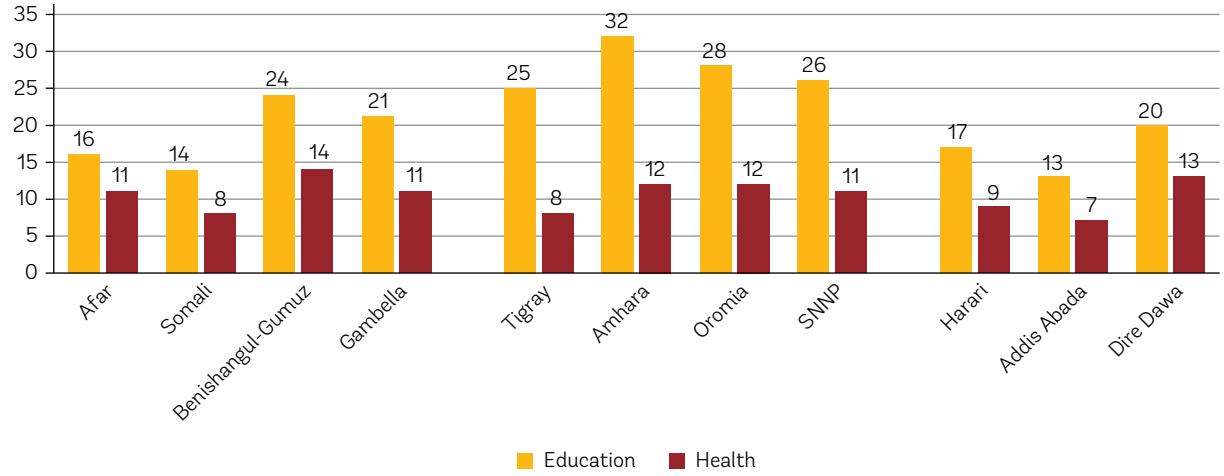
Given the large human capital deficits in Afar and Somali regions, there appears to be a critical knowledge gap regarding the relative benefit-to-cost ratio associated with the allocation of resources to the water sector versus the education and health sectors in their regions.

Figure E.12: Expenditures on rural development and water by region, FY12–18



Source: MoFEC (see also Table 7.7).

Figure E.13: Expenditures on education and health by region, FY12–18



Source: MoFEC (see also Table 7.7).

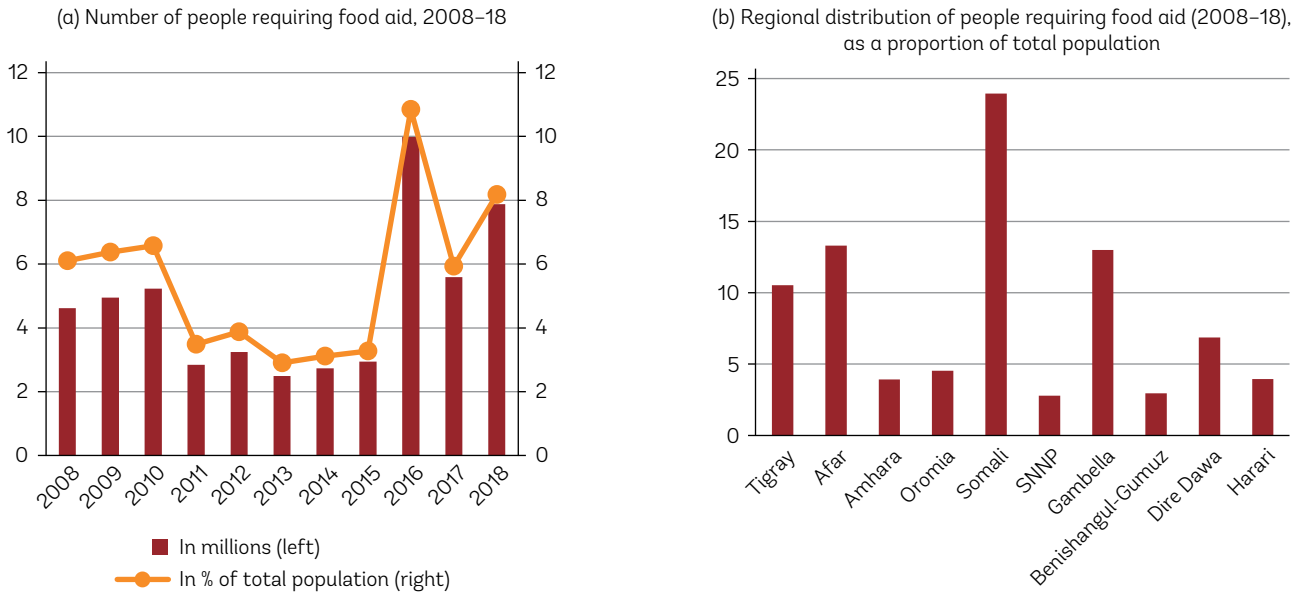
Weak human development services in the lowlands are also a significant impediment to effective humanitarian response; where basic services are stronger, the humanitarian response is more effective. A key to an effective and early response is stronger basic services in the lowlands, to both reduce the need for large-scale response and to ensure that responses are more effective. This can be most effectively accomplished when humanitarian and development actors work through a single and/or coordinated systems. Currently, humanitarian responses are fragmented and expensive.

The quality of basic services is critical to humanitarian assessment and response. Where investments in basic services have been made, humanitarian response is stronger and more cost effective. Weak services and low human capital make response more difficult, the impact of shocks harder to identify, and the overall effort more expensive.

Safety net system for coordinating humanitarian and development efforts

Building resilience in the lowlands requires the ability to respond effectively, both to transitory needs arising from rapid onset emergencies, such as conflict, and chronic needs arising from slow onset environmental changes, such as drought and extreme weather events. The instruments to do both should complement rather than undermine each other so that the humanitarian response should seamlessly transition to a safety net system that supports chronic and predictable needs. Building resilience is ultimately about building

Figure E.14: Humanitarian requirements, 2008–18



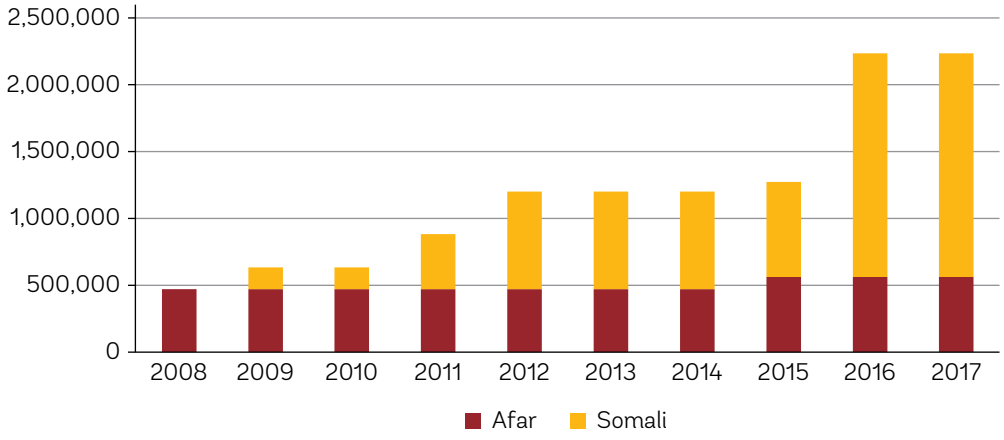
Source: HRD, various issues and CSA.

sustainable systems that can both tackle the short-term crisis but also the long-term needs of the population to protect themselves against future shocks and smooth out the high degree of variability and risk in lowland environments. To date the two have not always worked in close tandem as humanitarian interventions have been relied on to too great extent to tackle predictable and chronic need, while the latter should be built into government safety net and development interventions. Bringing these two together will be key in building lowland resilience.

The number of people requiring food assistance over the past decade averaged about 4.8 million people a year or 6 percent of the entire population, ranging between 2.5 and 10 million people (Figure E.14). The number of people impacted varied across the regional states. The lowland regions, including Somali, Gambella, and Afar, had a relatively large proportion of their population requiring food assistance over the past 10 years.

The number of households enrolled in the lowland PSNP is significant. Between 2008 and 2017, the number of PSNP beneficiaries in Afar region remained fairly constant, fluctuating slightly between 470,00 and 560,000. In Somali region the number of PSNP beneficiaries increased steadily over the same period, responding to the periodic reviews of needs assessments, growing from over 700,000 in 2015 to well over 1.6 million in 2016 and 2017. Together, the number of households that are addressed through either the PSNP or humanitarian assistance in the lowlands is increasing**.** Figure E.15 shows the combined annual PSNP and

Figure E.15: PSNP caseloads in Afar and Somali regional states: 2008–2017



humanitarian caseloads in Somali and Afar regions since 2008. The numbers have increased over time, with 2016 and 2017 representing the highest figures. The overall increase is reflective of the national trend, which is an increase in the number of people in need of social transfers (cash or food).

In view of the increasing dependence of lowland populations on the PSNP and HFA, as well as the overall costs of the current approach, it makes sense to bring the overall relief effort together into one unified system of response. This will allow the concentration of development resources on supporting the livestock economy of the lowlands to get more value added out of the livestock it produces while encouraging alternative income earning opportunities or migration to urban areas or outside the region for those without livestock.

A common policy framework for initiatives to address poverty and vulnerability in the lowlands needs to be developed. The key elements of this framework are set out below.

- **Ensure the program design and financing responds to the relative size of poor and vulnerable caseloads in the lowlands, which are different from the highlands.** In practice, the PSNP has a fixed national ratio between a 'core' caseload of chronically food insecure beneficiaries and a 'transitory' caseload, which it can modestly respond to as vulnerability conditions change and available financing allows. The humanitarian appeals augment the PSNP's response to the 'transitory' caseload.[19] The ratio between a 'core' caseload of PSNP beneficiaries and a 'transitory' caseload in the lowlands should better reflect local conditions (it currently reflects highland dynamics) and will need to change on an annual (possibly seasonal) basis, as rainfall and vegetation changes. According to poverty data, a 'core' regular caseload in the lowlands may need to be smaller than some regions' current caseload (for example in Somali region) and the annual allocation to a 'transitory' caseload larger than currently programmed. Within regional boundaries, beneficiaries are likely to differ in proportions, according to the incidence of poverty in pastoral, agropastoral, and farming areas.
- **Ensure there are appropriate, scalable instruments that can deliver support to those who are poor and those who are vulnerable to poverty.** With the numbers of vulnerable households approximately two times the number of poor households in lowland areas, it follows that appropriate instruments able to rapidly respond to their needs are required (for example, a transfer program with flexible delivery mechanisms that can reach those who may not be poor today, but who are likely to become poor if impacted by a 'shock'). Being vulnerable to poverty and risk does not mean that households are 'in need' all the time—rather, that vulnerable households may need rapid support as livelihood conditions change. When assistance is needed, a temporary and rapid scale-up to a larger caseload must happen *before* the 'alarm' sounds for the drought—multiple research shows that early interventions are more cost effective[20]—and with a 'no regrets' approach. This means that there should be pre-positioned funds and/or an annual allocation to enable an annual response to transitory needs among the lowland regions.
- **Introduce one financial framework with appropriate financial instruments for a scalable system.** The multiple systems and actors in the lowlands currently leverage multiple sources of financing through government systems, as well as parallel to government. Adopting one framework will lead to humanitarian financing flowing through PSNP systems and will clarify the limits to what government will accept financial responsibility for, when responding to vulnerability. This will then enable a realistic assessment of the related costs in addressing responsibilities, leading in turn to a more effective deployment of resources and ensuring complementarity between government and nongovernment resources.

Improving the efficiency of the livestock economy while encouraging economic diversification

Within the lowlands, the pastoral livestock economy is a critical resource that needs investment and support. Rural to rural migration has had weak poverty reduction impacts. The livestock sector is the most important source of livelihoods and

[19] While the PSNP can support a transitory caseload in all *woredas* within a PSNP region, in practice the HFA is directed to *woredas* without a PSNP core caseload and to *woredas* where the "need" surpasses the ability of the PSNP to respond.

[20] See Cabot-Venton et al. (2012). The Economics of Early Response and Disaster Resilience: Lessons from Kenya and Ethiopia, DFID; USAID, Economics of Resilience to Drought in Ethiopia, Kenya and Somalia, (2018), among others.

growth for the lowlands. For pastoralists, support to livestock is critical, as this sector is under threat from the increasing frequency of droughts and floods, and bush encroachment and loss of access to grazing, which is forcing a reduction in overall livestock herd sizes and a shift in composition of livestock. Given global and national demand for meat, livestock are an important economic asset for pastoralists but require adequate support in terms of veterinary services and access to markets, including export. For most pastoralists, domestic markets may provide greater scope for income increases because of higher prices compared with export prices. With respect to supporting and promoting pastoral livelihoods in the lowlands, important policy considerations emerging from this study include:

- the adoption of measures supporting pastoralist mobility as an important adaptation to rainfall variability and uneven forage availability;
- the legal recognition and support by the government of pastoralist land tenure regimes to ensure equitable access to grazing;
- the improvement of extention services; and
- access to grazing and water; and veterinary, abattoir, and cold chain services to better meet domestic and external demand for livestock and livestock products.

Given the nature of lowland pastoral livelihood systems, the provision of permanent water in lowland areas needs to be carefully considered in relation to other natural resources, including its long-term impact on grazing availability for livestock. Too much water can lead to permanent settlement and overgrazing. Environmental change induced by water availability may have permanent and negative land use consequences. The principal challenge in these areas is to understand how water development can contribute toward providing adequate water for human consumption and settlement, including exploiting untapped irrigation potential, while not upsetting traditional adaptive strategies to environmental and climate variability on which large numbers still depend for their livelihoods.

Economic diversification and alternative employment opportunities should also be encouraged, particularly in or near urban areas and in areas of higher agricultural potential. This will empower regional governments to work with the federal government to attract appropriate private investments that will help create some of these opportunities while ensuring effective environmental and social safeguards are maintained. Barriers to economic migration need to be removed so the poorer members of the community can look for jobs elsewhere, both within and outside Ethiopia.

Public investment will have to focus on improving connectivity and market infrastructure to enable greater links between lowland economic activity, urban demand, industrial activity, and trade corridors. There is no clear case to build more industrial parks in lowland areas.

The manufacturing sector based on industrial park development is not expected to have a major impact in the lowlands apart from the comparatively small agro-industrial sector. The study underlines that investors will not invest in areas without connectivity, labor force and local capacity, appropriate resources, or adequate water supplies. Industrial parks could be a source of employment for migrating rural lowlanders to the emerging manufacturing hubs who could then support their communities with remittance flows. In areas of the lowlands there are perceptions that new jobs, such as in industrial parks, are for highlanders; lower levels of human capital in lowland areas are likely to limit labor force participation locally and hinder economic migration.

There may be other opportunities to attract completely new investments and new activities to lowland areas. This should be done based on discussions with investors and making evidence-based public investment decisions. Investment in the capacity of regional governments will be critical, as investors, all things being equal, will prefer areas with better security and a high capacity of regional administrations.

In general, the benefits of large-scale private and/or public investment in commercial agriculture in the lowlands needs to be assessed carefully against costs such as potential long-term damage to the environment and other local livelihoods. Harnessing the irrigation potential of the main rivers that run through the lowlands is attractive but comes at a high cost both in terms of water management and the long distances to markets involved. Many agricultural concessions given to private/state investors remain largely dormant. The long-term viability of new sectors, such as agroforestry in the west and spices in the south,

is dependent on private investment and government support to enable market infrastructure, and market capability to enable access to highland and international markets. Experience of the success of floriculture in the highlands should be heeded to enable the development of smallholder and out grower market systems.

The extractive sector will become a major source of growth, but this will mainly be through national foreign exchange earnings and royalties, with limited employment opportunities and direct benefits to the lowlands. Revenues from extractives should be shared equitably with regions and local communities that bear the brunt of any possible negative consequences. Balancing national and local objectives by ensuring that new extractive industries do not undermine the development of the tradeable manufacturing sector (e.g., Dutch disease) and that host communities feel the benefits of the sector (e.g., through better services), will be critical. Low levels of human capital will be a constraint to access new jobs from new investments. Increasing urbanization will lead to the growth of the service sector in the lowlands, and with lower levels of poverty and vulnerability in urban areas, rural to urban migration provides a better opportunity than rural to rural migration for reducing poverty and supporting growth. However, investment in cities will require strong regional governments.

Greater regional integration through developing existing trade corridors to Djibouti and Berbera and the opening of new growth corridors to Assab/Massawa should benefit the lowlands. The Djibouti corridor has the highest potential as it reaches the greatest number of lowland residents, including the emerging urban cluster of Dire Dawa-Harar-Jijiga, and handles most of the trade. While growth corridors offer opportunities for employment and increased competitive advantage, there will also be some negative impacts to be addressed (e.g., shifting from road to rail impacts the market for ancillary services in the lowland areas). Cross-border trade needs to be facilitated and formalized to ensure a more level playing field among traders and livestock producers. Cross-border trade, most of which is largely informal, plays a crucial economic, political, and social role for pastoralists in the Horn of Africa. For example, the value of the livestock trade on the Somaliland border is estimated to be between US$200–300 million, four to five times the official recorded level. Because of the informal nature of the trade, the benefits are captured by powerful elites. Greater support to formalizing trade and improving veterinary inspection services would support pastoralists in a more inclusive way.

Part 1: Livelihoods, Poverty, and Vulnerability in the Lowlands

Chapter 1: Pastoral Livelihoods

Summary

This chapter provides a description of the key features of pastoral livelihoods in the drought-prone lowlands. The chapter documents a long-term decline in household herd sizes, a shift in the composition of herds, and a growing economic diversification, including an increase in cropping, and an increase in wealth inequality. Livestock, however, continue to be an important source of income for many households. This has been buoyed by the high prices that livestock command in the market. However, as livestock assets have reduced susceptibility to poverty, the result of shocks has also increased.

Introduction

The nature of agriculture-based livelihoods varies across the country based on ecological conditions. The highlands and lowlands represent two contrasting ecological and economic spaces. The latter historically lag the development of the highlands and are beset by problems of poorly developed infrastructure and communications, low population densities, highly variable and uncertain rainfall, and low agricultural productivity and human development outcomes. While there are pockets of higher potential agricultural productivity in the moist western lowlands and along the main rivers, such as Awash, Omo, and Shabelle, are suitable for irrigation agriculture, and the backbone of the economies of these lowland areas is extensive livestock herding by pastoralists and agropastoralists.

Pastoralism and Agropastoralism

According to the Atlas of Ethiopian Livelihoods (2010), based on data from the 2007 national census, pastoralists constitute 56 percent and agropastoralists 44 percent of the total pastoralist population of some 6.6 million people in the country. The main difference between these livelihood categories is in their degree of dependence on livestock. According to one definition, pastoralists derive 50 percent or more of household gross revenue from livestock or livestock-related activities, while agropastoralists (those who engage in both pastoralism and agriculture) derive more than 50 percent of household gross revenue from farming and 10–50 percent from livestock (Ellis and Swift, 1988). However, most of Ethiopia's pastoral societies pursue multi-resource economies in which the balance between pastoral and non-pastoral activities is constantly shifting in response to changing circumstances.

Pastoralism is a set of specialized economic activities and techniques revolving around the herding and care of livestock, which may be used alone or in combination with other economic activities at different times and places. Pastoralism and pastoralists are defined in the literature in different ways. Pastoralism is "a mode of production which depends on natural forage. In the arid regions this requires constant or periodic movement in search of pasture, a factor that differentiates this form of livestock production from those practiced by farmers and ranchers" (Markakis, 1993, 1). Pastoralism is also simply defined as a way of life, emphasizing the complex social, cultural, and institutional practices and value system surrounding livestock keeping.

Historically, the kinds of pastoralism practiced and degree of dependence on livestock alone or in

combination with other activities has changed over time. Groups which are typically labelled pastoralist, such as Somali, may have subgroups which, because of the favorable conditions in which they live, are able to specialize in both cropping and pastoralism at the same time. This is the case, for instance, for many Somali clans that live in the Jijiga and Teferi Ber areas of northern Somali region. Currently, in the Haud area of Somali region with the new technology of concrete lined cisterns or *birkas*, many pastoralists can stay in this formerly wet season grazing area all year round, leading to cultivation and development of private enclosures in what were once wet season grazing areas. Opportunistic rain-fed cropping appears to be becoming much more extensive in many formerly pastoral areas, both driven by population pressure in the highlands and poorer pastoralists taking up cropping.

Abate et al. (2010) describe how the shift from pastoralism to agropastoralism occurred among pastoralists in the Rayitu district in Bale, Oromia region, as follows:

> "Historically (30 years earlier), livestock production was practiced by 94% of families and the inhabitants were totally pastoralists. Livestock and livestock products played a major role and the rangelands were used mainly for grazing. Currently, only 36% are purely livestock producers, with 63% combining livestock and crop production (agro-pastoralists). Most of the families (73%), who commenced growing crops, did so during the period 1974–1991, with 13% doing so before that time. Reasons for adopting an agro-pastoral lifestyle included: the need to diversify household income (81%); human population pressure (49%); expansion of settlements (19%); and a decline in livestock numbers per household owing to drought (12%). Consequently, pastoralists started to cultivate small plots of land to grow cereal crops in situations which were marginal for cropping. About 94% of the respondents had increased the area of land devoted to cultivation at the expense of grazing area" (pp. 203–4).

The distribution of farmers, pastoralists, and agropastoralists across Ethiopia's main regions are set out in Table 1.1. While the population numbers in each category should be taken with a grain of salt, as accurately distinguishing between the categories is extremely difficult, they give a sense of orders of magnitude. Interestingly, as Ethiopia's largest pastoralist region, Somali region is also home to many full-time farmers (nearly 600,000).

Pastoral groups subsist off their animals both directly through milk consumption and to a lesser extent by eating their meat, and indirectly by exchanging them or their products for other commodities, such as grain they obtain in the market. It is a widespread misconception that pastoralists largely survive on milk and meat. Most pastoralists have too few animals to survive on a purely pastoral diet and depend on the market to buy grain. One of the significant changes taking place today as the numbers of livestock per capita decline (see more on this below) is the increasing dependence of poorer pastoralists on alternative income sources, and for 'middle' households' increasing dependence on the market for sales of livestock, especially small stock, to make up for losses in milk yields (HEA Change Analysis in Somali and Afar Regions, 2017/18)

Table 1.1: Rural population by livelihood zone (2007 Census)

Region	Cropping	Agropastoral	Pastoral	Total
Tigray	3,471,733	0	0	3,471,733
Amhara	15,003,844	0	0	15,003,844
Benishangul-Gumuz	572,882	0	0	572,882
SNNPR	13,021,540	374,491	0	13,396,031
Oromia	22,011,592	1,289,805	484,806	23,786,203
Gambella	110,113	118,925	0	229,038
Somali	584,929	998,792	2,177,992	3,761,713
Afar	0	148,897	1,051,432	1,200,329
National	**54,776,634**	**2,930,909**	**3,714,230**	**61,421,773**

Source: Atlas of Ethiopian Livelihoods (2010).

Gender Roles in Livestock, Crop Production, and Marketing

Women are actively engaged in livestock management and production in all regions. This includes taking care of weak animals and providing traditional veterinary services, herding small ruminants, fodder production (in SNNPR and Borena), milking goats and cows, sewing and smoking of milk containers in Borana, and preparing dung for manure. Women frequently engage in the production and marketing of small livestock, as well as in the processing and marketing of livestock products in all of the regions (Owitti, 2015; Nigussie, et al., 2014). This includes goats, sheep and chicken, milk and milk products, and petty trade. Women are also dominant in the production and marketing of chicken in Gambella and East Hararghe (Ojulu, 2015). Although chicken production was not a traditional feature of Borana's livelihood, it has recently become one of the main income sources for Borana women (Desta, et al., 2011).

Men are generally dominant in the production and marketing of large livestock, such as camels, cattle, and donkeys. In parts of Southern Omo and in the Borana lowlands, cattle have a central position in the economy, and men are usually occupied with the cattle, whereas women are responsible for the production and marketing of small stock. In Somali, men are involved in milking camels, whereas this is mainly women's work in Borana and Afar. The herding of cattle and camels is the responsibility of men and boys, while goats and sheep are boys' responsibility. The slaughtering of cattle and camel is done by men, while women slaughter goats in the Somali region.

Both men and women engage in crop production, though to what extent differs between regions. Women mainly engage in sowing, weeding, transporting, storing, and harvesting of subsistence crops such as cereals and pulses, whereas men are actively involved in land preparation, ploughing, weeding, harvesting, and threshing in crop production.

The main off-farm activity for women especially in Afar, Somali, and Gambella is petty trade, which includes managing tea stalls, and selling coffee/tea and biscuits. Due to their lack of access to finance, women favor these businesses because it requires low capital, they are familiar with it, and the risks to start up are low. For women in Somali and Afar, the contraband trade in secondhand and new clothing, food items (e.g., sugar), and electronic items that are smuggled across the borders from Djibouti and Somaliland is important. In Gambella, Afar, and SNNPR, women produce handicrafts, such as wooden vessels, utensils, baskets, mats, artificial fans, and brooms, as alternative sources of income (Adugna and Sileshi, 2013). Gambella women also sell local wine and alcohol as off-farm activities. In Borana, women who live near forested areas use forest products to complement their income. For example, they produce a scented wood product that is used as a perfume, they collect gum Arabic from trees, and sell incense. Sales of firewood and charcoal are one of the main sources of income for both men and women in Somali and Afar.

Sources of Income

According to data collected by the International Livestock Research Institute (ILRI),[21] Somali and Afar regions are overwhelmingly pastoral, with 71 percent of households in Somali region and 62 percent in Afar reporting that they depend largely or wholly on livestock for their income (see Table 1.2). In Oromia and SNNP the proportions are much less, with only 30 percent of households in SNNP and 20 percent in Oromia saying they depend largely on livestock. In these last two regions some 45 percent of pastoralists report they also grow crops compared to only 14 percent in Afar and 23 percent in Somali region.

Despite the number of households that report they also crop in Oromia and SNNP, cropping as a source of income appears to be only important in SNNP, where it represents 28 percent of mean household income (see Table 1.3).[22] Livestock continue to dominate sources of income in all the drought-prone regions and, according to the ILRI

[21] The data were collected through a series of household surveys carried out at different times between 2015–2017, based on a stratified (by livelihood zone and regional state) approach using two stages of sampling (by *woreda* and *kebele*) to draw a sample of 2,667 households in Afar, Somali, and the lowlands of Oromia, SNNPR. The initial first survey covered 1,295 households and was analyzed as part of the baseline for the World Bank financed Regional Pastoral Resilience Project—see Table 10. Subsequent surveys covered the remaining households. The moist western lowlands of Gambella and Benishangul-Gumuz were not part of the survey.

[22] While income from rain-fed agriculture is notoriously variable, it might have been expected that income from irrigated cropping on the Awash River would have been higher, in particular, as it is technically possible to produce two crops per year. It might be that the timing of the ILRI data collection coincided with the El Niño drought which, among other impacts, resulted in particularly hydrological drought in the Awash Basin.

Table 1.2: Livelihoods of households (%)

Region	Proportion of households by livelihood type				
	(A) A 'pure' pastoral household with no permanent residence, 100% income from livestock and no crop growing and no other income-generation activities	**(B)** A pastoral household where members move mobile livestock regularly to agreed grazing areas within the *woreda*, with milking/ weak animals kept around the settlement (i.e., a 'satellite' system), with no crop growing and no other income-generation activities	**(C)** An agropastoral household where members move mobile livestock regularly to agreed grazing areas within the *woreda*, with milking/weak animals kept around the settlement (i.e., a 'satellite' system) with crop growing and no other income-generation activities	**(D)** An agropastoral household where members move mobile livestock regularly to agreed grazing areas within the *woreda*, with milking/ weak animals kept around the settlement (i.e., a 'satellite' system) with crop growing and with other income-generation activities	**(E)** An agropastoral household where members own livestock but do not move them from their private land (i.e., livestock are kept in enclosures) with crop growing and with other income-generation activities
Afar	51.0	11.2	10.5	3.1	24.1
Oromia (Borana)	5.6	13.8	43.9	1.6	35.2
Somali region	36.1	34.8	18.1	4.6	6.5
SNNPR (S. Omo & Bench Maji)	0.0	29.4	40.9	4.8	25.0
Total	23.6	22.2	28.3	3.4	22.5

Source: Gebremedhin et al., 2017 (based on ILRI survey data of sample of 1,295 households across the four regions collected in 2015–16 for the WB financed Regional Pastoral Resilience Project).

Table 1.3: Mean share of total household income (%) (ILRI survey data)

	Afar	Oromia	Somali	SNNP
Livestock income	67	63	52	43
Livestock product income	1	1.7	2.6	7.7
Income from income generating activities	3	7	31	14
Crop income	4.8	1	2.7	28
PSNP income	14	21	3	0.0
Wage income	9.5	5.7	8.6	7.4
Household with share of livestock income >50% (%)	76.0	71.0	55.0	52.0

data, represent 67 percent of mean household income in Afar, 63 percent in Oromia, 52 percent in Somali, and 43 percent in SNNP regions (see Table 1.3).[23]

[23] While important, the study also showed that the value of livestock sales was more significant for wealthier households, with an average of 70 percent of all household income coming from livestock. Income from livestock was much lower for the poorest quartile with only 17.5 percent and 28.8 percent of sales in SNNP and Afar regions, respectively.

The ILRI data confirm that the government's safety net program for the poor, PSNP, is an important source of income in Afar (14 percent) and Oromia (21 percent), but less so in Somali and in SNNP regions, although it is increasing in importance in Somali region. Wage employment is of modest importance in all areas, but income generation is particularly important among Somalis, providing 31 percent of household income in the region but much less in other regions (see Table 1.3 for breakdown).

Overall, the ILRI data confirm, despite significant falls in household herd sizes, the continuing importance of livestock in lowland economies.

To understand how recent changes have affected pastoralists, it is important to understand four critical characteristics of pastoral societies and economies.

(1) Dependence on Livestock

This dependence on livestock has several consequences.

It is a characteristic of pastoral capital that it can reproduce itself without intervention of the

market. In pastoralism, capital gains are a normal part of the process of herd growth. Unless herd owners have viable alternative forms of investment, the tendency is to reinvest in herd growth. A consequence of this is that without intervening factors such as drought and disease and/or high market offtake rates, livestock populations may eventually exceed the carrying capacity of the land. It also leads to the typical saw tooth graph of herd growth of peaks and troughs coinciding with good and bad rainfall years that is commonly recorded in pastoral areas.

Because pastoralism is geared toward herd reproduction, there is an inevitable surplus of animals, such as most of the males which can be sold or eaten without affecting the reproductive capacity of the herd. This feature encourages the sale and/or exchange of surplus stock/livestock commercialization if the price is right.

Herd reconstitution after drought is a long and slow process because many of the female reproductive stock will have died. If a farmer loses his crop one season he can plant again the next, but a pastoralist will take much longer to recover his herds and flocks. Indeed, below a certain threshold, it is unlikely he can ever recover his losses. Therefore, it pays to have large herds and flocks in good times in preparation for the inevitable bad times that may follow.

Pastoralists are vulnerable to fluctuations in the terms of trade when milk yields decline in the dry season and at times of drought when they need to buy grains, but their livestock hold little value. At these times they risk losing their reproductive stock. In recent years, given increasing national and international demand for livestock, livestock prices have seen an upward trend in relation to grain prices, which has helped many pastoralists compensate for the long-term decline in herd sizes (HEA, Somali and Afar Change Reports, 2017/18, and Chapter 2).

In the past, the unfavorable terms of trade between livestock and grain disproportionately disadvantaged pastoralists and agropastoralists. Davies and Bennett (2007) observed that terms of trade fluctuated between a high of 183 kg of maize per goat to a low of 93 kg per goat (averaging around 133 kg per goat) in 2001 in Afar. The following year it dropped to 14 kg of maize per goat. In the past decade this has significantly improved in favor of livestock producers, at least in 'normal' years. A recent USAID report from the Afar region shows that terms of trade improved 96 percent for goats, 84 percent for cattle, and 71 percent for camels between 2003 and 2015 alone (USAID, 2017). The higher livestock prices and lower staple food prices helped offset herd losses and boost terms of trade.

However, poor pastoralists with only a few animals cannot take full advantage of the improving terms of trade between livestock and grain. Their market participation both as buyers and sellers is extremely limited (see Table 1.4). For them, their market engagement tends to be limited to emergencies, such as droughts, when they are forced to sell livestock. At other times they depend more on other sources of income to buy food and other essential goods. On the other hand, rich pastoralists can take advantage of the fluctuating livestock prices by selling when prices are good and buying when prices drop due to high supply during or immediately after droughts (Tari and Pattison, 2014). See Table 1.4 for market engagement (sales of livestock) by wealth categories in northern Kenya and southern Ethiopia between 2000 and 2002.

Table 1.4: Market engagement by wealth group, northern Kenya and Southern Ethiopia, 2000–2002

Mean livestock holdings per household	Number of quarters when market activity recorded
10.8 TLU	0
16.0 TLU	1
45.9 TLU	7
48.3 TLU	8

Source: Aklilu and Catley, 2009.

Reliance on diverse income sources varies by wealth group. While most wealthy pastoralists earn their income largely from the sale of livestock, this is not the case for the poorest category of pastoralists and agropastoralists. For example, among the Borana/Guji pastoral and agropastoral groups, the very poor earned their cash income from livestock (58%), labor (12%), firewood (8%), and safety nets (22%), unlike for middle and better-off groups who generated almost all cash income from the sale of livestock (Aklilu and Catley, 2009). In Shinille zone of the Somali region, similar patterns exist in terms of the contribution of livestock to annual household income (Table 1.5).

As Table 1.5 shows, households in the better-off and medium category derive almost all of their annual income from livestock-related sources, such

Table 1.5: Contribution of livestock to annual household income in pastoralist areas, Shinile zone

Wealth group	Total annual income (EB) from livestock/total income (%)	
	1998–1999	2004–2005
Better-off	6,050/7,000 (86%)	9,300/9,300 (100%)
Medium	3,978/4,350 (91%)	5,800/6,200 (94%)
Poor	1,980/2,200 (90%)	2,200/3,950 (56%)

Source: Catley and Iyasu, 2010.

as livestock sales, renting of pack camels, and sale of ghee. Poor households fill the deficits in annual income through gifts, relief food, wild foods, and other income generating activities.

Decline in household herd size

There has been a long-term decline in household herd size. Table 1.6 shows the number of livestock of different types owned by households in Afar, Oromia (Borana zone), Somali, and SNNP in 2016/17. These numbers represent a significant decline over the years.

A study by Berhanu (2017) in Borana zone based on a panel subsample of pastoral households tracked from 2003–2013 shows the scale of the drop in livestock per household over time. According to this study, more than 90 percent of previously asset-poor households remained in poverty, with a further deterioration in their situation, while a significant percentage of nonpoor stock owners slipped into poverty. Other studies among Borana and Karrayu pastoralists also indicate a decline in household livestock assets over time (see Table 1.7).

The study by Elias (2014) shows that both among the Borana and Karrayu pastoralists, livestock substantially declined over a thirty-year period, making households more vulnerable to food insecurity and fluctuating terms of trade. Similar herd size declines among all wealth groups have been reported for the Afar and Somali in a series

Table 1.6: Access to livestock asset in TLU by region

Access to livestock asset	Afar	Oromia	Somali	SNNP	All
Households owning livestock (%)	91.3	93.6	90.6	82.7	90.5
Cattle	39.8	86.8	43.8	74.4	59.4
Sheep	54.5	19.8	55.6	31.5	41.5
Goats	86.4	68.8	76.2	52.9	73.5
Camels	34.0	7.4	32.0	0.0	20.8
Equines	30.0	43.9	56.6	11.8	38.9
Chicken	0.4	36.9	4.7	59.3	20.5
Livestock owned per household (TLU)	7.3	4.5	6.3	5.0	5.9
Livestock owned per capita (TLU)	2.3	0.9	1.4	1.0	1.5

Source: ILRI survey data, 2016/17.

Table 1.7: Trends in household livestock ownership in Borana and Karrayu

Location/wealth group	Mean livestock numbers in the past (30 years ago)		Mean livestock numbers at present	
	Cattle (no.)	Camel (no.)	Cattle (no.)	Camel (no.)
Borana: Rich	94	12	74	12
Medium	39	9	23	6
Poor	22	10	6	3
Mean	30	11	12	5
Karrayu: Rich	176	111	36	30
Medium	108	79	19	23
Poor	109	35	6	5
Mean	133	79	12	16

Source: Elias (2014).

Table 1.8: Mean livestock holdings, by livestock holding quintile, region, and year in tropical livestock units

Livestock holding quintile	Afar				Somali			
	2010	2012	2014	2016	2010	2012	2014	2016
Poorest	4.8	1.5	0.8	0.2	1.1	0.5	0.6	0.2
2nd	13.7	4.9	2.6	1.4	4.2	3.0	3.6	1.5
Middle	25.5	8.8	5.1	3.3	7.7	7.1	7.2	3.5
4th	42.4	18.0	10.1	6.6	14.6	14.6	12.7	6.1
Wealthiest	78.5	61.7	35.6	18.9	36.7	38.7	27.5	17.1

Source: IFPRI/EDRI, 2018 Targeting Social Transfers in Pastoral Societies-Household Surveys for PSNP.

Table 1.9: Changes in wealth ranking of Somali pastoral households according to livestock holding over a 60-year period (1944–2004)

No.	Wealth ranks overtime	Cattle	Sheep	Goats	Camels	Donkey	Total	%
	30-year period before 1974							
1	Wealthy households	400	200	250	50	20	**920**	56.6
2	Medium households	200	100	150	20	10	**480**	29.5
3	Below medium households	80	50	80	10	5	**225**	13.9
	30-year period after 1974							
1	Wealthy households	100	350	500	120	10	**1,070**	63.3
2	Medium households	50	150	300	60	5	**565**	33.6
3	Poor households	3	10	22	1	2	**38**	2.2
4	Very poor households	0	5	12	0	1	**18**	1.1
	Changes over 60 years							
	Decrease/increase	**–527**	**+165**	**+354**	**+101**	**–17**	**+66**	—
	Percent change +/–	**–77.5**	**+47.1**	**+73.7**	**+126.2**	**–48.6**	**+4.0**	—

Source: Gezahegn, 2006.

of baseline surveys carried out over the period 2010 to 2016 for PSNP (see Table 1.8). According to these surveys, between 2010 and 2016 herd sizes declined by more than three-quarters from 78 TLU to less than 19 TLU among the wealthiest quintile in Afar, and among Somali by more than half from 37 to just over 17 TLU. In the poorest category the decline was even more dramatic, falling from 4.8 to 0.2 TLU and 1.1 to 0.2 TLU among Afar and Somali respectively, effectively forcing this group to exit pastoralism altogether.

Devereux (2006, 46) reported from his study of the Somali region that almost all his respondents "claim that the numbers of animals they own today is fewer than in the past." A recent study comparing household economy changes between 2003/06 and 2013/15 in Somali region similarly reports a decline in household herds by 25 percent between the two reference years (HEA, 2018). A study conducted in Borana area also shows that the average livestock holding per household decreased by 37% over 17 years prior to 2001, mainly due to drought (Mussa, 2004). It appears that this has been a trend since the 1960s, especially in Borana. Holtland (2011, 6) reports that Borana had 7.5 TLU[24]/capita in 1960, and this had declined to 4.5 TLU in 1990 and more recently to less than 3 TLU per capita. According to Desta and Coppock (2002) median household herd size was 58 cattle in 1980/81 but only 29 in 1996/97, having dipped as low as 22 cattle per household in the drought year of 1992/93.

Wealth differentiation

In Somali Region, Gezahegn (2006) assessed wealth ranks and livestock species kept by households over 60 years in Shinille zone and showed changes in both indicators (Table 1.9). He divided the period into two by taking 1974 as a reference year and compared changes over 30 years prior to and after 1974. The result showed drastic changes

[24] Tropical livestock units are a measure of livestock holdings in which different livestock types are converted to a common unit: cattle = 1, sheep and goats = 0.1, and camels = 1.4.

in livestock ownership and the type of species kept due to increased drought frequency. According to Gezahegn, the frequent droughts caused shrinkage of the grasslands and the expansion of woody plants, which favored camels and small ruminants. The average species composition of livestock holding per household changed, with camels increasing by 126.2%, goats by 73.7%, and sheep by 47.1%, whereas the number of cattle and donkeys declined by 77.5% and 48.6%, respectively (Gezahegn, 2006, 43). Over the period, while the species composition of household herds changed, there was an increasing shift of livestock holdings in favor of the wealthy, with the poor getting distinctly poorer in terms of their livestock asset holdings.

This growing gap between the few emerging wealthy (and commercial) herders and the growing number of stockless and poor pastoralists and agropastoralists has been reported on by a variety of commentators (Little et al., 2015; Fratkin, 2001; Fratkin and Mearns, 2003; Aklilu and Catley, 2009). Little et. al. (2015, 391) found greater wealth differentiation among the pastoral groups in the Horn of Africa and showed that the wealthiest 10 percent of herd owners control about 46 percent of aggregate TLUs, while the poorest 20 percent control less than 3 percent. Holtland (2011), who observed an increasing gap between the wealth groups in Borana, also stated:

> ". . . in 2007 only 7% owned 35% of all cattle and the poorest 70% owned only 30%. Thirty years before this was respectively 21% and 50%. For goats the poorest 70% still owns 50% of the herd (down from 66%). Today probably only 25–33% of all households have a herd that can sustain their families" (p. 6).

The study by Tache and Oba (2010) in the Borana area also shows that there were considerable shifts in individual wealth ranks over time, while the destitute category remained unchanged. Using the traditional Borana categories of wealth, the authors classified households into wealthy (*duuresa ciccitaa*), rich (*dureessa*), self-reliant (*nama ufirraa bulu*), transitional (*harka qalleessa*—'has weaker capacity'), poor (*deega*), very poor (*deega bombii*), and destitute (*qollee guutuu hiikanaa*), each category respectively owning 179, 58, 30, 11, 7, 5, and less than 2 TLU, respectively. The study indicates that the greatest shifts occurred in the numbers of the very poor and the very wealthy categories after 1992 due to frequent droughts, leading to a progressive increase in the former and decline in the latter. Following this shift and progressive loss of livestock assets, many households adopted agriculture as a coping mechanism.

Similarly, based on his study of pastoralists in Northern Kenya, Fratkin (2001, 9) reported that "Increased commoditization of the livestock economy has led to a growing polarization of pastoralists into haves and have-nots, particularly in . . . areas that are close to urban markets." The social, political, and economic challenges that are responsible for greater livelihood diversification are also responsible for increased social and economic stratification, urban migration, and diminished nutrition for women and children (Fratkin, 2001). The wealthy often diversify to expand their economic opportunities while the poor diversify for survival. According to Aklilu and Catley (2009) wealth disparities have increased markedly in Somali region. They estimate that over a 10-year period between 1996 and 2005, there was an increase of 2.5 percent in the number of wealthy households, 0.8 percent in the number of middle wealth households, and 4.1 percent in the number of poor households. "If this trend continues within 20 years the number of poor households will double, whereas the number of wealthy households will increase by about 50%" (Aklilu and Catley, 2009, 22)

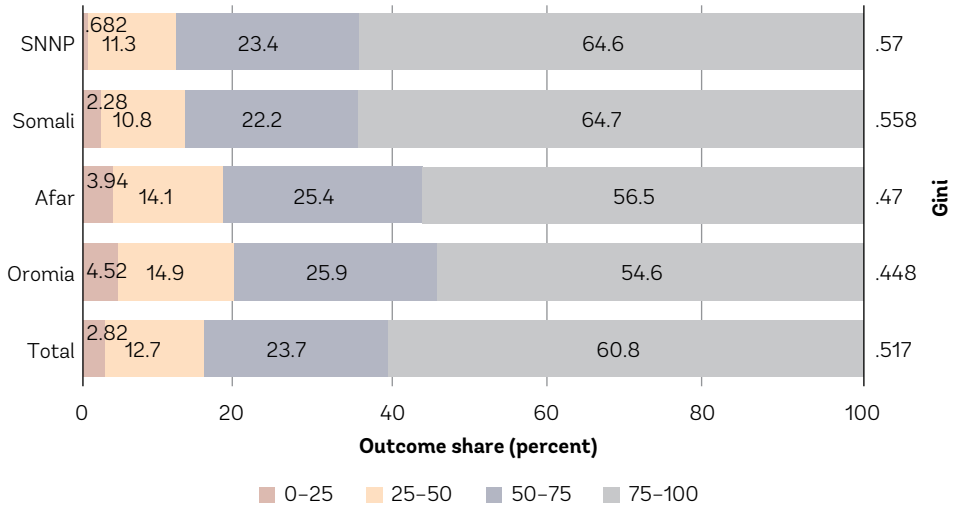
This growing inequality between households is confirmed by data from the ILRI surveys referred to above.[25] Based on livestock ownership as a critical dimension of wealth, Figure 1.1 shows the share of TLU's per household by wealth quartile across the four regions. The large share of livestock owned by the wealthiest quartile is consistent across all four regions and is confirmed by the findings of other case studies.

Tufts University in their research on pastoralism in the Horn of Africa, including case studies in Ethiopia, noted:

> "In 2009, research . . . explained the increasing domestic and international livestock trade from some pastoralist areas, and yet at the same time, the increasing destitution and levels of humanitarian assistance. The findings showed that although most pastoralists were engaged in livestock markets,

[25] The ILRI survey was carried out after the 2015–16 El Niño drought in the northern pastoral areas, and it coincided with the 2016–17 Indian Ocean Dipole drought in the southern pastoral areas. This may well have depressed the size of herds reported in the four regions.

Figure 1.1: Distribution of livestock wealth by household quartile and by region (based on ILRI survey data 2015–17)



commercialization was associated mainly with wealthier pastoralists and herd owners. Over time, and as human populations grew, commercialization was also linked to a gradual shift of livestock from poorer to wealthier producers, and related trends such as increasing privatization of rangelands, and declining social capital related to livestock transactions and support. These changes were evident in parts of Ethiopia, Kenya, and Somalia despite diverse central political ideologies and policies over several decades, and within a context of multiple conflicts and frequent droughts. This research became known as the "Moving Up, Moving Out" analysis, and notably, the findings were consistent with other studies on poverty and livestock development, the economics of pastoralism, and frameworks for understanding future trends. Although not widely recognized at the time, Moving Up, Moving Out also concluded that for many poorer households, future livelihoods were not only a matter of moving out of pastoralism, but also of moving out of pastoralist areas" (Catley, 2017, 1).

(2) Variable, Semiarid and Drought-Prone Environment

These environments are characterized by the extreme variability and unreliability of rainfall, both between different years and between different places in the same year, by the scarcity and seasonal variability of vegetation and water, and by vulnerability to drought. Permanent water points are few and far between. Pastoral areas, while they may produce crops in good years, are generally marginal to intensive crop production. Extensive livestock production is often the only way to make use of the fluctuating forage resources of these environments.

The variability and low productivity of pastoral environments has imposed certain constraints on livestock production and the nature of human adaptive strategies in these areas.

Livestock are bred for their resilience to drought and disease rather than their productivity. Growth and fertility rates are generally poor, and in addition, herd composition is adapted to the nature and availability of forage. Over the last few decades as bushy species have invaded many rangeland areas, there has been a general shift from grazers (cattle and sheep) to browsers (camels and goats), which are better able to exploit these invasive species. Many Boran cattle pastoralists in the Moyale area of the southern rangelands, for example, have adopted camels as an adaptive response, both to increased drought and to bush encroachment in the area.

Research in Borana zone in the 1980–90 found that when cattle populations exceed a threshold of 30 cattle per square km, increased mortality becomes more likely in years when annual rainfall is less than 400 mm/year.[26] In the droughts of 1983–85, 1989–90, and 1991–93, cattle mortality

[26] Coppock, L., Gebru, G., Desta, S., Mesele, S., and Tezerra, S. (2008). Are Cattle Die-Offs Predictable on the Borana Plateau. *Environment and Society Faculty Publications.* Paper 212. Utah State University. Global Livestock Collaborative Research Support Program. https://digitalcommons.usu.edu/envs_facpub/212

rates of 40 percent were recorded. Pastoralists in two *kebeles* in Dillo *woreda* estimated that cattle losses in the 2016–17 drought rose to as much as 70 percent, while agropastoralists in the neighboring Dirre *woreda* estimated cattle losses in the 2010–11 drought to exceed 85 percent.[27] While pastoralists' reflections should not be confused with an accurate representation of losses, they are probably valid illustrations of the scale of losses. Hence, the higher the reported losses, the more serious the drought. The reported losses therefore suggest that the 'die-offs' of the 1980s and 1990s have continued to the present. This is confirmed by zonal officials with reports of the loss of 200,000 cattle in the 2010–11 drought and 350,000 in the 2015–16 drought. The pre-drought value of the cattle lost in the 2015–16 drought is estimated to be more than US$65 million.[28] High cattle mortality rates can be expected to continue in Borana as large areas of savannah grassland continue to be lost to enclosure and invasive thorny, inimical scrub to cattle pastoralism.

Pastoral household health and well-being is extremely vulnerable to prolonged drought. Drought causes consumption losses and loss of assets in pastoral areas. A study in the drought-prone lowland areas of Ethiopia confirms that a moderate drought may reduce consumption by 8 percent,[29] rising to 20 percent in a prolonged drought.[30] While droughts in pastoral areas have similar impacts on household consumption, these impacts are typically different from consumption changes in drought-affected agrarian communities.

Pastoral households suffer different levels of loss according to wealth, with higher losses typically recorded by poorer, more sedentary households.[31] This is because poorer households are less mobile—they are dependent on alternative sources of food and income that are typically available only in or near to small urban centers—and therefore their livestock have access only to forage resources around the towns that are grazed throughout the year. Wealthier households have the labor and capacity to move their herds to less severely drought affected areas, including neighboring regions and even countries.[32] Wealthier pastoralists also maintain stronger social networks that help buffer them against drought impacts[33] through the provision of additional labor, livestock exchanges, and facilitation of higher levels of mobility through herd splitting. Other coping strategies include: diversification of livestock species—more than 50 percent of households keep at least three types of livestock; investing in herd growth; the purchase of livestock feed; destocking of surplus animals; and accessing local social safety nets.[34]

Despite high levels of livestock mortality in many pastoral areas due to drought, significant loss of human lives during these periods has been avoided due to significant improvements in the delivery of humanitarian assistance and/or scaled up safety net programs like the Productive Safety Net Program (PSNP). According to ILRI data[35] more than 65 percent of pastoral households reported receiving food aid during recent droughts. In Somali and Afar regions the share of PSNP and humanitarian beneficiaries to the total regional population has consistently been near to or greater than 30 percent since 2009, and in 2016 and 2017 reached above 50 percent. High levels of external assistance appear to be the new norm for many communities in the lowlands.

Because of the variability of rainfall and therefore grazing, a degree of mobility is enforced on

[27] Information collected using the Participatory Rural Appraisal proportional piling method.

[28] Tufts University (2017). The 2017 East Africa Drought: Drought and resilience perspectives from southern Oromia. Field Notes. Agriculture Knowledge Learning Documentation and Policy (AKLDP) Project Ethiopia.

[29] World Bank (2015).

[30] Porter, C. (2012). Shocks, Consumption and Income Diversification in Rural Ethiopia. *Journal of Development Studies*, Taylor and Francis Journals. Vol. 48 (9). Cited in World Bank (2015).

[31] A study in pastoral areas of northern Kenya classified pastoral households as: wealthy with 4.5+ tropical livestock unit (TLU) per household member; medium with 2–4.49 TLU category; poor with fewer than 2 TLU; and very poor with under 1 TLU. Little, P., McPeak, J., and Kristjanson, P. (2008). Challenging Orthodoxies: Understanding Poverty in Pastoral Areas of East Africa. *Development and Change* 39(4): 587–611 (2008). Institute of Social Studies 2008. Published by Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main St., Malden, MA 02148, USA.

[32] Pastoralists interviewed in Arbale *kebele*, Dillo *woreda*, Borena zone reported that in the 2016-17 drought they trekked their livestock as far as Samburu District in northern Kenya.

[33] Little, P., McPeak, J., Barret, C., and Kristjanson, P. (2005). The Multiple Dimensions of Poverty in Pastoral Areas of East Africa. Paper presented at 'Pastoralism and Poverty Reduction in East Africa: A Policy Research Conference', June 27–28, 2006 in Nairobi, Kenya. World Bank and World Bank's Arid Lands Resource Management Project (ALRMP), USAID's Global Livestock Collaborative Research Support Program (GL-CRSP) and Strategies and Analysis for Growth and Access Program (SAGA), and the International Livestock Research Institute (ILRI).

[34] Catley, A., Lind, J. and Scoones, I. (2016). The Futures of Pastoralism in The Horn of Africa: pathways of growth and change. Rev. Sci. Tech. Off. Int. Epiz., 2016, 35 (2). http://doc.oie.int:8080/seam/resource/directMedia/_jU2DnHa7TNgYWICszidt0yVl-KUH6GJ;jsessionid=82b105cb5607b2ab935984979dea?binaryFileId=13875&cid=68

[35] ILRI Livestock Surveys 2016–2017 (WB/ILRI analysis for this study).

pastoralists and their livestock. Human and livestock mobility is a response to seasonal variations in forage and water availability. The degree of this mobility and the extent to which it affects people, as opposed to their livestock, varies considerably. A common pattern among Boran pastoralists is for livestock to be herded in mobile livestock camps by the young men, while the women, children, and older men stay in more settled villages. Among Somali camel pastoralists households tend to be more mobile and shift more regularly. Access to dry season grazing areas of higher rainfall potential or along riverbanks is vital to most forms of pastoralism. As parts of rangeland areas are privatized and enclosed, either because of the development of commercial private or government agricultural plantations in areas of higher potential, or because of the actions of wealthier pastoralists themselves to enclose grazing areas, the overall adaptive strategies of pastoralists are affected.

Herd diversification is common, with many wealthier pastoralists herding a variety of different stock in different areas, partly to spread risk. This is labor intensive and often requires employing herders, which only the wealthiest can afford. Not only do different animals have different niche specializations but they have different vulnerabilities to drought. As pastoralist herds become depleted, the tendency is to specialize in small stock pastoralism rather than the herding of larger animals (cattle and/or camels). The risk of losing small stock is much less than large stock because their unit value is less to start with, and they can reproduce at a much faster rate than large stock, so they provide the fastest re-entry back into pastoralism.

Devereux (2006) reported that Somali pastoralist and agropastoralist households on average owned 9.7 camels, 7.7 cattle, 1.7 goats, 1.5 sheep, and 0.8 donkeys. In TLU, each species respectively constituted 46 percent, 34 percent, 8 percent, 7 percent, and 3 percent of the household herd. The corresponding share of livestock species recorded by Gebremedhin et al., in 2017 is 27 percent for camels, 17 percent for cattle, 31 percent for goats, and 24 percent for sheep for the region (see Table 1.10).

In other pastoral areas similar trends toward increasing numbers of small stock are reported. For example, in 1988 Cossins and Upton reported that small stock comprised about 7.4 percent of the TLUs on the Borana plateau. More than 25 years later, McPeak et al. (2015) reported a 76 percent cattle, 16 percent small stock, and 8 percent camel composition for the Borana, which is a significant shift toward small stock and camels. Getachew (2001) argued that the shift in livestock composition in Afar from grazers to browsers occurred in response to the loss of riverine land to irrigated agriculture. A recent report from Afar compares two baseline surveys over a decade apart and indicates that household herd composition has changed in some livelihood zones because of a changing resource base and reduced rainfall. "The typical herd now contains more browsers (goats and camels) and fewer grazers (sheep and cattle)" (USAID, 2017, 56).

Research carried out in northern Kenya suggests that below a threshold of 4.5 TLU per capita, pastoral households without alternative income sources will struggle to provide adequate food and income for family members from their herds and flocks. Households of fewer than 2 TLU are typically caught in a cycle of poverty from which they

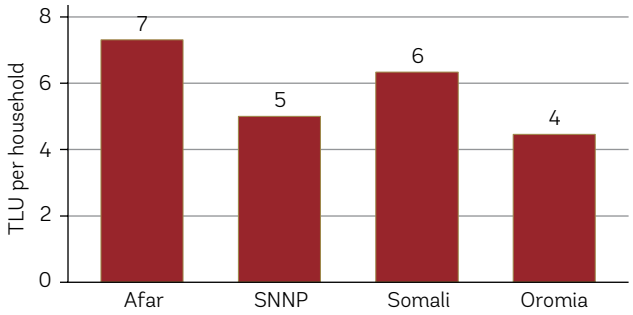
Table 1.10: Changes in household livestock composition in TLU by livelihood type for Somali region (%), 2006 to 2017

		Household livestock composition in TLU (%)					
Period	**Livelihood type**	**Camels**	**Cattle**	**Goats**	**Sheep**	**Donkeys**	**All**
2006	Pastoralist	57	19	11	9	3	100
	Agropastoralist	35	50	5	5	4	100
	Average	46	34.5	8	7	3.5	100
2017	Pastoralist	28	15	32	25	—	100
	Agropastoralist	26	20	30	24	—	100
	Average	27	17.5	31	24.5		100
% change over 10 years (+/–)	Pastoralist	–29	–4	+21	+16	—	
	Agropastoralist	–9	–30	+25	+19	—	

Source: Adapted from Devereux (2006); Gebremedhin et al. (2017).

are unable to exit, even in good rainfall years.[36] In the ILRI survey referred to above, the average TLU per household in 2016/17 ranged from 7 TLU in Afar to 4 TLU in Oromia (see Figure 1.2). As would be expected, richer households own more than the mean, but what is surprising is the percentage in the poorest quartile—43 percent (Afar), 75 percent (Oromia), 69 percent (Somali) and 46 percent (SNNP)—who owned no animals at all and are either wholly dependent on their relatives who continue to own livestock or have moved out of pastoralism altogether.

Figure 1.2: Average TLU per household by region (Ethiopia)



Source: ILRI (2017).

Herd rebuilding after drought takes time. For households that have lost in excess of 40 percent of their livestock, this recovery will take years: for sheep and goats the recovery may take 4–7 years; cattle 7–9 years; and camels up to 13 years.[37] During such herd rebuilding phases, pastoralists minimize consumption demands and avoid livestock sales as much as possible, as such losses simply further extend recovery periods.[38] It is however necessary to cover basic consumption demands and meet human and animal health costs and school fees, and hence all households are periodically forced to sell animals. Poorer households typically select immature animals for which they do not receive the full benefits.[39] Full recovery is also inevitably dependent on subsequent weather-related and other shocks.

Recurrent shocks may not only delay full recovery but may also prevent it altogether, as confirmed by ex-pastoralists in Yabello. While some had once been quite wealthy, they became progressively impoverished as the result of recurrent drought and were forced to abandon pastoralism and migrate to Yabello. Many were destitute. They also noted that once a household has moved to a town, it is extremely difficult if not impossible to accrue adequate livestock to return to pastoralism. The longer they stay in the towns, the smaller their social networks.[40]

Communal ownership of the range is an adaptation to variability. Without access to a variety of grazing areas, no pastoralist can be assured that his livestock will find grazing when needed. As Ethiopia's rangelands have become increasingly fragmented with important parts excised for commercial plantations or enclosed as a result of crop expansion and growth of permanent settlements, common access to grazing is becoming increasingly constrained. Newly created political boundaries between Ethiopia's regions since 1995 have also imposed new restrictions on access to traditional pastures and well complexes for some groups.

Protecting traditional pastoralist common access regimes is vital to pastoralist livelihoods remaining viable, given increased rangeland fragmentation experienced by many pastoralist groups today. Economic planning, in particular of land use, needs to take into account the potential impact on pastoralist livelihoods. The scope for livestock intensification as population density increases is limited. Excess population cannot be absorbed by existing production technologies. The inevitable consequence of a growing population trying to eke out an existence on a diminishing area of land (with the same level of technology) is likely to lead to increasing competition between groups, lower economic returns, and increasing poverty for those with few livestock assets and no obvious alternative economic opportunities. To date, pastoralists have benefited from increasing livestock prices and improving terms of trade at the same time as herd sizes have declined. But in the future more and more people will need to look outside pastoralism and pastoral areas for their livelihoods. This will require much more emphasis than before on human capital development and out-migration to areas of higher employment.

[36] Ibid.
[37] Toulmin, C. (1994). Tracking through Drought: Options for Destocking and Restocking, in Scoones, I., ed., Living with Uncertainty: New Directions in Pastoral Development in Africa, London: Intermediate Technology.
[38] McPeak, J., and Little, P. (2017). Applying the concept of resilience to pastoralist household data. Pastoralism Research, Policy and Practice, https://doi.org/10.1186/s13570-017-0082-4
[39] Wealthy pastoralists therefore typically benefit from investment in livestock marketing in pastoral areas.
[40] Discussions with ex-pastoralists in Yabello, August 2018.

(3) Remote Geographic Location

A third important characteristic of pastoral areas is their remoteness from centers of population, many basic services, and large urban markets. This has affected the costs of goods and services, which tend to be higher than in more densely populated areas. Relief interventions are also costlier. Because of their remoteness and distance, infrastructure and communications are generally poorly developed, and services limited. While this is changing in some lowland areas as result of new infrastructure investments, for example, the new all paved road from Jijiga to Gode has resulted in a considerable increase in commercial traffic between the two, in many lowland areas the orientation of pastoralists is still outwards across national borders rather than inward toward the Ethiopian highlands. This has important implications for trade and markets, as large numbers of livestock are traded across the border to Kenya and Somalia/Somaliland without passing through official channels. This has led to frequent prohibitions on such trade by the Ethiopian authorities.

(4) Political and Economic Marginalization from the Ethiopian State

A fourth characteristic of pastoral areas and lowlands in general is their political marginalization. These areas, historically, have formed the borderlands and frontiers of the Ethiopian state. Many pastoral groups were only incorporated into Ethiopia in the late 19th century during the reign of Emperor Menelik. The relationship between pastoralists and the Ethiopian state has therefore been ambivalent at best, and at worst openly hostile (Markakis, 1993). In general, mobile pastoralism has been viewed by highlanders as an outmoded form of production, and government pastoral policy has been largely driven by the desire to settle pastoralists and turn them into farmers or commercial livestock producers. There has been little appreciation of the finely balanced adaptation of pastoralists to a difficult environment and the validity of their overarching objective to maximize the numbers of their livestock to sustain as many people as possible in a highly variable and marginal environment. The early livestock development projects in the 1960s and 1970s were based on the ideas that pastoralists must keep less livestock, exchange more livestock, and collectively or individually regulate access to pasture and/or change their traditional land tenure system. Since then, frequent emergency relief interventions in pastoral areas after drought have compounded the widespread view that pastoralism is in a crisis.

As this study shows this view is not supported by the evidence. There are a variety of reasons for the vulnerability of lowland populations, and pastoralists are not the poorest of the poor but do suffer from severe human capital deficits and may be particularly vulnerable to shocks. Traditional pastoralism in Ethiopia is changing toward an increasing integration of livestock herding and cropping, and a greater degree of commercialization driven by high national and global demand for livestock. However, this brings with it its own attendant risks as pastoralists become less mobile and pastoralism itself becomes an increasing preserve of the wealthy, as poorer pastoralists are pushed out to become full-time croppers and/or to pursue other economic opportunities from petty trade to charcoal production.

Chapter 2: Poverty and Vulnerability

Summary

This chapter examines changes in monetary and nonmonetary poverty in the lowlands between 2011 and 2016. The analysis indicates a reduction in both dimensions of poverty from an initially high level. Those engaged largely in livestock production (pastoralists) seem to have experienced large decreases in the poverty headcount as well as declines in the depth of poverty. On the other hand, agropastoralists seem to have borne the brunt of the drought and have increasingly transitioned, presumably due to emergency livestock sales or deaths, to being full-time farmers (cropping only). These new farmers have not done well as evidenced by the increase in the depth of poverty among agropastoralists and crop producers. Increases in the price of livestock accompanied by decreases in the price of cereals combined to reduce monetary poverty, even in the case of smaller herd sizes and increasing asset-based poverty. Our analysis also reveals that in the lowlands: (i) the proportion of the vulnerable population is more than two times the proportion of the poor population in the lowlands; (ii) vulnerability due to aggregate shocks such as droughts is relatively more important than vulnerability due to idiosyncratic shocks; and (iii) poverty-induced vulnerability is relatively more important than risk-induced vulnerability, which is in sharp contrast to the other zones where the relatively more important sources of vulnerability to poverty is high consumption volatility. This points to the unique nature of the drought-prone lowlands in comparison to the other agroecological zones in the country and the need for policies and programs tailored to these special features.

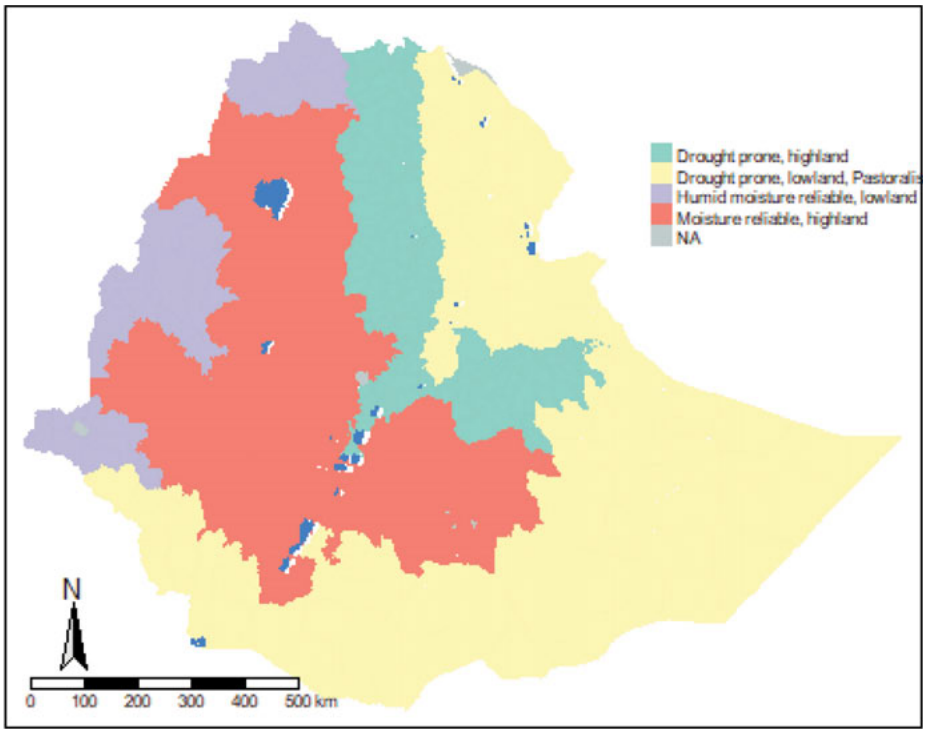
Introduction

This chapter analyzes the trends in expenditure-based poverty in the Ethiopian lowlands, with the objective of having a better understanding of the factors behind the changes over time in the poverty rate in the lowlands. Considering that monetary poverty is only one of many dimensions of welfare, an effort is made to cross-validate the observed trends in expenditure-based poverty with trends in other non-monetary dimensions of poverty. Attention is also paid to the potential effects of the large inflow of humanitarian food aid distributed in response to the 2015–16 drought that affected many areas in the lowlands, on the observed trends of poverty.

In a context such as that of the lowlands, characterized by repeated droughts and a high degree of volatility in consumption, a household's currently observed poverty status is unlikely to be a very good guide for a household's vulnerability to poverty, or its "poverty risk." For this reason, a measure of vulnerability to poverty is also estimated for comparison with the standard headcount poverty rate, and a concerted effort is made at understanding the sources of vulnerability in the lowlands.

The basic sources of data used in this chapter are the Ethiopian government's Central Statistical Agency's, Household Consumption Expenditure Surveys (HCES), and the Welfare Monitoring Surveys (WMS) in 2011 and 2016. It is important to bear in mind that there are some serious data limitations associated with the HCES and WMS surveys, especially when it comes to assessing the

Map 2.1: Ethiopia's four agroecological zones



level and the trend in the welfare of pastoralists and agropastoralists in Ethiopia. Prior to 2016, pastoral areas were underrepresented in the HCES since largely pastoralist zones were not included in the surveys.[41] In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali regions to increase the representativity of the surveys in pastoral areas.[42] To ensure comparability, all comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali).

In order to allow comparisons between agroecological zones, the country is divided into four agroecological zones: the drought-prone and pastoral lowlands, the moisture reliable lowlands, the drought-prone highlands, and the moisture reliable highlands following EDRI, 2009 (see Map 2.1).

Expenditure-Based Poverty

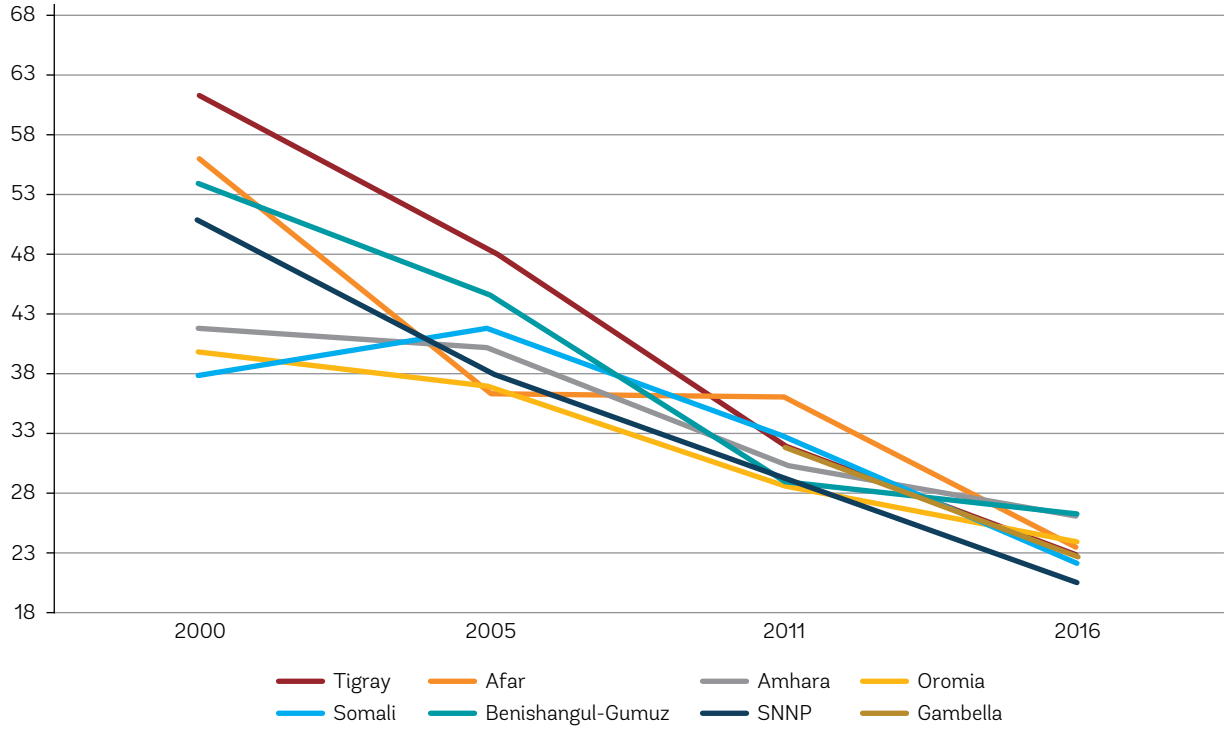
An estimate of expenditure-based poverty is derived by comparing total (food and nonfood) household expenditures per adult equivalent against the nominal (or inflation-adjusted) poverty line per adult equivalent (AE) (3,781 Birr per AE in 2011, and 7,184 Birr per AE in 2016).

Figure 2.1 reveals that poverty headcount rates in each of the eight regions of Ethiopia has declined significantly over the last 16 years (between 2000 and 2016). In 2000 there was a considerable diversity in the prevalence of poverty across regions ranging between 38 percent in the Somali region and just under 63 percent in the Tigray region. By 2016 the poverty rates in all eight regions ranged between 20 and 28 percent, exhibiting a rapid convergence to a lower headcount poverty rate. With the unique exception of the Somali region where poverty seems to have increased temporarily between 2000 and 2005, poverty in all other regions has either declined rapidly or did not increase from survey to survey. A likely explanation for the increase in poverty in the Somali region may be due to the regional ban by Saudi Arabia and the Gulf states on livestock imports from Somalia, Ethiopia, Eritrea, Kenya, Sudan and Djibouti because of the outbreak of Rift Valley Fever (RVF). The import ban was imposed in 2000 and ultimately lifted in 2003.

A comparison of the change in the poverty headcount rate across agroecological zones between 2011 and 2016 reveals that the decline

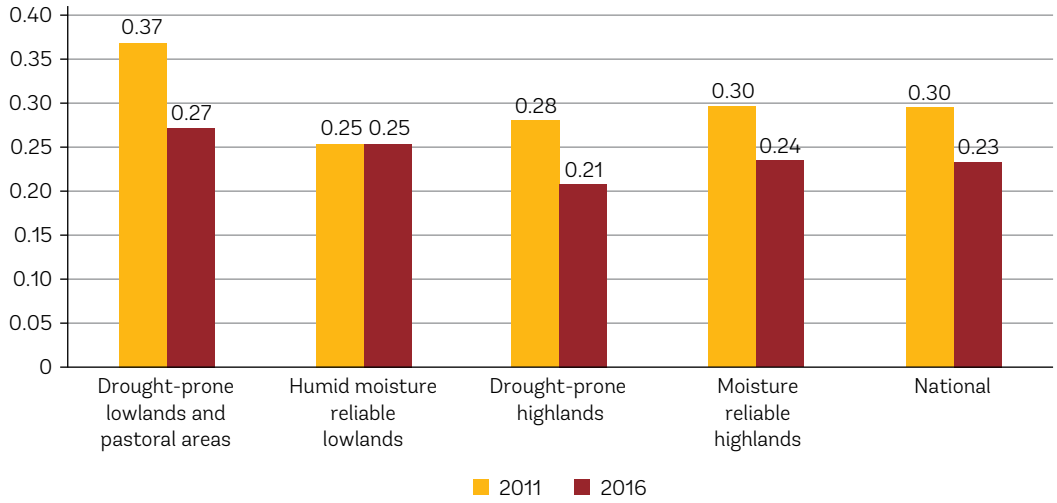
[41] The nomadic lifestyle of pastoral populations makes it difficult to identify the exact location of pastoral households in advance and thus very difficult to send enumerator teams to carry out the survey.
[42] In 2016 the sampling of pastoral households was based on sending enumerators to boreholes and *birkedas* where pastoralists are known to visit during the seasonal migration of their herds in search of pasture.

Figure 2.1: Overall decline in headcount poverty by region, 2000–2016 (HCE surveys)



Source: Bank Staff Estimates based on the respective HCES and WMS.

Figure 2.2: Headcount poverty rate by agroecological zone: 2011 vs. 2016 (HCES)



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

in poverty in the drought-prone lowlands and pastoral (DPL&P) areas is the largest among all agroecological zones (Figure 2.2) The DPL&P areas had the higher poverty rate of 37 percent in 2011, but by 2016, the poverty rate was 27 percent, a decline by 10 percentage points (pp), considerably greater than the decline by 7 pp in the poverty rate at the national level. The decline in the headcount poverty rate in the DPL&P is also accompanied by a small decline in the poverty gap (distance from the poverty line) and in the severity (depth) of poverty.

Trends in Nonmonetary Poverty

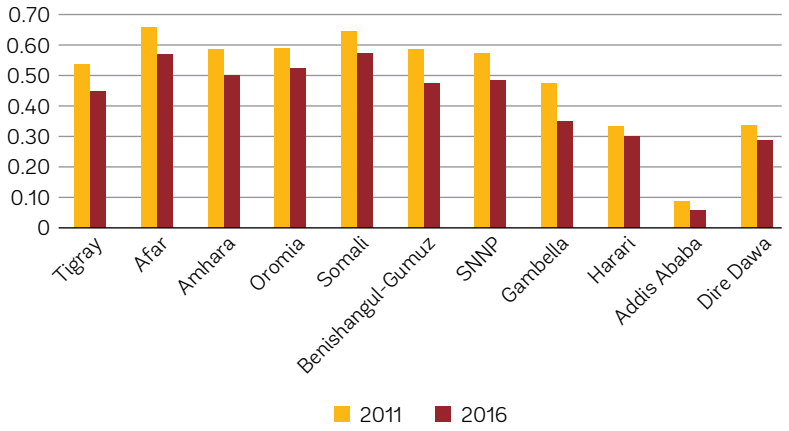
Expenditure-based poverty is only a measure of poverty in monetary terms. Yet, poverty has many different dimensions, most of which are nonmonetary. The Multidimensional Poverty Index constructed by Oxford Poverty & Human Development Initiative (OPHI) focuses on the combination of deprivations that simultaneously afflict a household (Alkire and Foster, 2011). A household is identified as multidimensionally poor if, and only if, it is deprived in some combination of indicators whose weighted sum exceeds 30 percent of deprivations. The dimensions and indicators are presented below

1. Health (each indicator weighted equally at 1/6)
   - Child mortality (if any child has died in the family)
   - Nutrition (if any adult or child in the family is malnourished—low weight for age)
2. Education (each indicator weighted equally at 1/6)
   - Years of schooling (if no household member has completed five years of schooling)
   - Child enrollment (if any school-aged child is out of school in years one to eight).
3. Standard of living (each of the six indicators weighted equally at 1/18)
   - Electricity (no electricity is poor)
   - Drinking water (MDG definitions)
   - Sanitation (MDG definitions, including that toilet is not shared)
   - Flooring (dirt/sand/dung are poor)
   - Cooking fuel (wood/charcoal/dung are poor)
   - Assets (poor if do not own more than one of these: radio, tv, telephone, bike, motorbike)

In line with the changes in the monetary measures of poverty, the values of the MPI by region in 2011 and 2016 suggest that the two main regions of the drought-prone and pastoral areas of Afar and Somali have also experienced a decline in the value of the MPI, albeit from a high value of deprivation in basic services in 2011 (see Figure 2.3). The value of the MPI appears to decline also in the regions of Benishangul-Gumuz and Gambella, the lowland areas which comprise the humid moisture reliable lowlands, whereas Figure 2.2 suggests that the headcount poverty rate based on consumption in the lowlands areas of these regions did not change. The reasons for this are unclear but are likely to be related to a deterioration in local conditions in some zones due to land alienation and localized conflict, and the absence of coverage by any safety net program like PSNP, which has become an important source of income to many in the drought-prone lowlands.

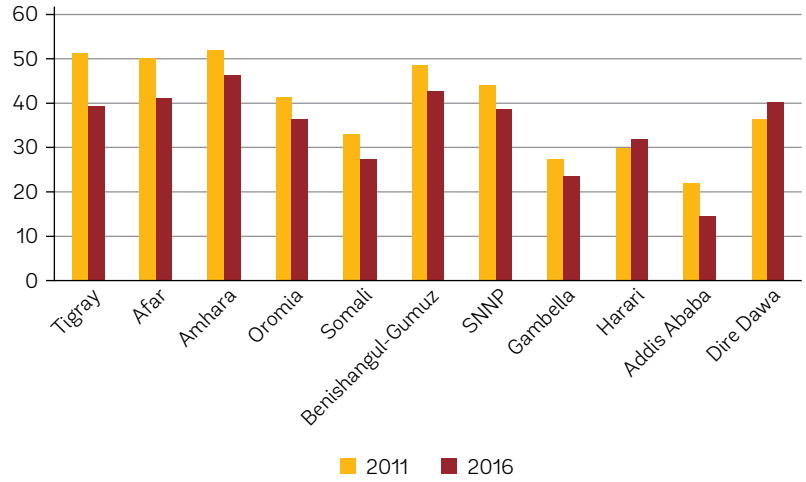
To complete the picture, Figure 2.4 presents the prevalence of stunting among children between zero and five years of age. There is an increasing consensus that child height for age scores (HAZ) provides a better measure of the nutritional status of children and of their potential welfare as adults. In a pattern consistent with that observed for expenditure-based poverty and the MPI, Afar and Somali regions also appear to have experienced a decline in the prevalence of stunting.

Figure 2.3: Multidimensional poverty index by region: 2011 vs. 2016



Source: Oxford Poverty & Human Development Initiative (OPHI) accessible at: https://ophi.org.uk/multidimensional-poverty-index/global-mpi-2018/

Figure 2.4: The prevalence of stunting among children 0–5 years of age by region: 2011 vs. 2016



Source: Ethiopia Demographic and Health Surveys 2011 and 2016.

Humanitarian Food Aid (HFA) and Poverty in the Lowlands

The decline in the expenditure-based poverty rate in the drought-prone lowlands and pastoral areas of Ethiopia appears to have taken place despite the 2015–16 El Niño—triggered droughts that affected large areas of the country, especially in the lowlands. The *Belg* rains of 2015 failed in large parts of the country and this was followed by further inadequate rainfall during the *Meher* season, which is the main growing season (FEWS NET, 2016).[43] This rainfall failure led to a fall in crop output and to a loss of livestock in parts of the country. Consequently, a significant share of the rural population living in these drought-affected areas suffered hardship, with an estimated 10.2 million people requiring emergency food assistance in 2016, on top of the 7.9 million already covered by the Productive Safety Net Program (HRD, 2016) (see Box 2.1).

Considering these events between the two survey rounds of the HCES, it is important to know the extent to which the large inflow of food aid contributed to the apparent reduction in poverty between 2011 and 2016 in the lowlands. To estimate the poverty rate that might have prevailed in the absence of food aid provided either through humanitarian organizations and/or through Ethiopia's social safety net system (PSNP), the counterfactual household expenditures in the absence of any food aid received are estimated by deducting the amount of food aid and donations received from total household consumption.[44]

Figure 2.5 compares the poverty rates inclusive of food aid received against the estimated poverty rate that would have prevailed in the absence of any food aid, by agroecological zone in Ethiopia in 2016. Clearly, food aid made a difference. This suggests that food aid in general was directed toward the poorer and vulnerable segments of the population, thus preventing the poverty rate from increasing. In the drought-prone lowlands and pastoral areas, for example, the poverty rate of 28 percent with aid in 2016 is lower than the 30 percent poverty rate that would have prevailed without food aid. Figure 2.5 also reveals that there is considerable heterogeneity in the extent to which the distribution of food aid was successful at reducing the poverty rate.

The preceding pattern is reinforced when actual poverty rates are compared against counterfactual poverty rates by region in 2016 (see Figure 2.6).

[43] The *Meher* is the main cropping season in Ethiopia and depends on the major rains during May through September. The *Belg* season, which is based on the shorter rains that start in March, is important only in some parts of the country.

[44] The value of food consumed from in-kind donations from Government/NGOs (code 62), cash received from the sale of in-kind donations from Government/NGOs (code 63), and donations in cash from Government/NGOs (code 64) are all deducted from the total value of food consumed by the household. The construction of the counterfactual expenditure in this manner assumes that there are no behavioral responses to household expenditures on food and nonfood items because of the loss of food aid, and thus the interpretation of the results must bear this caveat in mind.

Box 2.1: Ethiopia's hot spot *woreda* classification in the 2015–16 drought

The Ethiopian government and its partners have classified the *woredas* (districts) in the country into hot spot categories based on the impact of the drought, whereby *woredas* severely affected are categorized as hot spot 1 and those with decreasing severity of drought as hot spots 2 and 3. The hot spot *woreda* classification is derived using six multisector indicators—food availability; water, sanitation, and hygiene; access to markets; health and nutrition; education; and other factors (increased migration, significant disruption to normal livelihoods, etc.)—at zonal, regional, and federal levels that were agreed upon through expert consultations (EWRD, 2014). Operationally, this classification triggers a prioritized response, most notably in supplementary feeding (HRD, 2016) According to this categorization, 27, 18, and 9 percent of the 743 *woredas* in the country were categorized as hot spots 1, 2, and 3, respectively, in March 2016. In the region of Afar, in particular, 93.5 percent of the *woredas* were classified into the hot spot 1 category, whereas in the Somali region, 43.6 and 45.5 percent of the *woredas* were classified as hot spots 1 and 2, respectively (see Table 2.1).

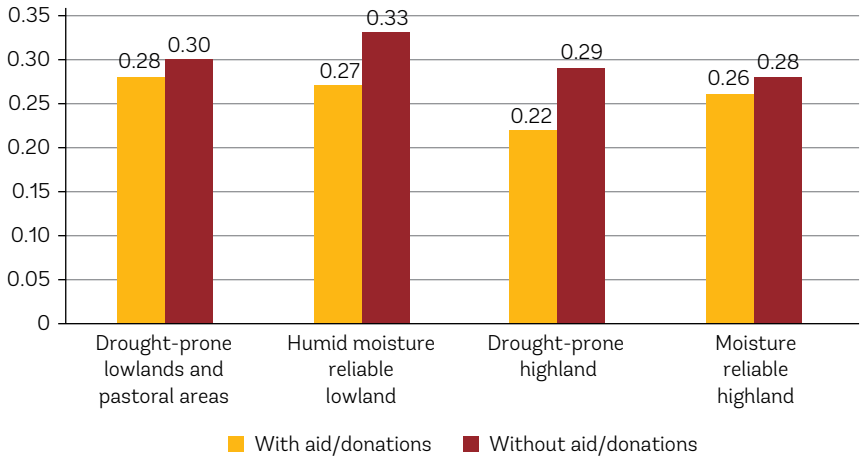
Table 2.1: Proportion of drought affected *woredas* by region, March 2016

Region	Number of *woredas*	Percent of *woredas* categorized as			
		Hot spot 1	Hot spot 2	Hot spot 3	Uncategorized
All regions	743	26.5	17.8	9.3	46.4
Tigray	47	40.4	6.4	17.0	36.2
Afar	31	93.5	—	—	6.5
Amhara	139	31.7	19.4	4.3	44.6
Oromia	279	21.9	11.8	7.2	59.1
Somali	55	43.6	45.5	—	10.9
Benishangul-Gumuz	20	—	—	40.0	60.0
SNNP	147	11.6	27.2	15.0	46.3
Gambella	13	15.4	30.8	30.8	23.1
Harari	1	—	—	100.0	—
Addis Ababa	10	—	—	—	100.0
Dire Dawa	1	100.0	—	—	—

Source: Bachewe et al., 2017.

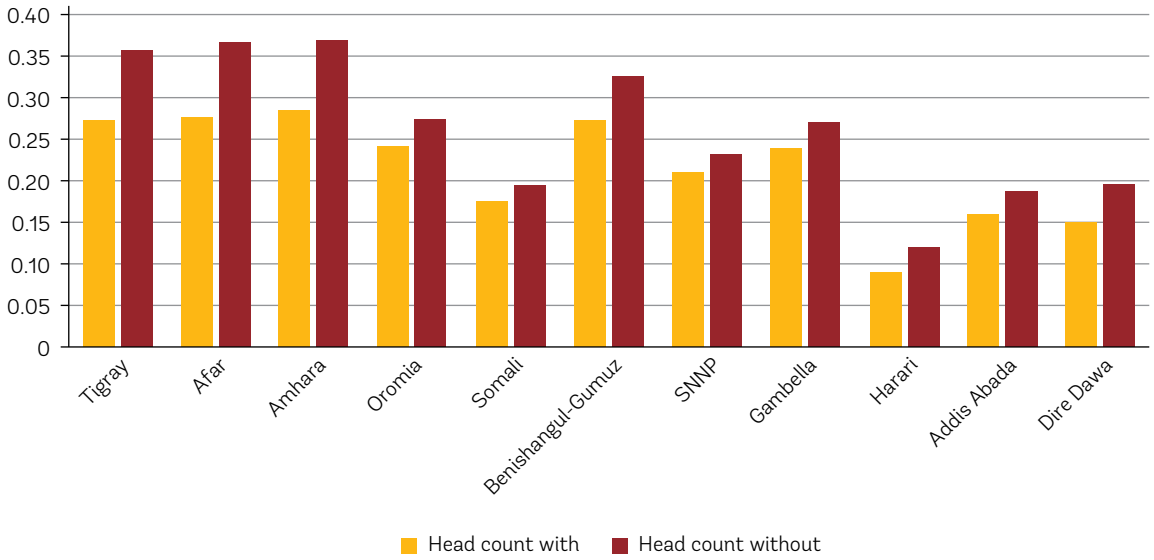
Note: *Woredas* in hot spot 1 are the most severely affected by the drought.

Figure 2.5: Poverty headcount with and without aid/donations in 2016



Source: Bank staff estimates based on the 2016 HCES and WMS, and inclusive of the additional zones in Afar and Somali aimed at increasing the representativity of the survey in the pastoral areas.

Figure 2.6: Poverty rate (headcount) by region—with and without aid/donations in 2016

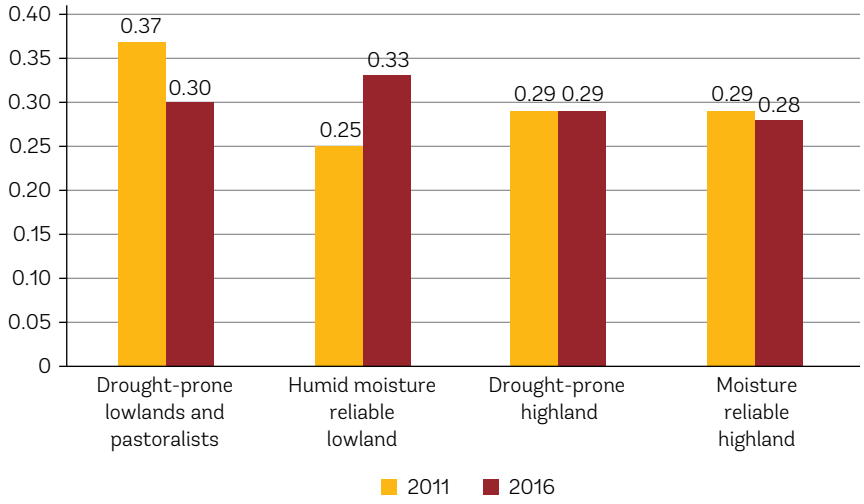


Source: Bank staff estimates based on the 2016 HCES and WMS, and inclusive of the additional zones in Afar and Somali aimed at increasing the representativity of the survey in the pastoral areas.

Food aid, through the PSN program or through NGOs appears to have made a significant difference in Afar, which was severely affected by the drought, where the poverty headcount with aid is 27.3 percent and the poverty rate without food aid is estimated to be 36.9 percent. In contrast, food aid appears to have made very little difference in the Somali region, where over 43 percent of the *woredas* were classified as hot spot 1, and some 45 percent of the *woredas* were classified as hot spot 2 (see Box 2.1). In the Somali region, the poverty headcount with aid is 17.5 percent, and the poverty rate without is estimated to be 19.2 percent.

Although food aid appears to have had an impact on the poverty rate prevailing in 2016, it remains to be determined whether food aid is also responsible for the observed decline in overall poverty in the lowlands. Figure 2.7, comparing the counterfactual poverty rates in both 2011 and in 2016 across agroecological zones of Ethiopia, reveals that the downward trend in overall poverty

Figure 2.7: Trend in the poverty headcount rate without aid/donations: 2011 vs. 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

in the (DPL&P) areas persists, even without the contribution of humanitarian food aid. In contrast, in the humid moisture reliable lowlands, the head count poverty rate increases slightly between 2011 and 2016, when food aid is excluded, while it remains constant when food aid is included (compare Figure 2.2 and Figure 2.7).

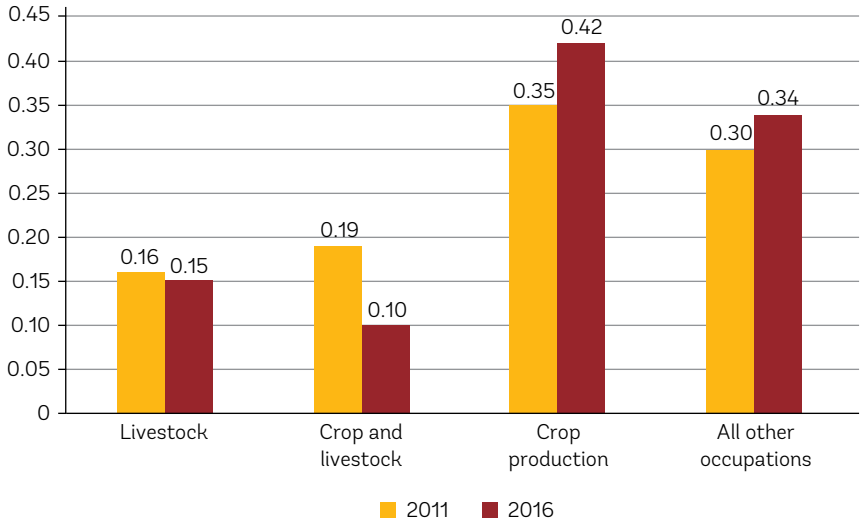
Poverty by Main Source of Household Income (livelihood)

The next step in the analysis is to investigate more closely the prevalence and trends in poverty by livelihood in the drought-prone lowlands and pastoral areas. Based on the information collected by HCES on the main sources of income, households are classified into the following livelihood types: livestock, crop and livestock (at comparable level), crop production (temporary and permanent crops), and all other (which includes, salary casual labor, manufacturing, trade, wholesale, retail, services, etc.). Figure 2.8 reveals that there have been substantial changes in the main source of income of households (urban and rural areas combined) between 2011 and 2016. The share of the population reporting livestock as their main livelihood has declined only slightly, from 16.3 percent in 2011 to 15 percent in 2016, whereas the share of the population in crop and livestock has almost halved, from 18.5 percent in 2011 to 9.5 percent in 2016. Most of the population shifting away from livestock, and crop and livestock, seem to be moving into full-time crop production, with the fraction of the population in crop production increasing from 35 percent in 2011 to 41.6 percent in 2016, and the rest moving into other livelihoods/occupations.

Figure 2.9 presents the prevalence of poverty associated with different livelihoods in the (DPL&P) areas in 2011 and 2016. Figure 2.9 reveals that there has been a substantial reduction in the headcount poverty rate among households with livestock as their main livelihood, with the proportion of the poor population among those largely dependent on livestock decreasing from 58 percent in 2011 to 29 percent in 2016 (a reduction by 29 percentage points). In contrast, the headcount poverty rate in all other livelihoods appears to decline more moderately (from 11 percentage points in all other occupations to only 3 percentage points in crop production).

The reductions in the headcount poverty rate by livelihood are not informative as to whether the standard of living among poor households in different livelihood categories improved or deteriorated. Figure 2.10 presents the poverty gap and the severity of poverty measures, with the former measuring the average distance of household expenditures from the poverty line among the poor, and the latter placing a higher weight on the expenditures of those further away from the poverty line. Figure 2.10 reveals that the depth of poverty among those engaged in crop and livestock, as well

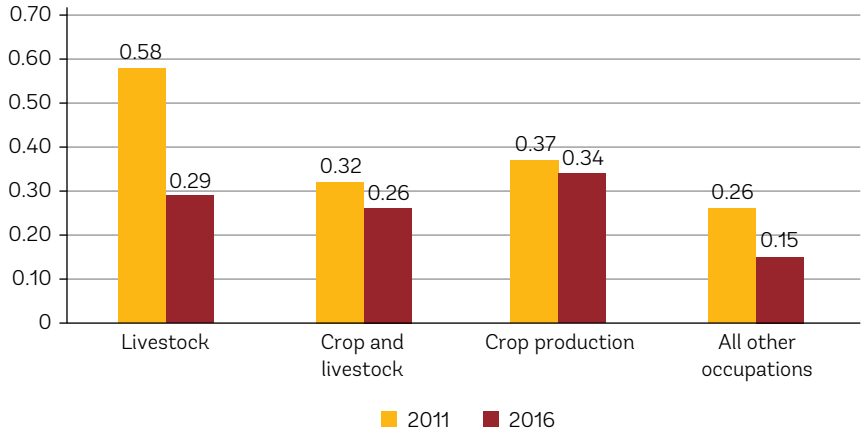
Figure 2.8: Changes in the percentage of population in different livelihoods—DPL&P areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS (urban and rural areas combined).

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

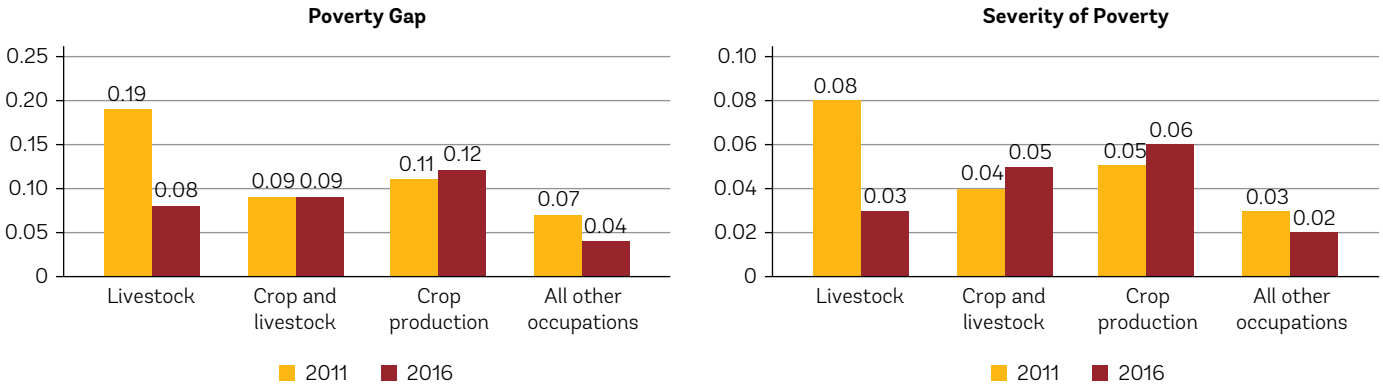
Figure 2.9: Poverty rate (headcount) by household livelihood—DPL&P areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

Figure 2.10: Poverty gap and severity of poverty by household livelihood—DPL&P areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

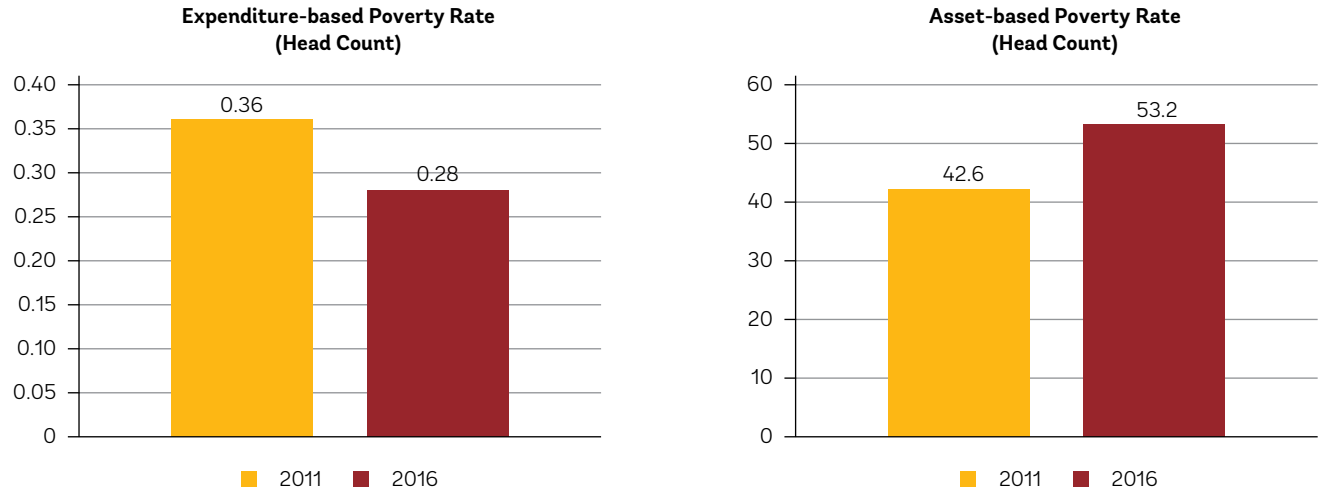
as in crop production only, has increased between 2011 and 2016. Thus, even though the headcount poverty rate may have declined, overall poverty has "deepened" among poor households engaged in crop and livestock production or in crop production alone.

Structural Factors behind the Decline in Expenditure-Based Poverty

The decline in expenditure-based poverty in the drought-prone lowlands and pastoral areas requires a better understanding of the structural factors behind it. Two potential explanations are possible: (i) an accumulation of new livestock assets that could sustain the increased household consumption expenditures (and the consequent reduction poverty); or (ii) an improvement in the terms of trade between livestock and staple grains. There is little evidence of the former and much stronger evidence of the latter.

There is scattered but generally consistent evidence in the pastoralist literature that household herd sizes or per capita livestock holdings have been declining in the last 20–30 years in Ethiopia (see Chapter 1 of this report). In addition, the 2015–16 drought contributed significantly to a further decline rather than to an increase in livestock herd sizes. Yet, concrete evidence on the extent to which household livestock assets have declined, especially between 2011 and 2016 in the drought-prone lowlands and pastoral areas, is lacking.

Figure 2.11: Changes in expenditure-based and asset-based poverty—DPL&P areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

Following Carter and Barrett (2006, 2013), the asset-based poverty line is constructed based on the value of livestock assets held by households around the expenditure-based poverty line in 2016 in the drought-prone lowlands.[45] The same asset-based poverty line is used in 2011. A household in each survey round is classified as "asset-poor" if the value of livestock owned (based on 2016 median prices for different types of livestock) is less than or equal to the asset-based poverty line.

Figure 2.11 provides estimates of the change in expenditure-based poverty and asset-based poverty (headcount) in the drought-prone lowlands. As Figure 2.11 highlights, the fraction of poor households based on expenditures declines between 2011 and 2016, while at the same time the fraction of households that are asset poor (or with livestock assets lower than the asset-based poverty line) increases from 42.6 percent in 2011 to 53.2 percent in 2016. In fact, it is estimated that the proportion of nonpoor households based on expenditures, who are asset poor increased from 45 percent in 2011 to 57 percent in 2016.

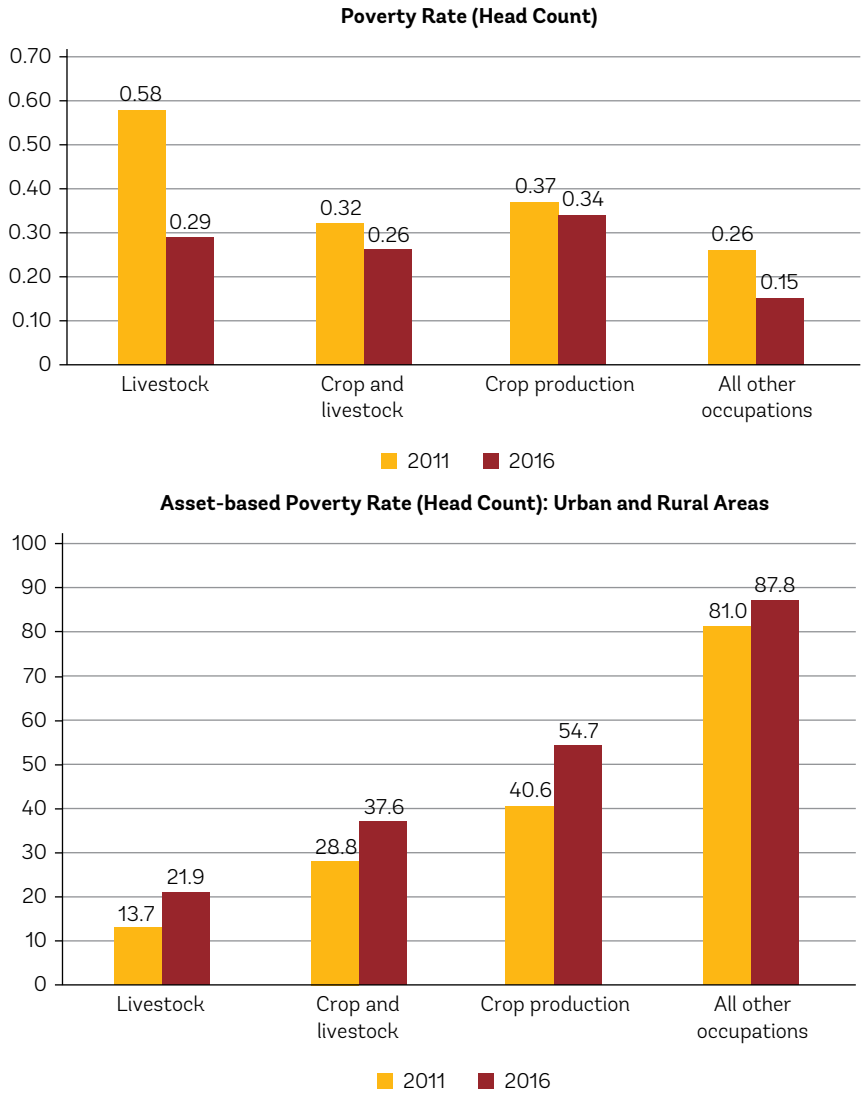
The same pattern prevails when expenditure-based poverty and asset-based poverty are compared across different livelihood categories in the drought-prone lowlands and pastoral areas in 2011 and 2016. Although expenditure-based poverty declines across all livelihoods, asset-based poverty or the fraction of asset poor households increases within each livelihood category (see Figure 2.12).

The preceding estimates confirm that the main explanation for the decline in expenditure-based poverty between 2011 and 2016 is likely to be in the increased returns to livestock owned. There is strong evidence regarding the positive trends in the livestock terms of trade over the last 15 years in the lowlands of Ethiopia. For example, a recent USAID report on the changes in livelihoods between 2003–2006 and 2013–2015 in the Afar region confirms that "in relation to staple grains, livestock are worth significantly more in the new baseline (2013–2015) than they were in the old baseline (2003–2006)" (HEA Change Analysis, Afar Regional Overview, USAID, 2017). Specifically, in Afar it is estimated that the terms of trade (the kgs of staple grain that could be purchased with cash earned from the sale of an animal) increased on average by 84 percent for cattle, 96 percent for goats, and 71 percent for camels. Moreover, livestock prices (adjusted for inflation) have increased significantly over the reference years allowing households to partially compensate for losses of livestock. In Afar, for example, the reported increase in prices for camels are between 40–45 percent, for goats between 60–65 percent, and for cattle between 50–55 percent.

The same pattern, in general, seems to hold in the Somali region, where the terms of trade (the

[45] This is based on the livestock holdings of households +/–3 percent of the expenditure-based poverty line.

Figure 2.12: Changes in expenditure-based and asset-based poverty by livelihood—DPL&P areas in 2011 and 2016



Source: Bank staff estimates based on the 2011 and 2016 HCES and WMS.

Note: All comparisons between 2011 and 2016 are based on the zones in Afar and Somali regions that were surveyed in both 2011 and 2016 (these are zones 1, 3, and 5 in Afar and 1, 2, and 9 in Somali). In 2016 some additional zones were included in the HCES/WMS survey in Afar and Somali to increase the representativity of the survey in pastoral areas.

kgs of staple grain that could be purchased with cash earned from the sale of an animal) increased between baselines (reference years) on average by 15–20 percent for camels, 10–15 percent for goats, and 25 percent for sheep (HEA Change Analysis, Somali Region, World Bank, 2019). Cattle, on the other hand, in the Somali region were worth less by 10–15 percent.

The recent study by Bachewe et al. (2017) provides additional evidence of increases in the terms of trade between livestock and cereals, even in the context of the 2015–16 drought. Their analysis of prices over the period between January 2014 and January 2017 confirms that the inflation-adjusted prices of major cereals were lower in January 2017 compared to three years earlier, especially for maize, sorghum, and wheat. These crops are the major source of calories in areas that were most hit by drought, such as Afar and the northern areas of the Somali region. The decline in the cost of cereals in the food basket in January 2017 compared to three years earlier was estimated at 13.3 percent at the national level, and the decline in cereal costs was highest in areas most affected by the drought, possibly indicating the effect of major cereal imports and food aid directed to these areas.

When crop and livestock prices are considered jointly, their analysis also reveals that

Table 2.2: Changes in terms of trade between livestock and cereals comparing January 2017 with January 2014, by *woreda* hot spot area, percent change

Items compared	Overall	Hot spot 1 *woredas*	Hot spot 2 *woredas*	Hot spot 3 *woredas*	Uncategorized *woredas*
Cattle vs. cereals	9.8	0.9	12.8	11.9	13.3
Cows vs. cereals	12.1	1.3	19.6	5.0	17.4
Oxen vs. cereals	8.3	0.7	8.5	17.0	10.8
Sheep and goats vs. cereals	17.8	7.5	16.5	36.6	20.1
Sheep vs. cereals	15.2	2.4	15.0	34.7	18.6
Goats vs. cereals	20.4	12.8	18.0	38.5	21.8
Sheep and goats vs. teff	–1.6	–9.3	0.1	9.4	0.3
Sheep and goats vs. wheat	–18.0	24.4	27.6	24.2	15.9
Sheep and goats vs. maize	95.5	22.4	25.8	42.7	38.1
Sheep and goats vs. sorghum	36.7	19.8	23.1	72.3	43.6

Source: Bachewe et al. (2017) based on computations using CSA producer price data.

Note: *Woredas* in hot spot 1 are the most severely affected by the drought (see Box 2.1).

livestock-cereal terms of trade improved between the period of January 2014 to January 2017. Table 2.2, copied from Bachewe et al. (2017), provides the percentage changes in the terms of trade between various types of livestock and cereals in the county overall as well as by *woreda* hot spot area (for additional details see Box 2.1)

Vulnerability to Poverty in the Lowlands

The standard poverty measures employed in the previous section, such as the poverty headcount rate or the poverty gap (see, e.g., Foster et al., 1984), are only able to assess the current poverty status of a household but are not necessarily a very useful guide to its future poverty status. Households in the lowlands are frequently hit by a variety of shocks resulting in high income volatility. While households in the risky environment of the lowlands characterized by periodic droughts have developed various ex ante and ex post risk-coping strategies to reduce income fluctuations or to insure consumption against these fluctuations, the variance of their consumption over time is likely to remain generally high.[46] In a context where there is high volatility in consumption, a household's currently observed poverty status is, therefore, unlikely to be a very good guide to a household's vulnerability to poverty, or its "poverty risk." For example, the current consumption of a household may be above the poverty line and thus classified as nonpoor, but, in the future after a shock, the same household may end up dropping below the poverty line. Such a household may be said to be "vulnerable to poverty" even though currently it is not poor. In general, the extent of vulnerability to poverty depends on the risk management strategies of households and communities, the abilities of households to cope after the incidence of the shock (e.g., assets owned, herd size, social capital), and access to safety nets (e.g., PSNP).[47]

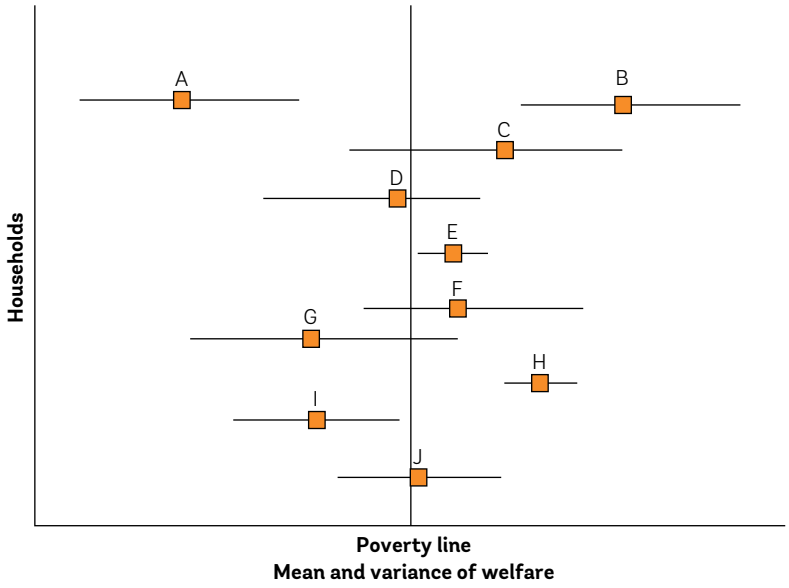
In contrast to the recent reduction in poverty among pastoralists in the lowlands, the prevailing view is that vulnerability to poverty from both idiosyncratic and covariate shocks[48] is increasing over the long term in the lowlands. The increase in vulnerability is attributed to a variety of factors that

[46] As emphasized by the extensive literature on consumption smoothing, household consumption may be insulated from idiosyncratic shocks through community-based risk sharing arrangements, but is likely to be affected by covariate or aggregate shocks that are more difficult to insure (Townsend, 1994).

[47] Vulnerability to poverty is related to the concept of "resilience" which concerns the longer time path of well-being in the face of shocks, and especially the likelihood that any adverse outcomes of either risk avoidance or a realized shock do not persist for an extended period. For example, a nonpoor household may be vulnerable to becoming poor due to a job loss yet be quite resilient if the prospects for finding follow-on employment offering similar compensation are high and/or formal or informal safety net programs reliably provide adequate support promptly. In statistical terms, a nonpoor household with high conditional variance of income might be both vulnerable (to becoming poor) and resilient (because the poverty is sufficiently short in duration, intensity, and/or likelihood (Barrett and Constas, 2014).

[48] In this report, idiosyncratic shocks refer to household specific shocks (e.g., injury, birth, death, or job loss of a household member) that are only weakly correlated across households within a community. Covariate shocks refer to shocks that are correlated across households within communities but only weakly correlated across communities (e.g., droughts, floods, earthquakes, or epidemics).

Figure 2.13: Vulnerability to poverty characterized by the mean and variance of welfare



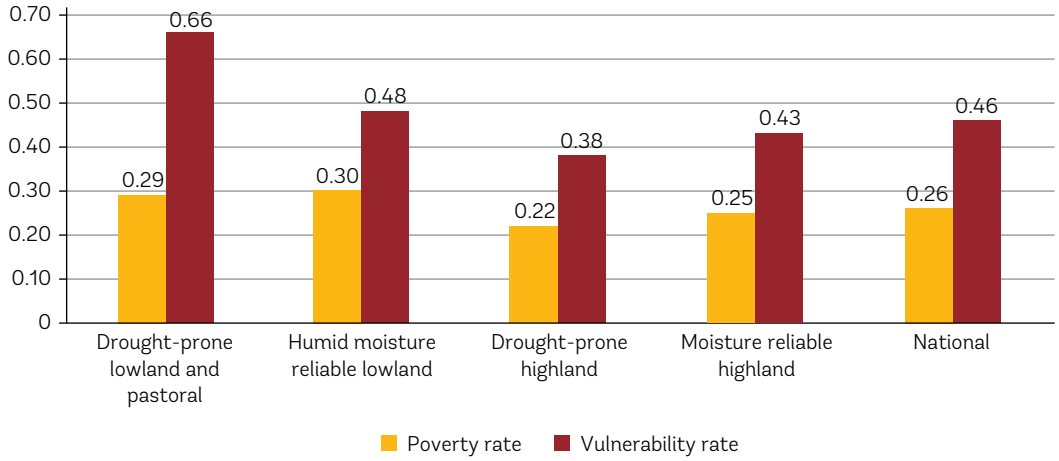
are discussed in this report, including the loss of grazing areas for pastoralists, increased population, expansion of cropland and agricultural concessions, and conflicts (see Chapters 3 and 4). These factors, combined with the increasing frequency and incidence of droughts and extreme weather events associated with climate change, lead to an overall decline in herd sizes per household, making households more vulnerable to poverty and more food insecure due to fluctuating terms of trade.

The "vulnerability to poverty" measure employed in this chapter rests on the characterization of welfare (income, consumption) by its mean value and its variance. Figure 2.13 summarizes these two dimensions of welfare, mean and variance, for 10 hypothetical households (households A through J). The mean consumption expenditure of a household (or the average value of consumption expenditures, for example, associated with many different shocks or states of the world over time) is depicted by the orange square. Different shocks at different points in time lead to variation around the mean value of expenditure, and the variance of welfare is depicted by the width of the horizontal lines to the right and to the left of the mean value of expenditure. Thus, households differ with respect to the mean level of their expenditure and the variance of their expenditure around that mean, with some households having a low (or high) mean level of consumption and a low (or high) variance of consumption.

Household A, for example, is on average a poor household with a low mean consumption, which places it below the poverty line, depicted by the vertical line in Figure 2.13, whereas household B is on average a non-poor household with a higher level of mean consumption located above the poverty line. In Figure 2.13, households A, D, G, and I are on average poor households and their vulnerability is "poverty induced," meaning that is determined primarily by low endowments of livestock assets and human capital, which are the primary determinants of their low mean value of their welfare. Households B, C, E, F, H, and J are, by contrast, on average nonpoor households as their mean welfare is above the poverty line. However, some of these households are vulnerable to poverty while others are not. Households B, E, and H, for example, have variability in their consumption but the variance line never crosses the poverty line. In contrast, households C, F, and J may end up below the poverty line under some circumstances, as depicted by the fact that the variance of their consumption around the mean crosses the poverty line. For households C, F, and J, vulnerability to poverty is "risk induced."[49]

[49] Figure 2.13 is also useful as an example of the difference between poverty and vulnerability headcount measures. The poverty headcount is based on the fraction of households whose consumption happens to be below the poverty line at a particular point in time. Depending on the timing of measurement and the type of shocks experienced (as well as the capacity of a household to mitigate the impacts of such shocks ex ante or cope with these shocks ex post) the poverty head count may range anywhere between 20 percent (only households A and I poor) and 70 percent (households A, C, D, F, G, I, and J). In contrast, the vulnerability head count rate is simply 70 percent.

Figure 2.14: The prevalence of poverty and vulnerability—lowlands vs. other agroecological zones in 2016



Source: Bank staff estimates based on the 2016 HCES and WMS.

An understanding of the causes of vulnerability to poverty in the lowlands is necessary for the design of policies that increase the overall resilience of household welfare to shocks. To the extent vulnerability to poverty in the lowlands is "poverty induced" (i.e., low assets and human capital endowments), then cash transfer programs or programs enhancing the delivery of basic services facilitating investments in physical and human capital are likely to be the most appropriate to the context of the lowlands. In contrast, if vulnerability is primarily "risk induced" (i.e., high uninsured income fluctuations), then an insurance type of program may be needed to increase resilience in the lowlands.

In the remainder of this chapter, a quantitative measure of vulnerability to poverty for households in the lowlands is derived based on an ex ante estimate of the mean and variance of consumption. The methodology employed allows the distinction between "poverty-induced" (or chronic poverty) and "risk-induced" vulnerability, as well as the decomposition of the variance of consumption into different sources, such as idiosyncratic and covariate shocks (a more detailed discussion of the method used is contained in Annex 2).[50]

Comparing Vulnerability and Its Sources among Ethiopia's Agroecological Zones

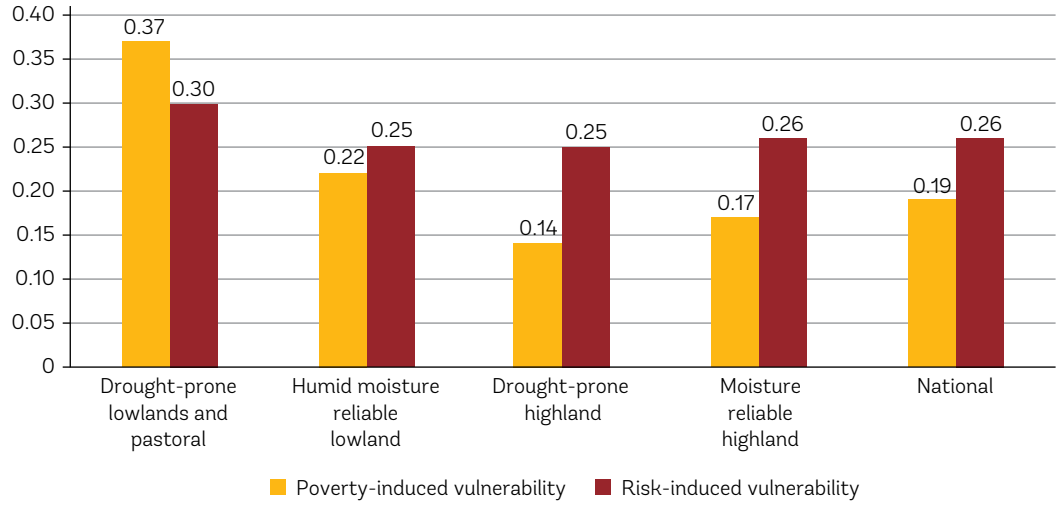
Figure 2.14 presents the prevalence of poverty and vulnerability by agroecological zone in Ethiopia in 2016. The vulnerability to the poverty headcount rate in the drought prone lowlands and pastoral areas, estimated at 66 percent of the population, is the highest among all agroecological zones in Ethiopia. Thus, 66 percent of the population is either poor or at risk of becoming poor in the event of a shock in the future. Moreover, in the lowlands the proportion of the vulnerable population is more than two times the proportion of the poor population (ratio of vulnerability rate to poverty rate is 2.26).

Figures 2.15 and 2.16 shed light on the sources of vulnerability by agroecological zone in Ethiopia in 2016. As discussed above, vulnerability to poverty can be either poverty-induced or risk induced. Figure 2.15 reveals that in the drought-prone lowlands and pastoral areas, poverty-induced and risk-induced vulnerability are both higher than in other agroecological zones. As a means of determining which of these two sources is relatively more important, the ratio of poverty-induced to risk-induced vulnerability reveals that poverty-induced vulnerability is relatively more important than risk-induced vulnerability (ratio equal to 1.25). This is in sharp contrast to the other zones where the relatively more important source of vulnerability to poverty is high consumption volatility. This attests to the unique nature of the lowlands in comparison to the other agroecological zones and points in favor of policies and programs tailored to the special features of the drought-prone lowlands and pastoral areas.

It is also possible to decompose the variance of consumption into different sources, such as idiosyncratic and covariate shocks (a more detailed discussion of the method is contained in Annex 2). Figure 2.16 reveals that the vulnerability due to

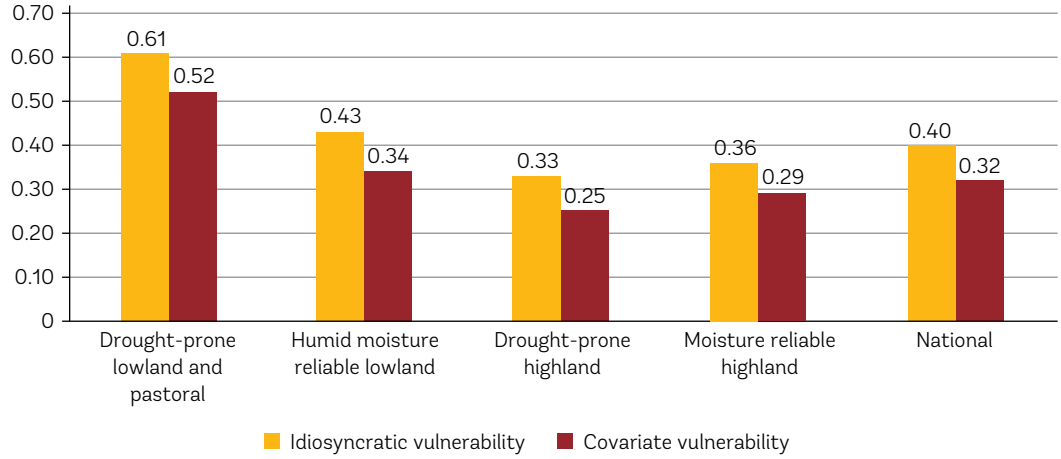
[50] See Hill and Poerter (2017) for a related approach to measuring vulnerability using explcit measures of shocks reported by households.

Figure 2.15: Sources of vulnerability in 2016—poverty induced vs. risk induced



Source: Bank staff estimates based on the 2016 HCES and WMS.

Figure 2.16: Sources of vulnerability in 2016: idiosyncratic vs. covariate shocks



Source: Bank staff estimates based on the 2016 HCES and WMS.

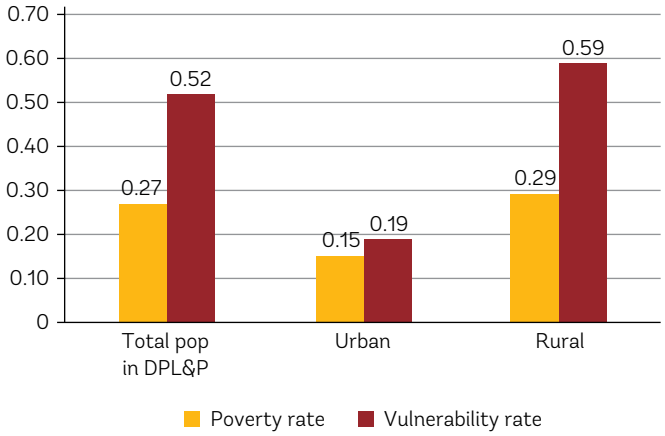
either idiosyncratic shocks or covariate shocks is the highest in the (DPL&P) areas. In addition, the ratio of covariate to idiosyncratic vulnerability reveals that in the (DPL&P) areas, vulnerability due to covariate shocks, such as droughts, is relatively more important than vulnerability due to idiosyncratic shocks (ratio equal to 0.86).

Comparing Vulnerability and Its Sources between Urban and Rural Areas of the Drought-Prone Lowlands and Pastoral Areas

A closer comparison of the vulnerability and its sources between urban and rural areas of the drought-prone lowlands and pastoral areas in 2016 reveals substantial differences between urban and rural areas. The prevalence of both poverty and vulnerability is higher in the rural areas than in urban areas of the lowlands (Figure 2.17), a finding consistent with the prevailing view that infrastructure (e.g., roads) and easier access to markets are associated with reduced poverty and vulnerability to poverty. Moreover, the fraction of the vulnerable population in the rural areas is twice the size of the poor population. In contrast, in the urban areas, the difference in the size of the poor and vulnerable populations is considerably smaller (ratio of the vulnerability rate to the poverty rate is 1.24).

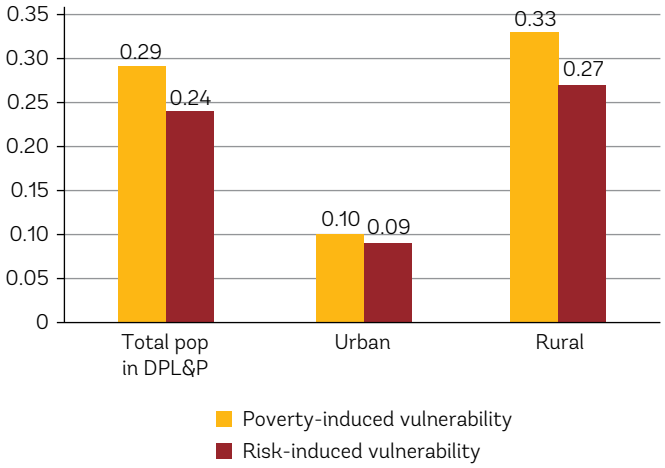
A closer look at the sources of vulnerability in urban and rural areas of the lowlands reveals that in rural areas poverty-induced and risk-induced

Figure 2.17: The prevalence of poverty and vulnerability in the DPL&P areas in 2016—urban vs. rural



Source: Bank staff estimates based on the 2016 HCES and WMS.

Figure 2.18: Sources of vulnerability in urban and rural areas of the lowlands in 2016—poverty induced vs. risk induced



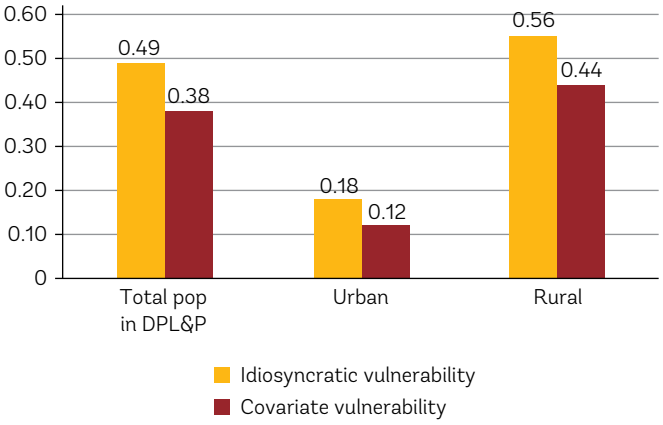
vulnerability are both significantly higher than in urban areas, and that low household assets and human capital endowments (or poverty-induced vulnerability) are relatively more important than consumption volatility (risk-induced vulnerability). See Figure 2.18.

Also, in rural areas of the drought-prone lowlands, covariate shocks are found to have a relatively higher contribution to vulnerability than idiosyncratic shocks (see Figure 2.19).

Comparing Vulnerability and Its Sources among Different Livelihoods in the Rural Drought-Prone Lowlands and Pastoral Areas

To complete the analysis, Figure 2.20 presents the prevalence of poverty and vulnerability for the population in the rural (DPL&P) areas grouped by different livelihoods. Figure 2.20 reveals that for those

Figure 2.19: Sources of vulnerability in urban and rural areas of the lowlands in 2016—idiosyncratic vs. covariate



Source: Bank staff estimates based on the 2016 HCES and WMS.

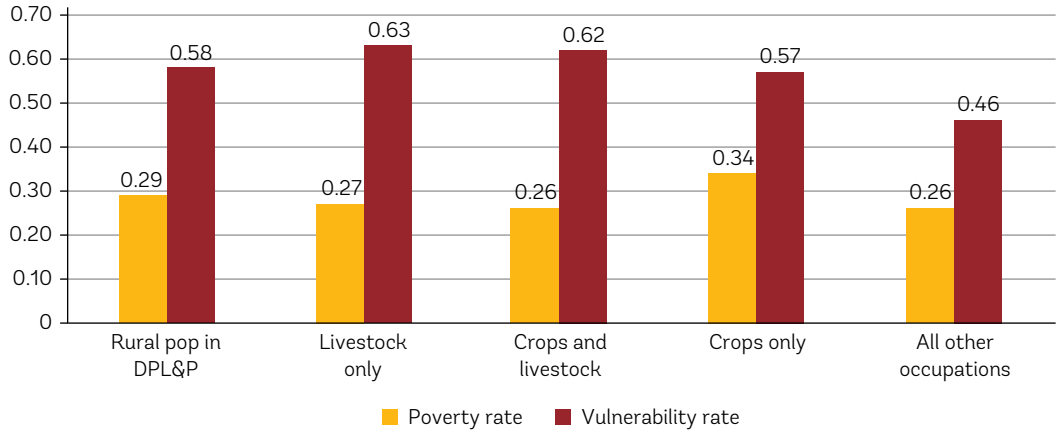
engaged in livestock as well as in crop and livestock (pastoralists and agro-pastoralists) livelihoods, the vulnerability rate in 2016 is more than twice as high as the poverty rate (the ratio of the vulnerability rate to the poverty rate is 2.34 for livestock and 2.39 for crop and livestock; for the rest of the livelihoods this ratio is less than 2).

The analysis of the sources of vulnerability reveals that the high variance of consumption (or risk-induced vulnerability) is almost as important as low household assets and human capital endowments (or poverty-induced vulnerability) especially for the population in pastoral, agropastoral, and cropping activities (see Figure 2.21). Nevertheless, it should be noted that among those engaged in crop production (crops only, and crops and livestock) risk-induced vulnerability tends to be relatively more important than poverty-induced vulnerability, which is a likely reflection of the inherent risks associated with crop production in the drought-prone lowlands of Ethiopia.

Conclusions

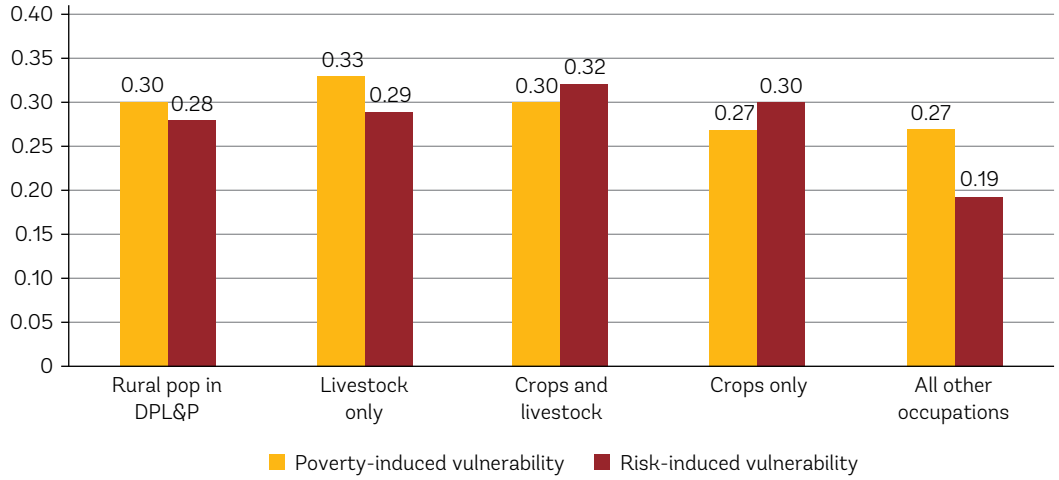
This chapter examined changes in monetary and nonmonetary poverty in the lowlands between 2011 and 2016. The analysis revealed a reduction in both dimensions of poverty from an initially high level. Those engaged largely in livestock production (pastoralists) seem to have experienced large decreases in the poverty head count as well as declines in the depth of poverty. On the other hand, agropastoralists seem to have transitioned, presumably due to emergency livestock sales or deaths, to being full-time farmers (cropping only). These new farmers have not done well, as evidenced by an increase in

Figure 2.20: The prevalence of poverty and vulnerability in the rural lowlands in 2016



Source: Bank staff estimates based on the 2016 HCES and WMS.

Figure 2.21: Sources of vulnerability by livelihood in the rural lowlands in 2016—poverty induced vs. risk induced



Source: Bank staff estimates based on the 2016 HCES and WMS.

the depth of poverty among agropastoralists and crop producers. Increases in the price of livestock accompanied by decreases in the price of cereals combined to reduce monetary poverty even in the case of smaller herd sizes and increasing asset-based poverty.

The analysis also provided firm quantitative evidence that in the lowlands aggregate shocks such as droughts combined with low human and livestock capital are major sources of vulnerability to poverty for households. This points to the need for policies and programs in the lowlands tailored to alleviating vulnerability to poverty and not just poverty per se. The regular occurrence of droughts in the lowlands and the transitory food insecurity associated with such events need to become integral components of the risk management strategy of the Ethiopian government for increasing resilience.

The next three chapters drill down on the determinants of poverty-induced and risk-induced vulnerability. Chapter 3 documents the low level of human capital assets of households in the lowlands. Chapter 4 examines the changes affecting the climate and environment in the lowlands, and Chapter 5 examines changes in land use and land cover.

Chapter 3: Low Human Capital as a Source of Vulnerability

Summary

Across a range of human development (HD) outcomes, from school attendance to infant and child mortality rates, and severe acute malnutrition, the lowlands do worse than the highlands. Accessibility and quality of services are also worse. As a result, sectoral ministries have developed specific strategies and approaches for delivery of human development services—especially to reach mobile pastoral populations. However, these strategies remain largely untested.

The main constraints to basic service delivery in the lowlands revolves around the nature of the Intergovernmental Fiscal Transfer System; low capacity and availability of skilled professionals stemming from low education, especially of girls; and lack of incentives and accountability systems to ensure results. Compared to the large human capital needs, regions and woredas tend to allocate too little of their budgets for health and education sectors, with minimal resources available for capital and operational costs. Afar and Somali regions have predominantly focused on investments in water and rural development to the relative neglect of education and health, while Gambella and Benishangul-Gumuz have preferred to allocate expenditures to rural roads and education and health.

Overall, there needs to be a much stronger focus on improving the human capital in these areas, especially in the drought-prone lowlands. Without this there will be little chance to break the cycle of vulnerability.

The chapter recommends to (i) allocate more on-budget resources for human development in the lowlands; (ii) introduce results-based approaches; (iii) introduce Specific Purpose Grants, targeted to regions/woredas with low human development outcomes; (iv) align civil servant incentives and pay to results; and (v) recentralize some local and regional functions to higher levels and review mechanisms of local planning enforcement and sectoral budget allocation in view of national targets.

Introduction

Ethiopia has achieved significant advances in human development over the last several years. It has reduced child mortality, and increased net enrollment rates (NERs) and the share of the rural population with access to clean water. Between 1990 and 2017, Ethiopian life expectancy at birth increased by 18.8 years, mean years of schooling increased by 1.2 years, and expected years of schooling increased by 5.4 years. Between 2000 and 2017, Ethiopia's Human Development Index value also increased from 0.283 to 0.463, an increase of 63.5 percent (UNDP, 2018).

These achievements were made possible through the government's continued commitment to financing basic services primarily through the Intergovernmental Fiscal Transfers (IGFT), known as block grants, to regions and *woredas* (see Chapter 7). This

is complemented by the government's additional MDG/SDG Fund for capital expenditures in pro-poor sectors (education, health, agriculture, water, and rural roads) and through the sectoral investments of the government and sector specific programs financed by development partners. A large portion of the general government's expenditures (about 63 pecent in 2017) continues to be allocated to the pro-poor sectors, with block grant subsidies to regions showing a much higher growth rate in 2016/17 than in preceding fiscal years (see Chapter 5 for more details).

In the 2018 World Bank Human Capital Index (HCI)[51] Ethiopia ranked 135 out of 157 countries. With an HCI score of 0.38, a child born in Ethiopia today will be 38 percent as productive when she grows up as she could be if she enjoyed complete education and full health. That means that her human capital endowment is around 2.5 times below its potential. In addition, the consumption growth of the bottom 40 percent of the population has not kept pace with the top 60 percent, and the consumption of the bottom wealth quintile has contracted since 2005 (HCES 2016). So, while growth has been a main driver of poverty reduction, the benefits have not been felt equally. Similarly, the poorest have not been able to benefit equally from services. On average, their human capital outcomes (e.g., on literacy, school attendance, and skilled birth deliveries) are well below the wealthiest quintiles. Finally, falling and converging poverty rates across regions hide disparities between regions and among *woredas* within regions. HCES 2016 data show that regional disparities are growing.

In addition, Ethiopia is impacted by frequent droughts that have the potential to undermine the development gains the country has made. The El Niño–induced drought of 2016/17 resulted in almost 20 percent of the rural population needing support to meet their basic food needs. The 2019 Humanitarian Response Plan (HRP) estimates that in addition to PSNP beneficiaries, 8.13 million people will need humanitarian food assistance (with most of them in Oromia, Somali, and SNNP regions), 4.4 million children and pregnant lactating women are targeted to receive treatment for acute malnourishment, and a further 4.8 million people are targeted to receive emergency health interventions. Approximately 3.1 million school children in 212 *woredas* are affected by drought and conflict-induced emergencies. Among these are 444,839 displaced school-age children residing in temporary settlements, of which 125,035 (28%) have no access to any educational services. In addition, the mortality rate in children under five is likely to increase given the vicious cycle of poor nutrition/malnutrition, increasing their susceptibility to infection and illnesses. Newly displaced people in Oromia and Somali regions also increase the burden on existing health facilities in host areas.

In Ethiopia's lowlands, livelihood patterns are changing in response to climate factors and government policies. Frequent droughts, coupled with the loss of rangelands, have led to an increase in the shift from traditional, mobile livestock herding pastoralism to a mix of livestock herding and crop production. The government's "voluntary based resettlement" program has also resulted in large sections of the lowland population in some areas moving to more urban environments and abandoning their traditional livelihoods.

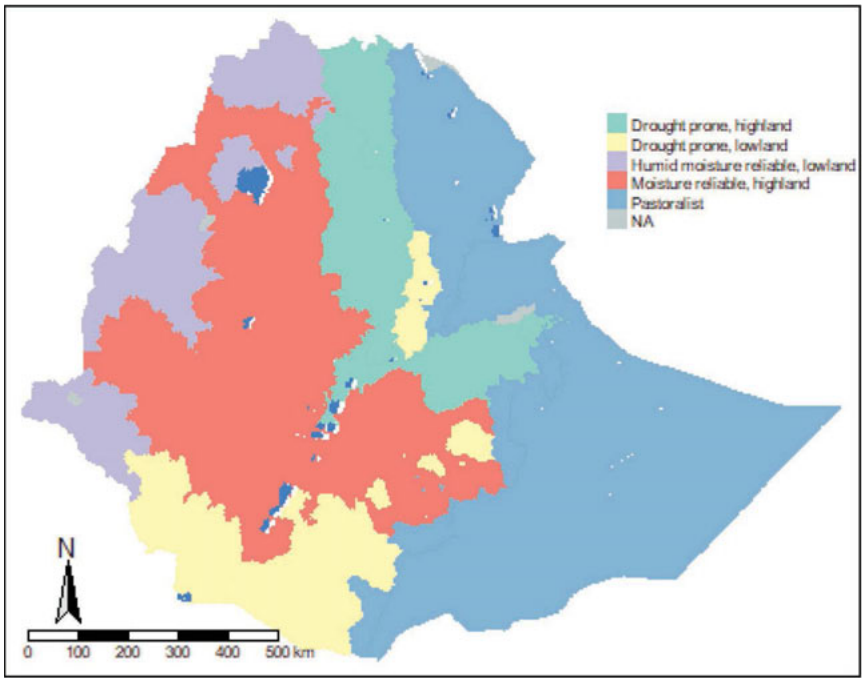
Status of Human Development in Lowland Areas of Ethiopia

This section examines the human development (mainly health, nutrition, and education) situation in the lowlands (below 1,500 m), which sheds light on the effectiveness of these sectors in supporting human capital development. The quantitative data on which the analysis is based are the Welfare Monitoring Survey (WMS), Household Consumption and Expenditure Survey (HCES), and the Demographic and Health Survey (DHS), all of which were conducted in 2016. Additionally, it explores other reports of studies conducted in the lowlands with a focus on human development including sociocultural norms, traditions and practices in the lowland areas which affect health seeking behavior, nutrition practices, and attitudes and behaviors related to schooling.

To examine variations within the lowlands, additional classifications of drought-prone, moisture reliable, and pastoral lowlands are made whenever possible. Ecologically, the lowlands are divided in

[51] The HCI measures the amount of human capital that a child born today can expect to attain by age 18. It conveys the productivity of the next generation of workers compared to a benchmark of complete education and full health. It is constructed for 157 countries. It is made up of five indicators: the probability of survival to age five, a child's expected years of schooling, harmonized test scores as a measure of quality of learning, adult survival rate (fraction of 15-year olds that will survive to age 60), and the proportion of children who are not stunted.

Map 3.1: Agroecological zones map of Ethiopia



two—drought prone and moisture reliable. The residents in moisture reliable lowlands are mainly settled and rely on sedentary agriculture for their livelihood. Drought-prone lowlands on the other hand have both settled (agropastoralists) and more mobile pastoralists. For this analysis, drought-prone lowlands refer to the sedentary agropastoralists, while pastoralist refer to areas dominated by pastoralists (see Map 3.1).[52]

Disaggregation was also made by sex, age, and expenditure/wealth quantiles. We have used expenditure data from HCES together with WMS to classify households based on their socioeconomic status. There are five such quintiles with the lowest being referred to as the poorest, followed by poor, middle, wealthy, and wealthiest quintiles.

The chapter is organized into two main sections: education and health/nutrition. Under each of the sections we start with a comparison of the lowlands versus highlands (above 1,500 m) in terms of their human development characteristics. This is then followed by comparisons of variation within the lowlands based on agroecological zones, wealth, and gender. The section concludes with an analysis of the cross-cutting sociocultural challenges that are impeding the development of human capital within the lowlands, followed by some recommendations to address these challenges.

Education

Education differences between highlands and lowlands

Schooling experiences (having ever been in school) and literacy rates are significantly lower in the lowlands than in the highlands (Table 3.1). Nationally, 63 percent have been to school at some point in their life, while this number rises to 73 percent for current school-age children (4- to 18-year-olds) (WMS). Overall, males are more likely to have attended school than females (69 percent versus 56 percent). Among adults (19–65-year-olds), the gender gap widens (67 percent for males versus 40 percent for females). However, for school-age children, both males and females are equally represented in terms of having attended school (73 percent). However, fewer children have been to school in the lowlands—only 68 percent—compared to the highlands with 74 percent of children having been to school.

Nationally, 64 percent of school-age children were attending school in 2016 with the proportion being almost equal for boys and girls. However, the proportion of school-age children in school is much higher in the highlands (67%) than the lowlands (59%). Interestingly, the proportion of lowland school children attending school is similar across

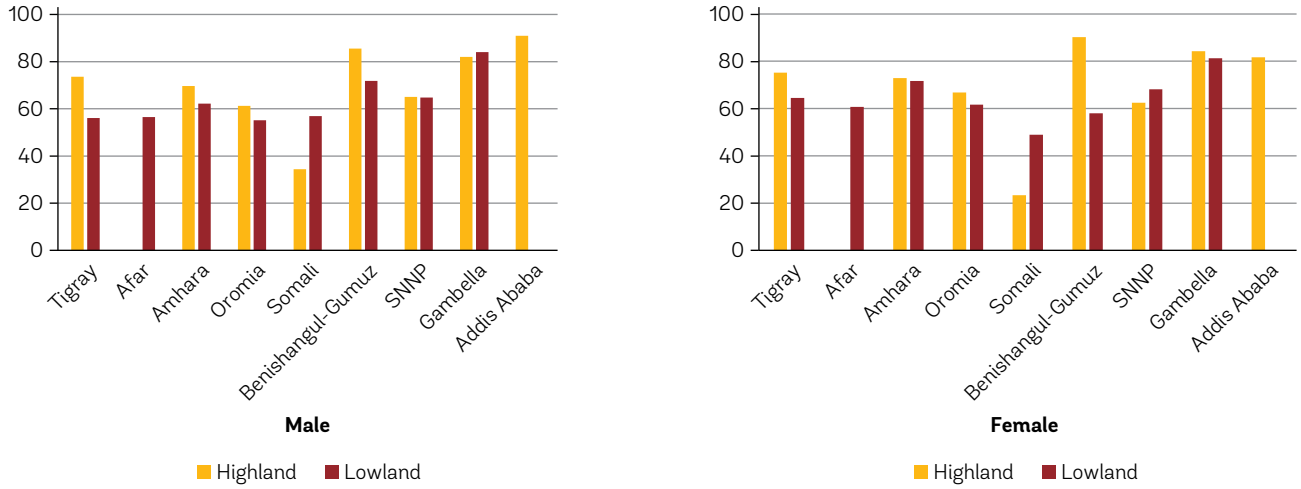
[52] The only difference between Map 3.1 and Map 2.1 is that Map 3.1 distinguishes the pastoralist areas from the drought-prone lowlands.

Table 3.1: Ever attended school (schooling experience)[53]

	Frequency	Percent		Frequency	Percent
School age	**33,138**	**73.1**	**School age**		
Male	17,034	72.7	Highland	18,669	74.9***
Female	16,104	73.4	Lowland	5,287	67.9
Adult	**32,353**	**53.3**	**Adult**		
Male	19,677	67.2***	Highland	19,967	55.3***
Female	12,676	40.4	Lowland	3,705	41.6

***Differences are statistically significant at the 1 percent level of significance using Pearson's chi-squared test.

Figure 3.1: School attendance by region, gender, and highland/lowland



all regions, with the striking exceptions being Benishangul-Gumuz and Gambella, where male attendance in both regions is much higher than the lowland average (Figure 3.1). Furthermore, female attendance is exceptionally high in the lowlands of Gambella but very low in Benishangul-Gumuz, where it falls even below the level for the Afar region. It should be noted that the predominantly highland regions allocate the largest share of their regional budgets to the education sector, while this is not the case for the lowlands.[53]

Education differences within lowlands

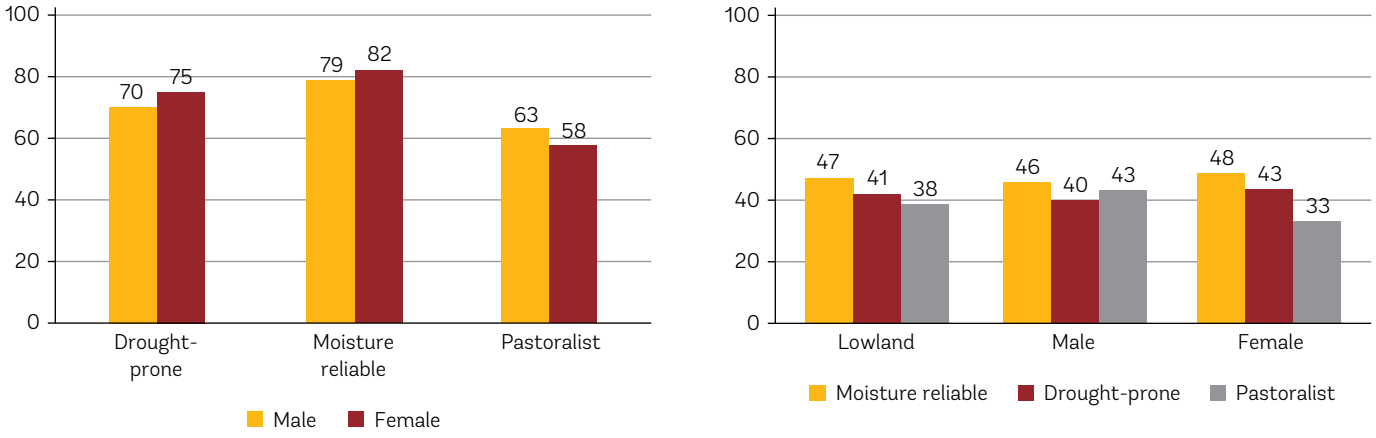
The moisture reliable lowlands (mainly Gambella and Benishangul-Gumuz regions) perform much better across a range of indicators from "having ever been to school," "literacy," "current school attendance," and being "at a closer distance to school," than the drought-prone and pastoral lowlands. Differences within the socioeconomic (wealth) groups do not have a clear pattern, except that the top quintile having higher education outcomes.

Pastoralists in the lowlands have the lowest proportion of school-age children who have ever been to school.[54] Only 61 percent of school-age children from pastoral areas have ever been to school compared to 72 percent for children from drought-prone and 81 percent from moisture reliable lowlands. In terms of wealth groups, it is the wealthiest (quintile 5) who have the highest proportion of schooling experience for school-age children. As can be expected, the proportion of students attending secondary school increases with the wealth quintile. In the poorest quintiles about 92 percent of those attending school are at the primary level with only 3.6 percent at secondary. On the other hand, among the richest quintile, 78 percent of students were in primary and the number in secondary reached 16 percent.

[53] Tables and figures are WB staff calculations using WMS/HCES unless stated otherwise.

[54] One-way ANOVA result being significant at 1 percent level of significance.

Figure 3.2: Schooling experience and literacy by gender and ecological zones



Pastoralist areas are also among the worst performers in terms of the ability to read and write, with a 38 percent literacy rate followed by drought-prone (41%) and moisture reliable lowlands topping the list but still at only 47 percent (see Figure 3.2). For girls, pastoralist areas have the lowest literacy rate at 33 percent while for boys, it is the drought-prone lowlands (40%). Literacy rates increase from the poorest (36%) to the wealthiest quintile (60%).

Reasons for education outcomes in the lowlands

Among the main reasons for not attending formal education, 'family not letting' tops the list for drought-prone and pastoralist lowlands, while 'child is too young' is the primary reason for moisture reliable lowlands. These reasons are demand side factors and might have been influenced by the fact that the response options had only one category related to the supply side, namely 'no school around the household'. Family not letting the child go to school emerged as a top reason for drought-prone lowlands (38%), pastoralists (49%), 3rd, 4th, and 5th expenditure quintiles (42 percent, 53 percent, and 41 percent, respectively). This could be related to the need for children to work or help with chores related to animals or household activities. It could also be related to sociocultural norms related to the usefulness of schooling and early marriage and childbearing for girls.

Reasons for dropping out of school once they have started are a mix of demand side (having to work) as well as supply side (school being too far and lack of education materials). The most common reason was having to work, which is the highest among the richest quintiles at 45 percent followed by lack of educational materials, particularly for drought prone, pastoralist, and the 4th quintile (21 percent, 23 percent and 26 percent, respectively). Distance to school is also another factor that came up frequently among drought prone (16%), and pastoralist (15%).

The most common reasons for being absent from school (defined as being absent for more than a week in the month preceding the WMS survey) in the lowlands are having to work to help the family, school being temporarily not functioning, and illness. Nonfunctioning schools (temporarily) were the main reason for not attending school in the pastoral areas (86%). Poor health as a reason for being absent from school was exceptionally high for drought-prone lowlands at 23 percent. Of course, the timing of the WMS study may have influenced these data.

Education quality issues in the lowlands

The Young Lives (YL)[55] survey shows that pastoral communities in the lowlands have been relatively disadvantaged in terms of school facilities, such as laboratories, libraries, and computers for students. In terms of textbook availability, all students from Addis Ababa sites have one math and English textbook each, while possession of an English textbook falls to a low of 38 percent in Afar and 44 percent in Somali (Table 3.2). This means that more than half of students in these lowland communities do not have their own textbooks.

Shortage of books was the most severe problem among the range of problems identified by respondents in WMS, particularly for the pastoralist group

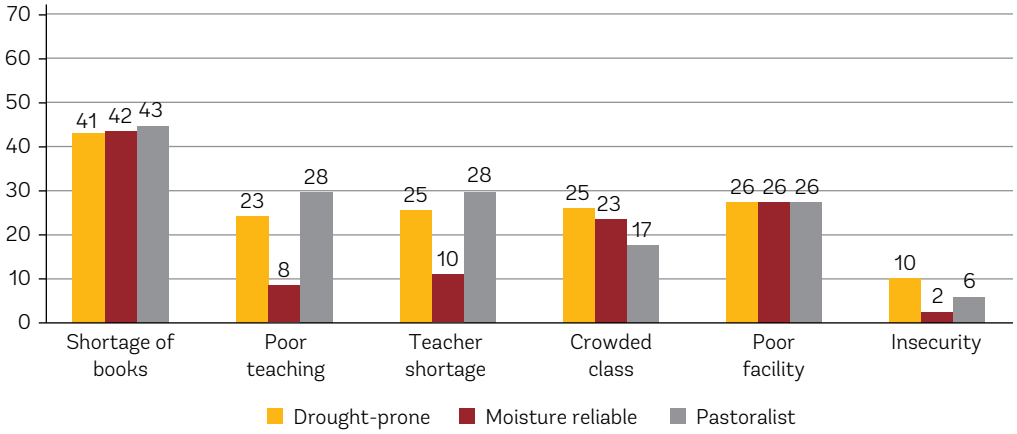
[55] The results cited here are from the school surveys of Young Lives conducted at different highland and lowland sites. These were not meant to be nationally representative.

Table 3.2: Average class size and availability of textbooks

Location	Mean class size (number of students)	Proportion of students who have math textbook (%)	Proportion of students who have English textbook (%)
Addis Ababa sites	49	100	100
Amhara sites	44	86	93
Oromia sites	52	74	74
SNNP sites	51	77	68
Tigray sites	50	78	68
Somali sites	62	52	44
Afar sites	46	54	38
All sites	51	75	70

Source: Young Lives School survey, 2016.

Figure 3.3: Problems faced in school by ecological zones



(Figure 3.3). Other problems included poor teaching, shortage of teachers, overcrowding of classrooms, poor facilities, and insecurity. Among these problems, poor facilities were the second most reported problem after shortage of books. Poor teaching and shortage of teachers were also reported frequently in both the pastoral and drought-prone lowlands, but the moisture reliable lowlands appeared much better off for these two indicators.

Regarding school accessibility (Table 3.3), children in the lowlands on average must walk for up to 3.7 km to access Grades 5–8, while their peers from the highlands only travel 2.7 km to attend the same level of schooling. Moisture reliable lowlands have the lowest average distance to school, 2.5 km (Grades 5–8), while pastoralists have the longest at nearly 5.0 km. The difference is particularly large for secondary schools in the lowlands where children travel up to 14.0 km to attend Grades 9–10. The equivalent distances for children in the highlands are 9.9 km (WMS, 2016; HCES, 2016).

In summary, the overall picture emerging is that education outcomes and quality indicators in the lowlands are much lower than in the highlands. Furthermore, within the lowlands, moisture reliable lowlands (Benishangul-Gumuz and Gambella) fare better than drought-prone and pastoralist lowlands, with the pastoralist lowlands having the worst education outcomes and quality indicators. While there may be many factors contributing to these results, including demand-side sociocultural factors (which are discussed in more detail later), it should be noted that this trend is mirrored in the investment in education by the regions. The highland regions (Tigray, Amhara, Oromia, and SNNPR) generally place higher priority on education than the lowlands in terms of budget allocation, and within the lowlands, Benishangul-Gumuz and Gambella spend a greater proportion of their budgets on education than Afar and Somali regions.

Table 3.3: Average distance from school in km

Group	Primary (G1–4)	Primary (G5–8)	Secondary (G9–10)
Area			
Highland	1.99 (2.0956)***	2.73 (2.9364)***	9.87 (9.6361)***
Lowland	1.90 (2.7066)	3.66 (5.5555)	13.95 (15.9300)
Ecological zone			
Drought prone	1.69 (2.0194)***	3.18 (3.372)***	14.70 (23.9776)***
Moisture reliable	1.41 (1.8183)	2.5 (3.7433)	15.17 (14.2456)
Pastoralist	2.3 (3.4310)	4.88 (7.2292)	14.87 (15.6799)
Socioeconomic status			
Poorest	1.94 (2.3120)***	3.52 (4.8446)***	16.46 (17.8573)***
2	1.78 (2.6172)	3.23 (4.8644)	14.77 (15.7314)
3	1.91 (2.9099)	4.29 (6.7503)	12.95 (14.0905)
4	2.08 (3.0700)	4.07 (5.9719)	12.91 (14.9461)
Wealthiest	1.69 (2.6187)	2.55 (4.18458)	10.16 (15.5881)

Significant at **5% and ***1% level of significance (one sample t-Test for gender and one-way ANOVA for the rest), SE in parenthesis.

Health

Health differences between highlands and lowlands

The highlands fare much better than the lowlands across a range of key health service indicators, including availability of key health professionals, availability of essential drugs at health facilities and attendance at delivery by skilled birth attendants at health facility level. Under five mortality rates and total fertility rates are also significantly lower in the highlands.

When comparing health seeking behavior within the last two months prior to the WMS survey, nationally 15% of households received medical assistance after facing a health problem, with a higher incidence of women than men in both the highlands and lowlands (Figure 3.4). Households in the highlands and lowlands demonstrate similar trends in the type of medical facilities used. However, in the lowlands 11% of households use government health posts, which offer a less comprehensive package of health services than health centers or hospitals, and which there are more of than in the highlands. This is largely due to the inaccessibility of health centers and hospitals in the lowlands.

The two most frequently diagnosed illnesses, malaria and diarrhea, are much more common in lowland areas than in the highlands. Both lowlands and highlands exhibit almost the same kinds and levels of challenges regarding availability of quality

Figure 3.4: Households who sought health services by gender and type of residence (highland and lowland)

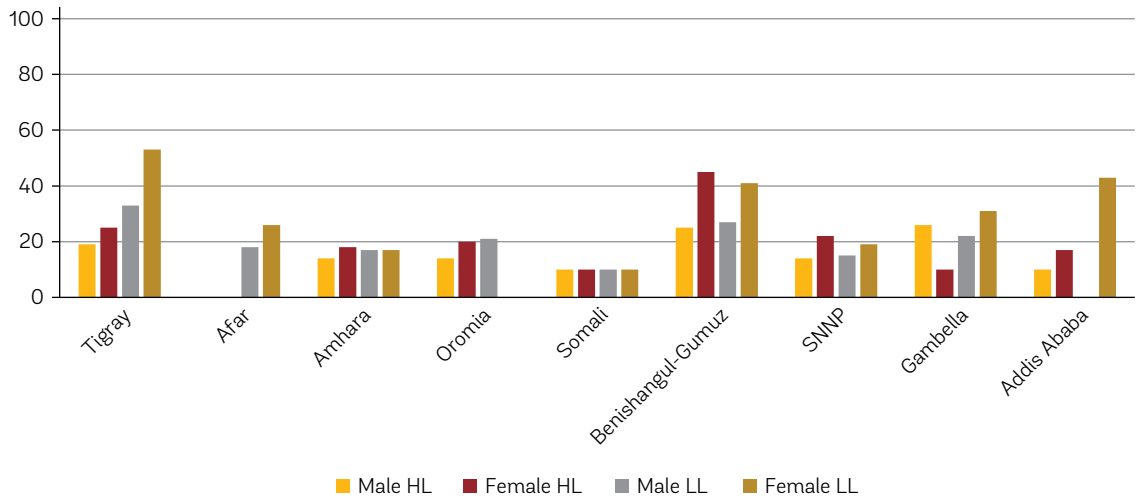
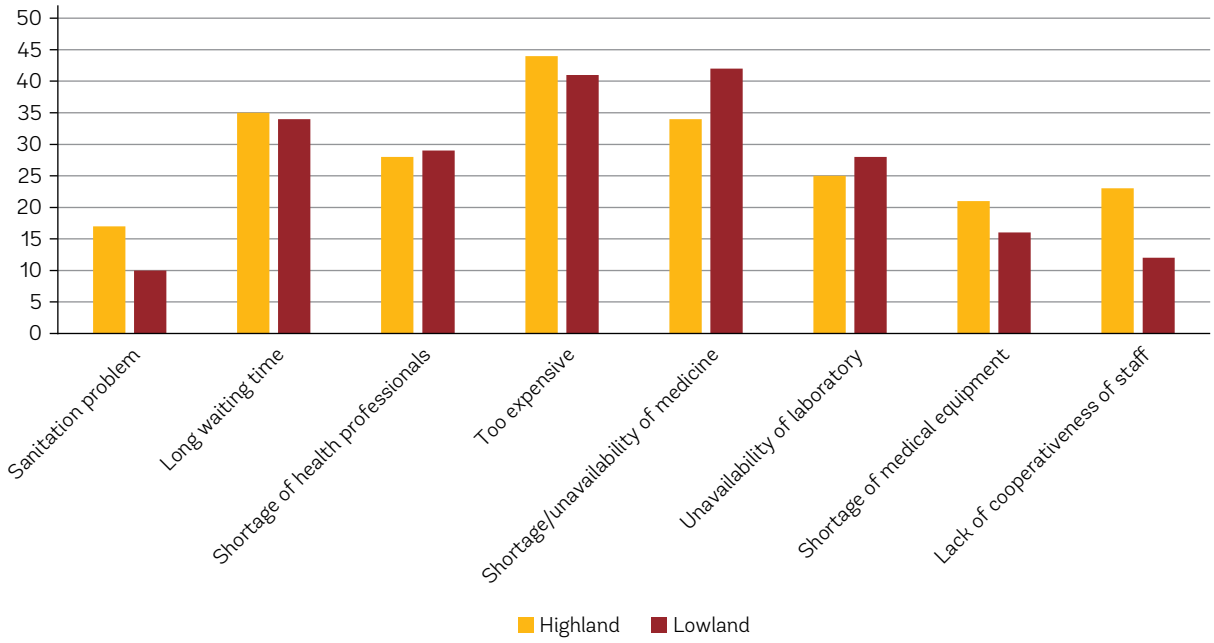


Figure 3.5: Type of problems faced at health facilities by location of residence (highland/lowland)



health services (Figure 3.5). Lack of medicines and cost of service are the most reported problems in the lowlands followed by lack of laboratories and long waiting times to receive service.

While the national rate for institutional deliveries has increased to 26 percent in 2016 from 5 percent in 2000, almost 80 percent of households in the lowlands reported that their child was born at home, which is much higher than the rate in the highland areas (67%). This may be due to the relatively better availability of key health professionals attending deliveries in the health centers in the highlands compared to the lowlands, shorter distances to facilities, or sociocultural factors that may deter women in the lowlands from having institutional deliveries. Addis Ababa and Tigray report the highest facility births, followed by Gambella in the lowlands (Figure 3.6).

Under five mortality and total fertility rates in the lowlands were much higher than in the highlands according to the 2016 DHS (Figure 3.7). Under five mortality rates in the lowlands accounted for around 76 deaths per 1,000 live births compared to the highlands, which were around 65 deaths per 1,000 live births. However, infant mortality rates were similar in both highland and lowland areas (48 deaths per 1,000 live births).

The total fertility rate is notably higher for the lowlands at 5.9 compared to the highlands at 4.4. When we further disaggregate it by urban and rural areas, the total fertility rate is much higher for the rural areas of the lowland regions. On average, rural women will give birth to nearly three times more children during their reproductive years than urban women. Importantly, total fertility has also been increasing in Afar and Somali since 2000.

Figure 3.6: Birth delivery at a facility by location of residence

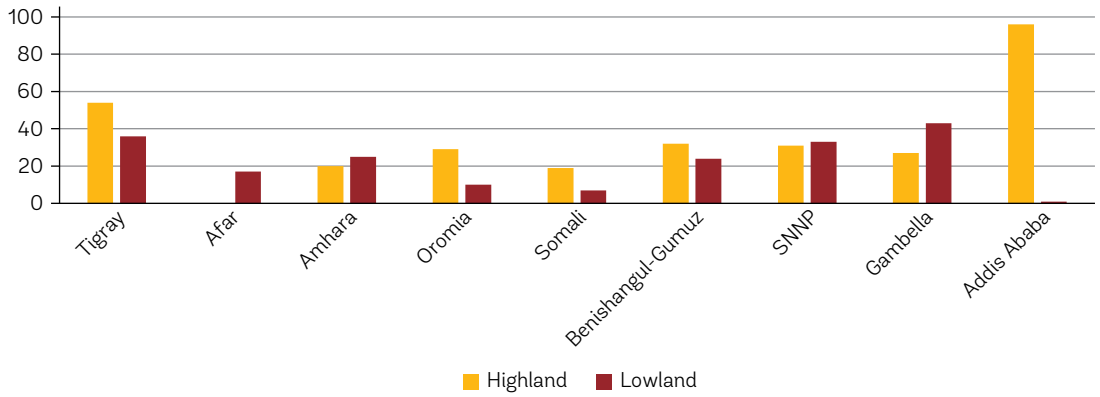
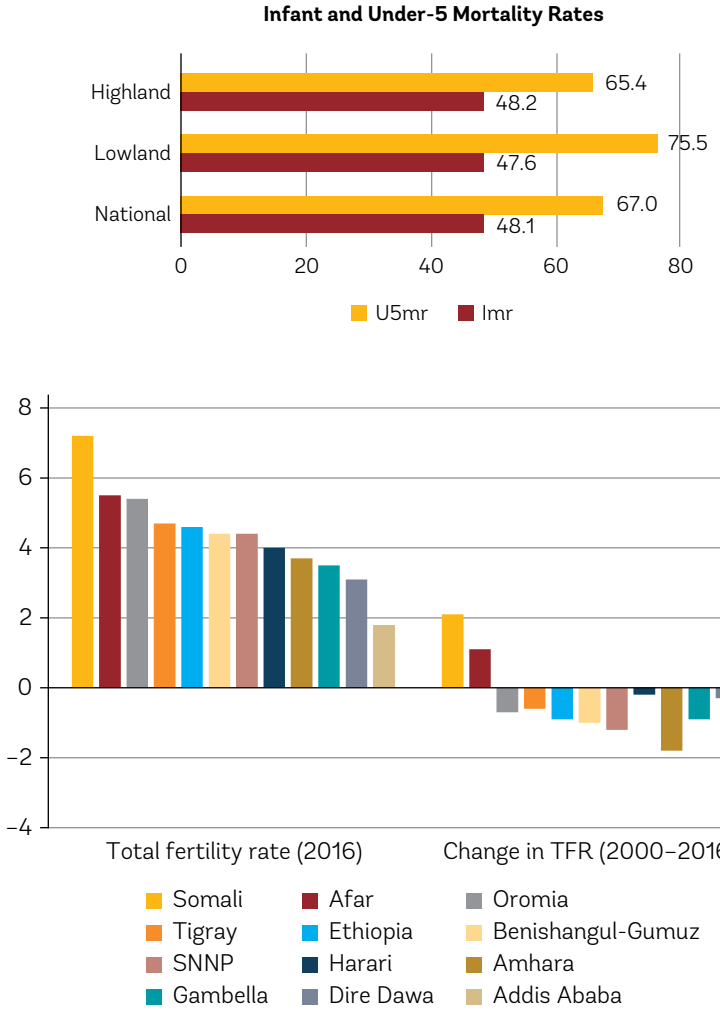


Figure 3.7: Mortality rate and fertility rate by location of residence



Source: WB staff calculation based on DHS, 2016.

Health and nutrition results within the lowlands

The moisture reliable lowlands of Benishangul-Gumuz and Gambella report the most health problems (23%) followed by the drought prone lowlands (19%) and pastoral lowlands (8%) (Figure 3.8). Looking at the same indicator by expenditure quintiles, the richest quintile reported the highest incidence of health problems (18%). Incidence of health problems by wealth does not seem to have a clear trend for drought-prone lowlands and pastoralists while it seems to be increasing from poorest to richest expenditure quintiles for moisture reliable lowlands. Higher incidence of reporting illnesses among wealthier households may be due to greater

Figure 3.8: Incidence of health problems by ecological zones and wealth quintiles

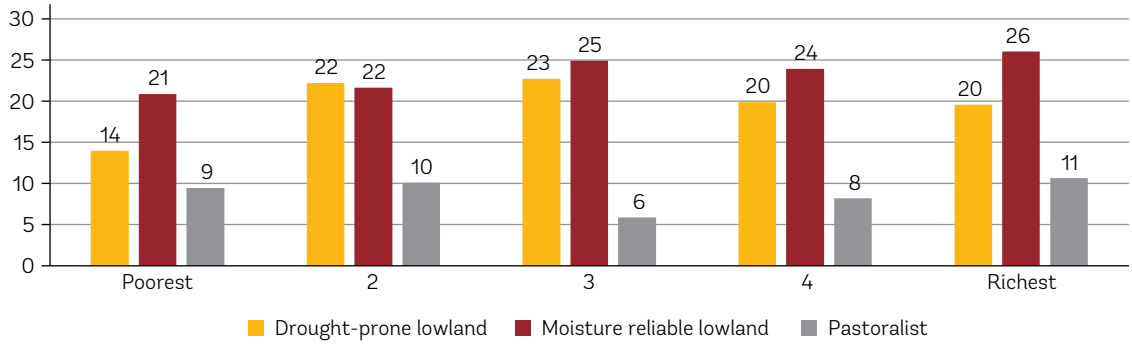


Table 3.4: Place where medical assistance was received, by ecological zone and wealth strata

		Ecological zones			Expenditure quintiles				
Type of health facility	Overall	Drought prone	Moisture reliable	Pastoral	Poorest	Poor	Middle	Rich	Richest
Health center	46%	37%	47%	44%	48%	48%	48%	41%	35%
Private clinic	16%	30%	11%	10%	13%	14%	19%	17%	28%
Government hospital	14%	8%	8%	28%	12%	10%	12%	22%	21%
Health post	12%	13%	18%	10%	12%	18%	10%	10%	5%
Total number of observations	4,108	630	2,248	842	779	786	705	877	961

knowledge of signs of illness in households of better economic and educational status. Of those who faced a health problem, around 80 percent or more consulted a medical institution or traditional[56] healer. The highest proportion of health service seekers live in the drought-prone lowlands (94%) followed by moisture reliable lowlands (83%) and pastoralist (81%).

Government health centers (HC) are the most common places visited for medical care regardless of ecological zones or expenditure quintiles. HCs are followed by private clinics for drought-prone lowlands, government health posts (HP) for moisture reliable lowlands, and government hospitals for pastoralists (Table 3.4). The reasons given for not seeking health care included both demand and supply side constraints. Even though the number of observations was limited (587), the most frequently reported reasons were 'no need for consulting' and 'financial limitations' among the different groups. Other reasons that followed these two include 'not believing in medicine' (quintiles 2 and 4 as well as moisture reliable lowlands groups), 'service being too far away' (quintile 3 and moisture reliable lowlands), and 'lack of confidence in the service' (drought-prone lowlands).

Overall, around 80 percent of the children in the lowlands under five, according to WMS, were born at home. The home delivery rate is highest among pastoralists at 89 percent, then for drought prone (73%) and lowest for moisture reliable lowlands (64%). With increasing wealth, deliveries seem to shift away from home delivery and toward institutional delivery. Home deliveries drop from 85 percent for the poorest to 53 percent for the wealthiest quintile.

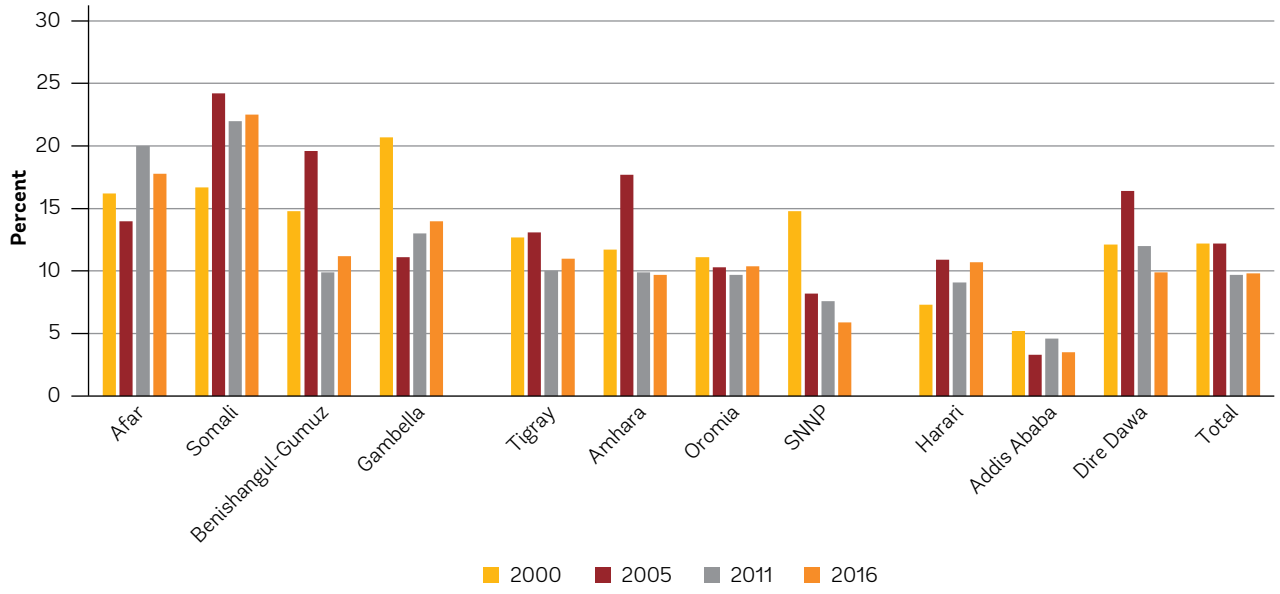
As can be expected from the high rates of home delivery, most of the births (about 78 percent) were assisted with untrained traditional birth attendants (TBA) and family members. This rate is the highest among pastoralists (87%) followed by drought-prone lowlands (66%) and moisture reliable lowlands (56%). Similarly, wealth dictates the type of birth assistance used where 81 percent of births among the poorest quintile use TBA and family members but this number drops to 50 percent among the top quintile. In fact, 47 percent of deliveries among the top quintile were assisted by trained medical personnel.

The lowlands and emerging regions have extremely high rates of acute malnutrition (wasting) among children under five compared to the highlands, with an alarming upward trend in prevalence. This is of serious concern because wasting is a strong predictor of under-five mortality; and is usually the result of acute significant food shortage and/or disease (and persistent food insecurity in the lowlands is threatening to worsen the nutrition situation). Wasting prevalence above 10 percent is the threshold for determining an emergency nutrition situation, and five out of the six lowland/emerging regions have wasting rates above 10 percent (the national average is 9.9 percent): Somali (23%), Afar (18%), Gambella (14%), Benishangul-Gumuz (12%), and Oromia (11%). As shown in Figure 3.9, wasting rates have increased between 2011[57] and 2016 in Somali, Gambella, Benishangul-Gumuz, and Oromia (DHS). Reports suggest that climate-induced IDPs have higher levels of malnutrition than host communities, which contributes to this lower access to services. This is also the case for conflict IDPs; 42% of IDPs

[56] Going to a traditional healer as a primary choice for health problems account for less than 2 percent among those who reported facing a health problem.

[57] Wasting rates from the 2011 DHS survey: Somali (22%); Gambella (12.5%), Benishangul (9.9%), and Oromia (9.7%).

Figure 3.9: Wasting prevalence among children under five



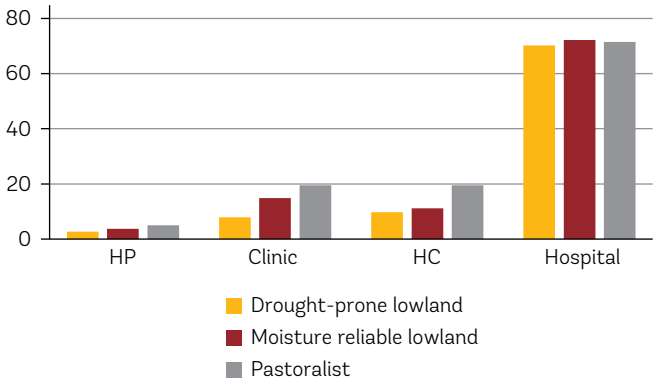
identified in need of support by the 2019 humanitarian appeal are defined as in acute need.

Afar region has the lowest level of early initiation of breastfeeding (42%) and the highest level of pre-lacteal feeding (41%). A mixed methods survey by UNICEF (2017) conducted in selected zones of Afar, Amhara, Benishangul-Gumuz, and Tigray found a much lower rate of early initiation of breastfeeding in Afar compared to other regions. It reported that "only 27 percent of surveyed participants from zones in Afar with a child 0–23 months initiated breastfeeding within one hour of birth, as compared with zones in other regions (57 to 86 percent)." There is significant regional variation in the proportion of children 6–23 months who receive a minimum acceptable diet, with the lowest levels (2–3%) in Afar, Somali, and Amhara.

Health-Related Quality Indicators

Among the lowland regions, Afar has the highest mean availability of basic amenities[58] accounting for 52 percent. In comparison, Addis Ababa was the region with highest mean availability of basic amenities among all regions with 79 percent. People in the drought-prone lowlands live closest to health facilities (except for hospitals) followed by the moisture reliable lowlands (Figure 3.10). Pastoralists live

Figure 3.10: Distance to health facility in km by ecological zones



the farthest away from health facilities. In the case of hospitals, all lowland households were on average around 70 km away. This must be seen in relation to the service standards and catchment areas that are expected of health facilities.

In summary, like the education sector, the overall picture emerging is that health outcomes in the lowlands are poorer than in the highland areas. Within the lowlands there is not such a clear distinction between ecological zones in terms of overall health outcomes, though the pastoralist areas fare significantly worse in terms of facility deliveries. Wealth appears to be a more dominant factor than agroecological zone in terms of some health outcomes, such as facility deliveries and breastfeeding (except for pastoralist areas). Again, it should be noted that most of the four highland

[58] Service readiness for basic amenities was assessed based on sanitation facilities, communication equipment, consultation room, improved water source, power source, emergency transportation, and computer with Internet access.

regions (apart from Tigray) allocate a greater percentage of their budgets to health than the lowlands, with Somali region only allocating 8% of its budget to the sector. This is even more significant when factors such as low population density, inaccessibility, harsh environment, and human capacity are considered. These will be discussed in more detail later in the chapter.

Sociocultural and Economic Constraints in Health and Education

In analyzing the causes and contributing factors to poor health outcomes in the lowland areas, gender and other sociocultural determinants play major roles in the lowland health care system. People in the lowlands adhere strongly to traditional cultural values and beliefs and have limited access to information and services, although there is some evidence of gradual changes in some traditional practices. Deep rooted traditional practices such as female genital mutilation, early marriage, and a variety of traditional ceremonies and rituals are critical bottlenecks influencing the demand side of the health care system. The use of traditional healers and religious leaders to cure a variety of medical conditions is also widespread.

Apart from most maternal and child health services being free of charge, there still exists very few financial protection mechanisms to protect households from out-of-pocket expenses; consequently, fees are an important barrier to service utilization in lowland areas. In the lowlands, health care costs of households increase because of high transportation costs due to long distances to health facilities. Financial barriers to care are the main reason given for not seeking health care in the lowlands. With increasing wealth, for example, deliveries shift away from home delivery and toward institutional delivery. Community-based health insurance schemes (CBHI) are implemented in very few geographic areas in the lowlands and are completely absent in Somali, Afar, and South Omo.

The nomadic nature of pastoralism and the need for child labor to herd cattle results in higher primary school dropout levels at certain times of the year among Borana in Oromia and in Afar and Somali regions (Dyer, 2016). Child labor requirements also deter families from sending children to boarding schools. Retention rates are much higher for agropastoralists and urban residents. Child labor demands are also factors in Gambella region where subsistence farming is practiced, which also affects school enrollment (Bacha et al., 2014). Where school timetables have not adjusted to child labor demands, dropout levels are higher. In Borena zone, the Alternative Basic Education (ABE) system offers evening classes for children, which reduces dropout rates (Dyer, 2016), whereas this flexibility is rarely practiced in Afar, Somali, and South Omo.

Education and Health Services in the Face of Shocks

Lowland areas are prone to both natural and man-made hazards that have led to high mortality rates, displacement, and loss of property. Among these, flood, drought, conflicts, and political instability have all taken their toll on the health care system and disrupted access to livelihoods and food security, resulting in escalating rates of child undernutrition. According to the 2019 Humanitarian Needs Report, there are 5.91 million people in need of nutrition assistance and 4.4. million who have been targeted for humanitarian support. Somali region over the last two years has represented at least 25 percent of the national detected Severe Acute Malnutrition (SAM) cases, compared to its population size, which is estimated to be 6 percent of the Ethiopian population. Afar is also overrepresented with 6 percent of the SAM cases nationally but with only 2 percent of the national population.

Conflicts and political instability in the region are further worsening the health care system. A significant proportion of "highlanders" (health professionals that come from other areas) abandoned health facilities in lowland areas because of the recent inter-ethnic conflicts in the area. During the field visits for this study the regional health bureau estimated that about 50 percent of middle-level health professionals (nurses, health officers, midwives, etc.) had left their jobs from health centers and hospitals in Somali region. As noted from the field visit in South Omo zone, more than 20 health posts are ruined/destroyed because of conflict which left several *kebeles* without health posts.

In Somali and Oromia regions conflict has left hundreds of thousands displaced, often in areas already experiencing ongoing drought. Nearly all districts along the regional borders are affected. For IDPs, accessing services in their area of displacement (or while on the move) including humanitarian assistance, social protection, health, and education is challenging, which makes them highly

vulnerable. Displaced persons who reside in host communities report having difficulty accessing services and may not be recognized officially as displaced. For those IDPs living in relief centers or informal settlements, there are further concerns. These include lack of space and privacy, lack of shelter, lack of latrines, exchanging sex for food or money, and gender-based violence. The risk of outbreaks of preventable disease is extremely high, and due to poor living conditions could lead to high levels of morbidity.

As of December 2018, Ethiopia was host to more than 900,000 refugees, the majority who live in camps in the lowlands. In 2016, the government articulated a strategic approach to the plight of refugees in a series of nine pledges aimed at improving rights and expanding services to benefit both refugees and host communities. Currently, services in camps are provided through the Agency for Refugee and Returnee Affairs (ARRA) with the support of UNHCR and the international community. In practice there is often overlap with host community members accessing some services in camps and vice versa. Building on the pledges, the draft National Comprehensive Refugee Response Strategy outlines a vision of gradual integration for refugees who have been in Ethiopia for more than 20 years within host communities and gradually moving away from the current in-camp assistance to refugees and toward an integration of service provision to refugees into national systems.

HD Delivery Systems' Analysis

Decentralized service delivery systems—relevance for the lowland context

In addressing the challenge of low density and mobile populations in the lowlands, the government initiated "voluntary based resettlement and villagization" programs in the four lowland emerging regions. The purpose of villagization is to provide access and utilization of basic socioeconomic infrastructure and services. The status of villagization and settlement programs varies across the regions but is more advanced in Benishangul-Gumuz and Gambella than in Afar and Somali. In general, settlement makes it easier to deliver services at scale and could be one factor contributing to better service outcomes in Benishangul-Gumuz and Gambella than in other lowland areas. In Gambella, for example, primary school attendance, especially for girls, is very high in villagization sites and areas with large numbers of highlanders but continues to lag elsewhere. Yet these programs are controversial and need to be carefully assessed in terms of their impact on the environment and local livelihood strategies.

Decentralized service delivery is organized following sector specific expenditure assignments (Table 3.5). The two main elements of decentralization (particularly in a devolved system) are expenditure assignment and revenue assignment by level of government. In the health and education

Table 3.5: Sector specific expenditures assignments/service delivery functions at different tiers of government, district level decentralization program

	Kebele	*Woreda*	Region	Federal
Education	Primary school admin, PTA, matching finance	Primary and 1st cycle secondary school, primary school teachers, salaries, primary textbook distribution, primary boarding school, school management and cost sharing, adult education	2nd cycle secondary school, up to public colleges, management institutes, vocational and technical training, training centers, regional policies and standards	Tertiary/higher education, national policies and standards
Health	Primary health care admin, HIV/AIDS prevention, health posts up to 5,000, health extension	Health centers up to 25,000, health posts up to 5,000, health extension, clinic admin, HIV/AIDS and malaria control and prevention, allocation of *woreda* funds	Up to public hospital care, referral hospital, HIV/AIDA immunization and malaria control, allocation of regional funds, regional policies and standards	Specialized hospital, medical training institutes, educational materials, large procurement, national policies and standards, resource mobilization

Source: Ministry of Capacity Building, 2011.

sectors most of the basic service delivery functions are assigned at the *woreda* and *kebele* levels, with regional and federal levels responsible for higher level education and health care (upper secondary and tertiary education and referral and specialized hospitals), as well as regional and federal policy and standards setting and monitoring. Hence, the mandate and responsibility of basic health and education provision rest strongly with *woredas*. This is consistent with the high degree of *woreda*-level autonomy in the allocation of budgets across sectors.

However, in Oromia and Benishangul-Gumuz regions, while *woredas* are responsible for providing services at health post, health center, and recently primary hospital levels, they do not have the mandate to construct the facilities except for health posts. Construction of health centers is still the mandate of the regional government in both regions, and this was reported to be associated with low capacity at *woreda* levels and to ensure value for money through bulk contracting of construction work at regional levels. Delegated financing is mostly controlled at the regional level, and district administrations are underfunded and under-capacitated.

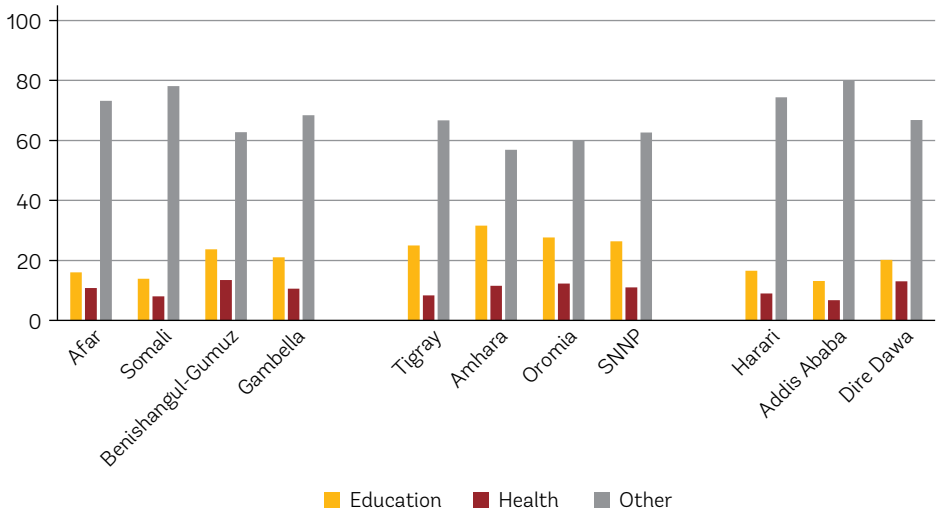
As a result, the influence of federal sectoral ministries on how basic services are provided and organized, and the matching of resources for adequate provision of those services (compared to set service standards) varies. In the health sector, because the Federal Ministry of Health (FMOH) manages the SDG Performance Fund, primarily for essential commodities and drugs, it retains some control of how these resources are used to deliver improved health results. The federal sector level is also responsible for the procurement of drugs through the specialized agency Pharmaceuticals Supply Agency (PSA) which procures and distributes all major drugs to regions and *woredas*. For education however, the influence of the federal Ministry of Education (MoE) over the management and operation of primary and secondary education in the regions is extremely limited.

Resources for health and education service delivery are very limited and not allocated based on severity of needs or performance

The cost of human development (health and education) service delivery in the lowlands is much higher in per capita terms than in other regions due to low population density, limited urbanization, inaccessibility, harsh environmental conditions, and lower capacity to manage and deliver services. The current formula used by the federal government to allocate block grants to the regions does not adequately compensate for the increased costs of service delivery in the lowlands. While the federal government gives some consideration to the unique circumstances of the lowlands in determining the budget allocation formula for block grants, it is not consistent with the real costs of delivering services in the lowlands. Generally, the lowlands receive approximately 1 percent more in block grants than their population size warrants. Afar, for example, constitutes 2 percent of Ethiopia's population and has received around 3 percent of the block grants over the last decade. Similarly, the pastoralist population in SNNPR comprises about 14 percent of the regional population and has received approximately 15 percent of the region's block grants over the last five years. In Oromia, pastoral and agropastoral zones constitute about 30 percent of the population and received around the same percentage in block grants over the past seven years. Benishangul-Gumuz and Gambella received higher grants in per capita terms. However, the changes to the block grant formula in 2018 have resulted in an increase for Somali region of about 2 percent, no change for Afar, and a decrease for Benishangul-Gumuz and Gambella. Nevertheless, the slightly higher than average block grants to the regions with lowland areas still fall well short of what is required compared to the significantly higher service delivery costs and the level of needs of these areas to boost human development outcomes.

At the regional level, at the same time, the rationale for the sectoral allocations made by regional governments are often unclear. Significant differences emerge between the priorities of the various regions. In Afar and Somali regions, the economic sectors (water and agriculture) are prioritized over the human development sector, with the combined health and education sectors only receiving 27 percent and 22 percent respectively, of the regional budgets over the last five years (Figure 3.11). This is in stark contrast with Amhara allocating 43 percent to these sectors. Benishangul-Gumuz and Gambella allocate significantly higher proportions on education, which may partially account for the better education outcomes in moisture reliable lowlands. All four lowland regions allocate relatively

Figure 3.11: Sectoral disaggregation of regional expenditures during FY12–18, percent of total expenditures



higher proportions of their budgets to administration and general services than highland regions. The implication of this is evident in the health sector where regions with the best service coverage indicators (i.e., availability of health facilities) spend the most on the sector (Addis Ababa, Dire Dawa, Harari, and Gambella), while the region with the worst in the country at only 14 percent (Somali), spends the second least amount per capita after Benishangul-Gumuz.

These differences in regional allocations extend to capital allocations from the MDG/SDG grants regional governments receive to boost the capital expenditures. For example, Afar and Somali regions allocated their entire MDG/SDG budget to the water sector in EFY 2012, meaning that health and education did not benefit from these resources (Table 3.6). In contrast, Amhara region, in addition to the already high 43 percent of its regional expenditures going to human development, spend 22 percent of its MDG/SDG on human development infrastructure. Benishangul-Gumuz and Gambella spend a commendable 23 percent and 38 percent, respectively, on the HD sectors.

Operational budgets are inadequate and exceptionally limited at the *woreda* levels in the lowlands (see Table 3.7). While Somali region fares relatively better than the other lowland regions, the operational budgets for both health and education in Gambella and education in Benishangul-Gumuz are particularly low, and it is difficult to perceive how the systems can function within such constraints. Furthermore, the percentage of operational budgets going to the *woredas* as opposed to the

Table 3.6: Sectoral allocation of the MDG transfers in EFY12 by region

	Agriculture	Water	Rural roads	Education	Health
Tigray	3.9%	63.5%	28.4%	4.0%	0.2%
Afar	—	**100.0%**	—	—	—
Amhara	5.7%	14.1%	57.8%	10.3%	12.2%
Oromia	2.8%	8.9%	68.0%	11.3%	9.0%
Somali	—	**100.0%**	—	—	—
Benishangul-Gumuz	**14.3%**	**10.5%**	**51.0%**	**17.9%**	**6.2%**
SNNPR	18.4%	7.0%	57.0%	8.0%	9.5%
Gambella	**11.2%**	**29.3%**	**21.1%**	**19.9%**	**18.5%**
Harari	1.9%	23.9%	41.6%	27.2%	5.4%
Dire Dawa	11.8%	32.1%	12.8%	22.3%	20.9%
Total	6.8%	25.0%	50.8%	9.1%	8.4%

Source: MoF.

Table 3.7: Percentage of *woreda* level operational budget share in 2009 and 2010 EC from the total operational budget of the region, February 2019

Region	Description	*Woreda* level oper. expn. in million birr (office, health center/posts, non-salary)		*Woreda* share from total operational budget of the region in %	
		FY2009 EC	FY2010 EC	FY2009 EC	FY2010 EC
Somali	Education	67.87	53.44	17.8%	32.1%
	Health	75.42	84.85	26.9%	44.7%
Gambella	Education	2.09	3.42	5.1%	9.8%
	Health	2.11	2.95	7.4%	7.9%
Afar	Education	41.79	41.49	56.8%	51.2%
	Health	55.13	42.06	54.9%	42.9%
Benishangul-Gumuz	Education	17.04	20.46	33.4%	30.0%
	Health	46.27	58.67	47.8%	52.4%
Tigray	Education	115.05	98.37	30.4%	24.9%
	Health	92.59	87.37	28.6%	25.9%
Amhara	Education	956.60	960.06	79.1%	89.8%
	Health	727.89	806.23	68.4%	78.5%
SNNPR	Education	729.54	929.84	68.3%	72.6%
	Health	921.89	1021.89	92.3%	92.6%

Source: MoF.

Note: EC = Ethiopian calendar.

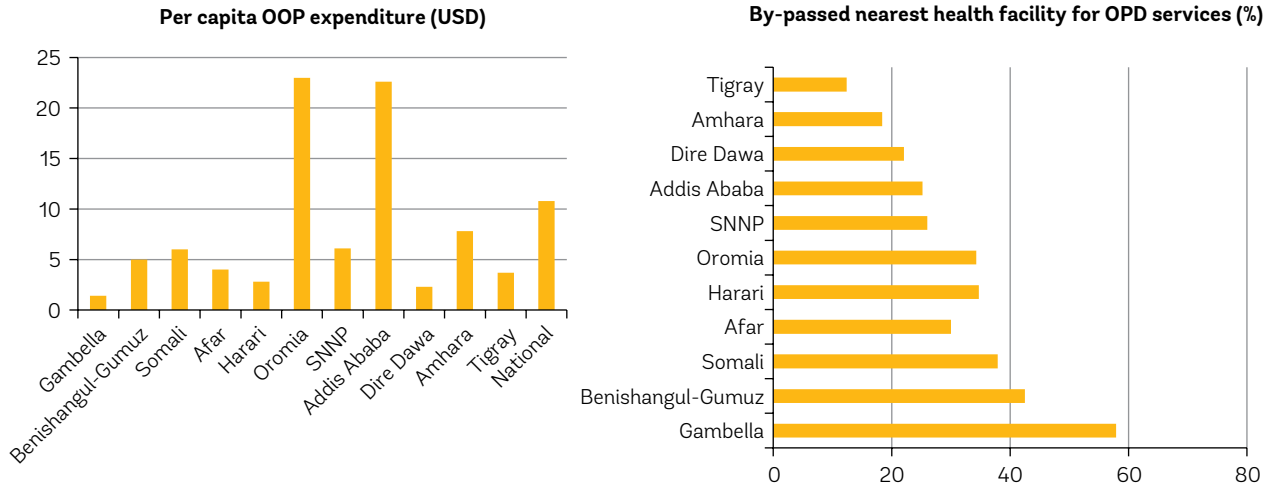
regional level is much lower for the lowlands than the highlands, with Gambella and Somali regions doing particularly poor. This is inconsistent with the fact that major expenditure assignments for basic health and education should be at the *woreda* level. It also means that *woreda* health and education staff are unable to adequately monitor and support the work of remote health and school facilities due to lack of per diems and transport allowances.

Off-budget resources supplement the low government HD expenditures but do not address the extent of the challenges. Given the limited budgets that are available for capital expenditures or operational costs in the lowlands, off-budget resources from community driven, externally funded projects supplement the limited human development in the lowlands. For instance, the World Bank financed Pastoral Community Development Project (PCDP) in Afar and Somali regions has supported the construction of health facilities, particularly health posts, furnishing and equipping health facilities as well as training health workers in targeted *woredas*. PCDP supported the construction of health posts at the sub-*kebele* level (village level) due to the large size of *kebeles* in lowland areas and seasonal mobility of many communities. The project also constructed residential homes for health extension workers alongside health posts. In the health sector, NGOs fund essential drugs and compensate, to a certain extent, for unavailability of adequate operational budgets for the duration of the NGO support. However, this by no means makes up for the shortfall in overall operational budgets from the government. While out-of-pocket expenditures at facilities are relatively low in lowland regions, patients often chose to bypass the nearest facility to go to other facilities with better quality care and hence incur additional costs related to travel (Figure 3.12). Overall, poor coordination between off-budget resources and on-budget government resources lead to inefficiencies and sustainability problems in health care funding.

Local level capacity and accountability processes are not aligned with delivering results

Leadership and management capacity in the health and education sectors lack effective accountability and incentive mechanisms. Health and education managers at all levels of the service delivery systems in the lowland areas lack capacity to adequately understand and implement health and education policies, guidelines, standards, protocols,

Figure 3.12: Per capita out-of-pocket expenditures and facility by-pass rate by region

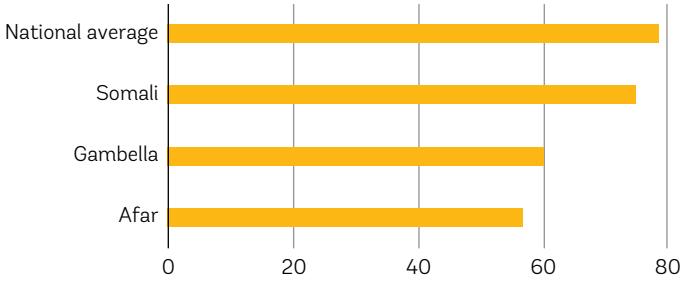


and reforms. The political commitment from regional government and *woreda* councils toward the provision of quality education and health services is also lacking. Too often poor execution of plans and programs fails to result in any perceived consequences, and there is a lack of an appraisal system that rewards high performance. The use of feedback mechanisms to improve human development service performance is weak and often decision making follows a top-down approach. While there are incentives from the Ministry of Health (MoH) to support emerging regions and lowland areas, they are not necessarily addressing key challenges related to performance, motivation, skills, capacity, and retention of the health workforce.

Human capacity in the lowlands is very low and inadequate to provide adequate human development services

There is an overall shortage of trained health and education professionals in the lowlands (Figure 3.13). The government struggles to find suitably qualified personnel to fill vacancies. Only 70 percent of civil servants in the lowlands have university degrees (Afar being the lowest with 57 percent), which is in stark comparison to 83 percent in the highlands. Civil servants in Somali region are the youngest in Ethiopia (29 years), 4 years younger than the national average of 33. Correspondingly, their years of service (and therefore experience) are shorter (eight years), with some four years less than the national average. Because of the lack of locally available expertise, highlanders, who have distinct cultural differences, possible biases and negative stereotypes toward lowland populations, and do not speak the local language, are filling many civil service positions in the lowlands. This poses challenges for health and education service delivery in terms of communication, and understanding and appreciation of sociocultural factors, which can result in poor quality and low uptake of services.

Figure 3.13: Percent of civil servants with a university degree, by region



Source: Ethiopia Civil Servant Survey (2016).

The pool of suitably qualified women to take up government jobs in health and education is particularly scarce. One reason for this is the shortage of girls completing high school in Afar and Somali regions. The lack of female teachers is a deterrent to families to send their daughters to school, which reinforces the problem of an inadequate supply of women in the workforce. Similarly, for the health sector, the lack of local female health extension workers is a deterrent to women to seek health services, particularly in relation to reproductive health. Thus, without targeted interventions, this situation will not be rectified and any progress in human development will be difficult to achieve.

Turnover of staff, particularly at the *woreda* level, is very high in the lowlands. At times this is due

to voluntary departures by the staff and at other times due to widespread reshuffling of staff. The top five drivers of voluntary turnover in the education sector, as stated by Directors and Heads of Organization, are: (i) the lack of opportunities for promotion (33%), (ii) the workload is too much (19%), (iii) work climate (17%), (iv) poor pay and benefits (15%), and (v) problems with one's manager (8%). The top five drivers of voluntary turnover in the health sector, as stated by Directors and Heads of Organization, are: (i) the lack of opportunities for promotion (38%), (ii) problems with one's supervisor (18%), (iii) work climate (13%), (iv) poor pay and benefits (10%), and (v) workload (10%). Interestingly, poor pay and benefits are placed lower on the list than one may expect.

Health workers often do not remain in their posts for more than a year in the lowlands. In December 2018, a large-scale reassignment of government personnel took place in Afar and Somali regions, with new staff being appointed without any handover mechanisms in place to ensure orientation and onboarding of the new appointees. In general, there is a lack of appropriate deployment, retention, and motivation mechanisms, and few monetary and nonmonetary incentives available, to encourage staff to stay for longer.

The Management Information System for education and health care in the lowland areas has very limited capacity to generate, analyze, disseminate, and use information

In the heath sector, data are often inaccurate, late, incomplete, and inconsistent. Third-party verification is almost nonexistent without checks and balances for false reporting. Inadequate systems for quality data collection and analysis for preprimary and primary education are also evident. Education data are often not available or unreliable and often appear to be inconsistent. Moreover, there are no joint databases and reports from EMIS, NEAEA, and GEID within the Ministry of Education that would provide insights into the education system of the country in general and that of the lowlands, in particular. The utilization of modern ICT systems to assess the education system performance and development in lowland areas is only at the rudimentary stage. Some of the factors that contribute to the underdeveloped EMIS in the lowlands include lack of ICT structures, remoteness of the schools and health facilities, and deliberate incorrect reporting to conceal low performance.

Education System Analysis

Education strategy not adapted to lowland context

The provision of education services for lowland communities in Ethiopia was given special attention in the 1994 National Education and Training policy, which clearly spelled out the government's intention to offer special support to lowland communities that had been deprived of educational opportunities in the past. The policy provided for a new structure, decentralized management, and local languages as mediums of instruction. The lowland education service delivery was guided by a Pastoralist Education Strategy, developed in 2008, which proposed institutionalizing different educational modalities (Alternative Basic Education [ABE], mobile schools, para-boarding schools, hostels, distance education, adult education, education radio programs, and formal primary schools), improving the quality and relevance of primary education, and addressing cultural, environmental, and economic constraints of lowland communities. Despite the recommendations of a variety of education strategies and modalities, most of them have never been implemented due to technical, managerial, and financial limitations.

The new Pastoral Education Strategy developed in 2017 builds on the previous strategy. In addition, the MoE has developed an Education in Emergency Operational Strategy—2017, to create a nexus between humanitarian and development initiatives and assist in the mobilization of resources in emergencies. The strategy sets out defined roles and responsibilities of partners, harmonizes emergency response, applies well-coordinated monitoring and evaluation approaches, and seeks to minimize and/or avoid duplication of efforts (MoE, 2017).

These policies and strategies provided impetus and opportunities to promote educational development in the lowland areas. However, there are policy and implementation gaps in the education service delivery system in the lowlands. The national education and training policies are developed based on a "one-size-fits-all" approach that does not explicitly address the different livelihoods of lowland communities. Though it suggests "special support," this support is not backed up by appropriate education service delivery modalities which can fit the distinctive ways of life of pastoralists. National strategies, such as timely delivery of school grants, are often not fully reflected in the budget (block grant) at regional and *woreda* levels, and the Ministry of Education has little leverage to overcome the

financial and human resource shortages and weak political commitments of the decentralized education service delivery system. In various policy and strategy discussions, it was suggested that a separate education policy and road map for the lowlands needs to be developed instead of having one policy for both highlands and lowlands. However, this has never materialized.

Even though various education delivery modalities were recommended in the pastoralist strategies, few of them are being implemented

While formal education is relatively accessible at primary levels in the more moisture reliable lowlands and agropastoral or drought-prone lowlands of south Omo and Oromia, it has inherent limitations for more mobile pastoralist children in Afar and Somali regions. Expanding static formal schooling and inflexible academic calendars for mobile and semi-mobile lowland communities is unlikely to deliver the intended results. Pastoralists have the lowest proportion of school-age children who have ever been to school.

Over the last few years, the most common means of addressing the gap in educational access in pastoral areas has been ABE (see Box 3.1). However, it has not been implemented according to the standards and guidelines set by the MoE. The major strength of ABE is that it is a form of education delivery that does not undermine the pattern of labor organization and mobility on which pastoralist livelihoods depend. Despite the potential of the fixed ABE modality to extend educational access, there are still many children in mobile pastoralist families who do not have access to schooling. As an Afar Elder said, "We will learn if you bring us a school which has a foot and can walk with us."

The use of mother tongue as medium of instruction could be promoted further in the lowlands. Ethiopia has progressed well in promoting mother tongues as a medium of instruction, compared to many African countries. In fact, most students in grades 1–4 receive their education in their mother tongue. However, in SNNPR where 45 languages are used, there is room for further expansion of education in local languages. The major constraint to such expansion is the limited number of local teachers.

Other modalities recommended in the pastoralist education strategy for delivering education in remote areas include mobile schools, para-boarding schools, hostels, distance education, adult education, and education radio programs. However, they have not yet been implemented as planned. Moreover, preprimary education, specifically 0-class education is not fully functional and implemented in the lowlands as per the required national standards due to resource shortages in terms of both finance and personnel, lack of trained teachers, poor facilities and materials, classrooms, poor incentives, and lack of a proper functioning system to run the program.[59] In general, 0-classes are not accessible for most young children because the distance from home to schools is sometimes up to 5–8 km in pastoralist and drought-prone areas.

There is no strategy and plan to ensure education services can continue during periods of emergency. The education service delivery system, particularly in the drought-prone and pastoralist areas, is unable to adapt and flex in response to emergencies such as drought and conflict. Both ABE and formal primary schools in rural settings in conflict-prone areas are generally closed until peace is restored. For instance, currently many schools in Oromia and Somali are closed due to conflict. Many children miss school every year due to an absence of proactive planning and budgeting, extended periods between assessments and responses, and the absence of an organizational structure within the education system to deal with emergencies. As the lowland areas are vulnerable to natural disasters, the absence of an emergency

Box 3.1: Alternative basic education

The Alternative Basic Education (ABE) program is an organized basic education program designed to be flexible and responsive in character, delivered outside formal schooling, and offered in small cost-effective buildings. It is an alternative to formal education and has a four-year cycle. It is equivalent to the first cycle formal primary education (Grades 1–4). Under this program, education is provided for out-of-school children.

ABE is meant to improve access to quality basic education for children excluded from or beyond the reach of formal education, which especially concerns children in pastoral and agropastoral areas (MoE, 2010) and "disadvantaged and previously under-served ethnic groups" (MoE, 2015). It targets children at the age of being enrolled in the primary cycle of primary school (7 to 10 years old) but also overage children with ranges from 11 to 14 years old (MoE, 2011).

Source: MoE.

[59] 0-class is a one-year pre-primary program, delivered by primary schools, organized for children before they enter Grade 1.

response system will affect students' participation and quality of education. Moreover, the Education Service Delivery Strategy (ESDS) is not integrated with the early warning and disaster risk management system and early preparedness and response planning.

Health System Analysis

The health transformation agenda is relevant, but implementation remains poor

Currently, the health care delivery system is guided by a 20-year rolling Health Sector Transformation Plan (HSTP), which is part of the second Growth and Transformation plan of the country. HSTP-I, the five-year health sector strategic plan (2015–2020), is mainly focused on four transformation objectives alongside other programs. These are:

- *Woreda* transformation with the aim of *woreda* health programs delivering improved health outcomes. The *woreda* transformation aims at narrowing the gap between the high and low performing *woredas*. It has three components: high performing primary health care units (PHCUs, health posts, health centers, and primary hospitals), expansion of model *kebeles* (healthy community behavior), and financial protection through expansion of community-based health insurance (CBHI).
- Transformation in equity and quality of health care, which has elements to ensure equity of access, service utilization, and quality of care.
- Information revolution which aims to reform the methods and practice of collecting, analyzing, presenting, and disseminating information. It is a radical shift from traditional ways of data utilization to a systematic information management system.
- Caring, respectful, and compassionate health workforce—this is a multi-pronged approach and calls for a mechanism to promote the values, hopes, and aspirations within health professionals that brought them into health care in the first place.

While all these transformation goals are relevant to the lowland areas, their implementation remains poor due to an absence of effective implementation arrangements, lack of political prioritization, and financial and institutional capacity. Conventional health service delivery modalities are often designed and piloted in highland areas and then expanded to pastoralist and lowland areas without sufficient adaptation to the change of context. There are few lowland tailored health service delivery modalities for drought-prone pastoralist populations, and usually they are introduced years after being introduced in highland areas.

In recognition of the needs of the lowlands, the Federal Ministry of Health is providing health system strengthening to support the four emerging regions and least performing zones in agrarian regions. The Ministry of Health has developed a five-year plan to address geographic inequity, providing budget subsidies and deployment of additional health professionals to the lowland regions. However, in practice the support is irregular and insufficient.

The FMOH has also embarked on optimization of the health extension program and has developed a health extension strategy that seeks to better fit the lifestyle of lowland populations. The program envisages (i) improving the leadership, governance, and performance management capacity of health sector managers, (ii) community engagement, (iii) revisiting the service delivery modality, (iv) providing special support, (v) enhancing integration with key sectors, and (vi) close follow-up, monitoring, and evaluation. While the Health Extension Program (HEP) implementation has not yet begun, there is a guideline for its implementation in the pastoralist areas. The guideline outlines roles and responsibilities of all actors but does not include key aspects such as implementation arrangements, financing, procurement, and monitoring.

There are some promising emerging practices in alternative health care delivery in the lowlands. Two such examples are discussed in Box 3.2. The feasibility and sustainability of potentially scaling up these experiences, however, would require careful review, as currently they are at a relatively small scale and financed off-budget.

There are several recommendations to be considered to strengthen the delivery of health services in the lowlands. These include:

- Tailor the design of national service delivery platforms (Primary Health Care Unit, Health Extension Program, etc.) to the specific context of lowlands and pastoralist areas;
- Establish a strong context-specific comprehensive early warning system. Strengthening emergency preparedness and response activities through an innovative approach such as risk-informed programming and creating a lowland

Box 3.2: Promising practices in health care delivery in the lowlands

The DFID-funded Reproductive Maternal and Neonatal Health Innovation Fund (RIF). The RIF project aims to improve the health outcomes of women, newborns, and young people in the pastoralist regions of Ethiopia using innovative interventions to increase the demand for services. To implement RIF interventions, FMOH has contracted 16 Sub-Recipients (SRs) over two funding rounds. SRs include RBHs, RDAs, NGOs, FBOs, and professional associations. In the Somali region, SRs have worked collaboratively under the leadership of the ESRHB to promote and improve RMNCH services through co-opting TBAs and mother's support groups; using solar powered mobile health centers for hard-to-reach communities; and through engaging key influencers and gatekeepers in the use of mini-media for IEC. Final evaluation of the RIF project shows that "there is strong evidence that interventions improved service utilization and mutually reinforcing to improve the uptake of RMNH services."

CordAid has experimented with Performance Based Financing (PBF) in the lowlands. Cordaid has been financing and implementing Phase I of the PBF Show Case Project in Borana, Ethiopia, from May 2015 to June 2018 in nine health facilities (Yabello hospital and eight health centers) in the four *woredas* of the Borana zone. The main objectives of the PBF Showcase Project were improving the quantity (coverage), quality, and health information system by introducing performance-based financing complementing the existing government input-based financing system. The recently conducted external evaluation has found that the six elements/principles upon which the approach of PBF is based were successfully applied. The separation of roles/responsibilities, formalizing the same with contract agreements (accountability) and linking payments with verified results, vetting performance reports through an independent verifying body, and increasing autonomy (decision space) to the health facility on the use of the subsidy earned through their performance improved the functionality of the health system in the pilot area. The quantity of health services has increased—in some health centers increasing to seven-fold over the three years of support.

health emergency fund will contribute to create more resilient systems;

- A model for financial protection that fits with the lifestyle of lowland populations needs to be designed. Community-Based Health Insurance (CBHI) as currently designed may not be appropriate;
- The coordination of Performance Based Financing (PBF) with CBHI or other financial protection mechanisms could be a practical, relevant, and financially sustainable approach to create resilient systems that can withstand shocks. Experience from Borana shows promising results in the lowlands;
- A specific human resource development and management program should be developed. A well-designed and systematic incentive scheme that includes financial and nonfinancial packages to attract qualified front line health workers is essential;
- Establish effective engagement of local organizations and nongovernment actors to promote culturally appropriate social and behavioral change communication (SBCC); and
- Improve coordination of NGOs supporting emergency responses in the health sector and strengthen integration of "emergency" health services into the national health system and routine service delivery.

Conclusions

Across a range of HD outcomes, from school attendance to infant and child mortality rates to severe acute malnutrition, the lowlands do worse than the highlands. Accessibility and quality of services are also worse. Due to the challenging circumstances in the lowlands, including climatic conditions, low population density, and settlement patterns, sectoral ministries have developed specific strategies and approaches for delivery of human development services in the lowland areas—especially for reaching pastoral populations. However, these strategies remain largely untested.

The main constraints to basic service delivery in the lowlands revolve around limited budgets and competing regional priorities; low capacity and availability of skilled professionals stemming from low education, especially of girls; and lack of incentives and accountability systems to ensure results. Compared to the large human capital deficit in the lowlands, regions and *woredas* tend to allocate too little of their budgets to their health and education sectors, with minimal resources available for capital and operational costs. Afar and Somali regions have predominantly focused on investments in water and rural development to the relative neglect of education and health, while Gambella

and Benishangul-Gumuz have preferred to allocate expenditures to rural roads, education, and health.

Overall, there needs to be a much stronger focus on improving the human capital in these areas, especially in the drought-prone lowlands. Without this there will be little chance to break the cycle of vulnerability. This chapter recommends to (i) allocate more on-budget resources for human development in the lowlands; (ii) introduce results-based approaches; (iii) introduce Specific Purpose Grants, targeted to regions/*woredas* with low human development outcomes; (iv) align civil servant incentives and pay to results; and (v) recentralize some local and regional functions to higher levels and review mechanisms of local planning enforcement and sectoral budget allocation in view of national targets.

Chapter 4: Climate Change and Environment as Sources of Vulnerability

Summary

This chapter sets out the geographical and climate context of the lowlands and explores some of the longer term climate trends affecting them. The moist western lowlands of Gambella and Benishangul-Gumuz are significantly wetter than the drought-prone lowlands of Afar, Somali, and parts of Oromia and SNNP regions. Despite these trends, which suggest a long-term slight increase in rainfall, the most significant features of these environments are their enormous rainfall variability, lack of surface and groundwater, and ability to regenerate after drought. Water development is critical but extremely expensive and, unless integrated into range management plans, may cause long-term environmental damage.

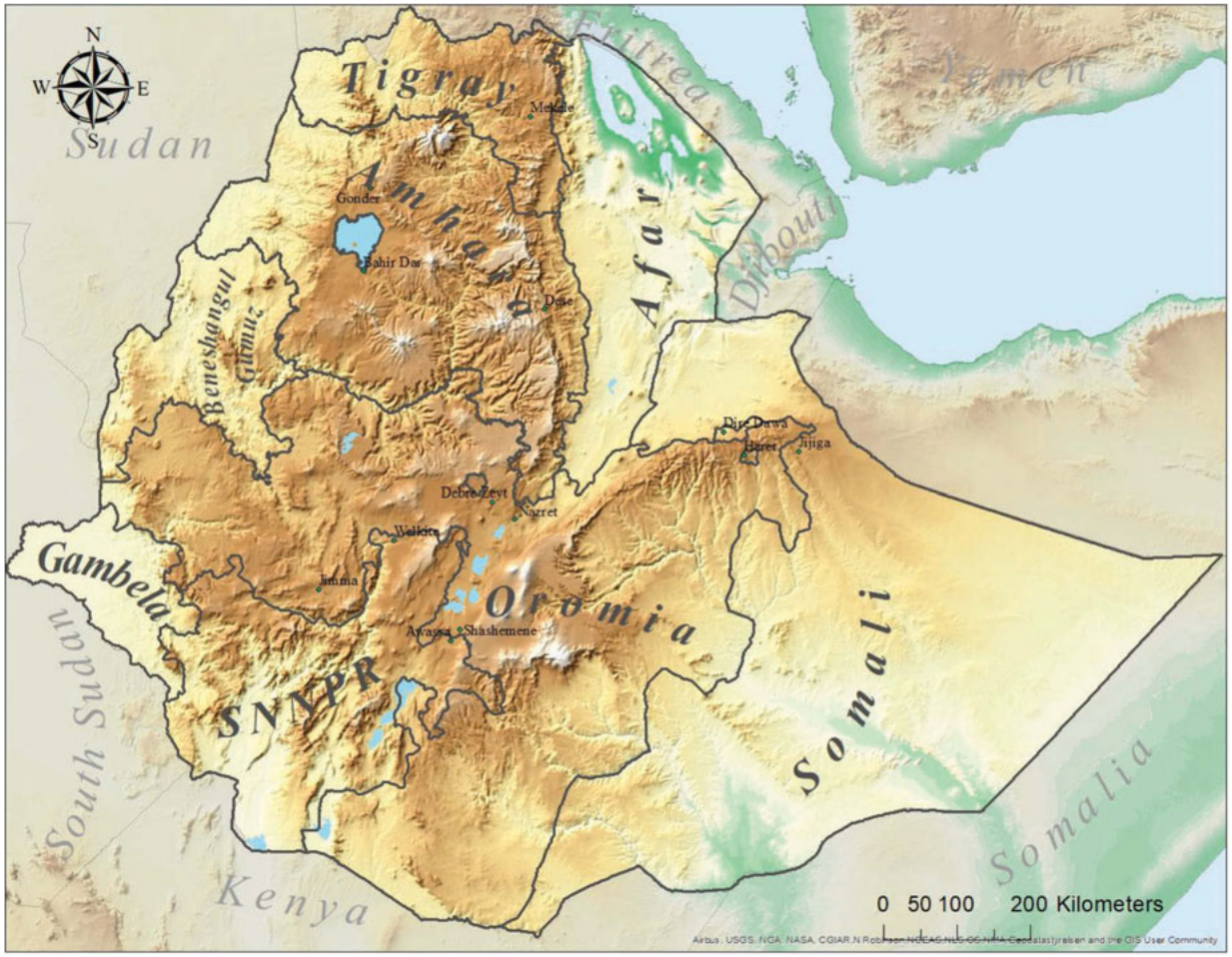
Introduction

Ethiopia is a country of huge geographic diversity with a central highland massif, where altitudes rise to above 4,000 meters, surrounded by an apron of semiarid lowlands below 1,500 m in the northeast, southeast and south and wetter lowlands to the west along the South Sudan and Sudan borders (see Map 4.1). Administratively, they cover parts of Tigre and Amhara, the four "emerging" regions of Benishangul-Gumuz (BG) and Gambella in the west, and Somali and Afar in the east and southeast, as well as parts of Oromia and SNNP regions in the south (see Map 4.1).

Hurni (1998) divides the Ethiopian lowlands into four agroecological zones (AEZ) based on elevation and rainfall.[60] With an elevation threshold at 500 m and annual precipitation at 900 mm/year, the four AEZs are: (i) dry Berha (<500 m, <900 mm/year);

[60] The associated shapefile with AEZ extents was further refined by Hurni (2008) and provided by the Ethiopia Water and Land Resources Center (WLRC) and available as part of EthioGIS-II database (Krauer et al., 2015). Without loss of generalization, minor adjustments to geometry were made, such as smoothing boundaries and a merging of the 'wet Kolla' AEZ as part of the 'moist Kolla' AEZ, and is reflected in the current definition specifying precipitation is >900 with no upper limit (the updated classification by Hurni (2008) specified precipitation range >900 and <1,400 mm/year).

Map 4.1: Administrative regions with highland/lowland relief



(ii) dry Kolla (500–1,500 m, <900 mm/year); (iii) moist Berha (<500 m, >900 mm/year); and (iv) moist Kolla (500–1,500 m, >900 mm/year). The dry lowlands—dry Berha and dry Kolla—cover most of the lowlands, completely characterizing those areas in Afar and Somali as well as large areas of Oromia, Tigray, and Benishangul-Gumuz (see Map 4.2).[61] Moist Kolla is predominantly found along the western periphery of the highlands and pockets in Oromia to the east which also border the highlands. Moist Berha (<500 m) is limited to the western areas of Gambella bordering South Sudan.

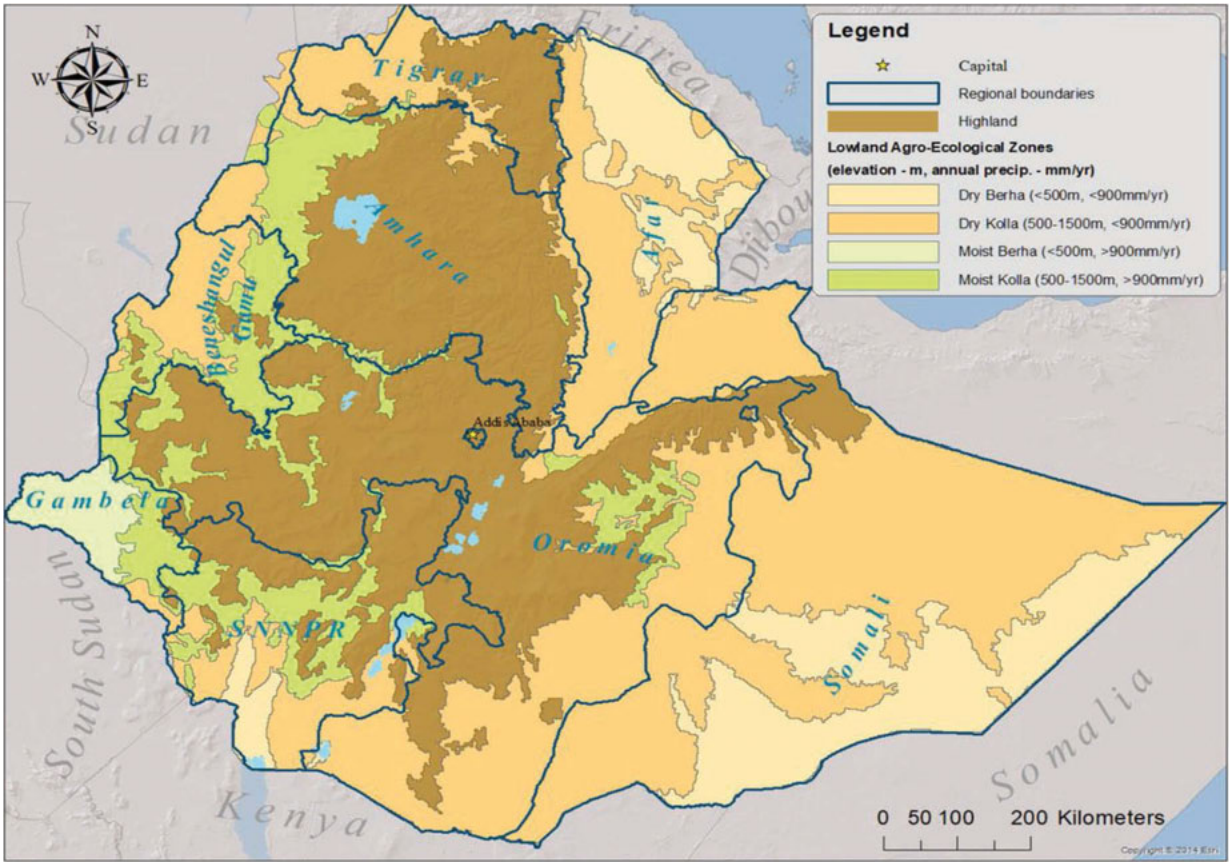
Rainfall

Rainfall is highly variable both in distribution and amount. This variability is particularly marked in the arid and semiarid, drought-prone lowland areas which cover most of Afar and Somali regions and parts of Oromia and SNNP.

Contrary to the conventional narrative that rainfall has been declining in recent years, lowland rainfall appears to have increased slightly during the years 1982–2017, with the western lowlands showing the largest increases (see Map 4.3). A summary of annual mean precipitation for highland and lowland as well as lowland AEZs for three time periods is given in Table A.2 in Annex 1. Nationally, the average rainfall over this period was roughly 805 mm/year with the lowlands receiving only half the rainfall received in the highlands. The data also reveal considerable variation between lowland regions. For example, despite average annual rainfall of 627 mm/year in the lowlands from 1982–2017, Benishangul-Gumuz (BG) received 1,220 mm per year on average, which was nearly four times that of Somali region (331 mm/year). Within the lowlands the different agroecological

[61] Regional and subregional boundaries are based on shapefiles from the following site: https://datacatalog.worldbank.org/dataset/ethiopia-woreda-districts

Map 4.2: Ethiopia's agroecological zones



zones further highlight spatial differences. For example, in dry Berha (i.e., the lower lowlands) areas, the 36-year average is 285 mm but varies considerably by region (i.e., 742 mm/year in SNNP vs. 228 mm/year), underscoring the considerable diversity across 'lowland' areas.

Comparing rainfall from the earlier period (1982–1999) with the later period (2000–2017) (see Maps 4.4 and 4.5 respectively) nationally there has been a slight increase (801 mm/year vs. 809 mm/year), a trend that is reflected in both the lowland (624 mm vs. 630 mm) and highland areas (1,142 mm vs. 1,154 mm) as a whole. However, the data do not support wetter conditions in all regions. In Somali region, for example, annual mean precipitation since 2000 is less than the 1982–1999 period for both dry Berha and dry Kolla zones.

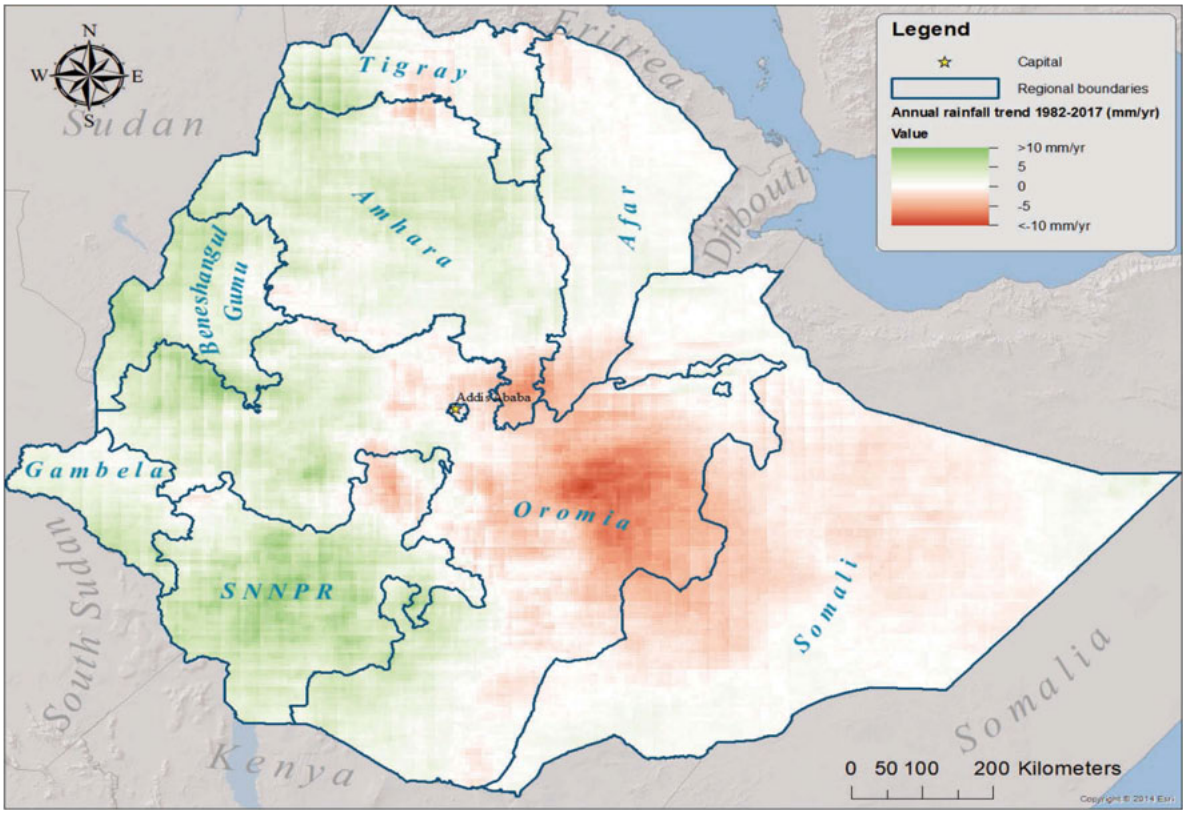
Nationally, the trend has seen an increase of a little over 1 mm/year between 1982–2017 (see Table A.3, Annex 1) although there is considerable spatial variation (green represents increasing while red indicates a decreasing trend in Map 4.3). In the lowlands, the long-term trend is one of increasing precipitation (0.9 mm/year), with lowland areas of Amhara (3.0 mm/year), BG (4.2 mm/year), Gambella 3.0 mm/year), SNNPR (5.4 mm/year), and Tigray (2.5 mm/year) showing respectable long-term increases (see Table A.3, Annex 1). The lowlands of Somali and Oromia in contrast indicate a (small) decreasing trend at –0.6 and –0.3 mm/yr.

Focusing on the most recent period (2000–2017), we again find that for a majority of the lowlands there is an increasing precipitation trend averaging 2.5 mm/year (Map 4.5 and lower panel of Table A.3, Annex 1) with the lowlands in BG, Gambella, and SNNPP showing fairly large increasing trends (8.2, 4.6, and 7.1 mm/year respectively). By AEZ, large increases during this period were found in the moist Berha (3.7 mm/year) and moist Kolla (6.2 mm/year). Results for lowland areas in Afar and Tigray indicate negligible change (0.1 and –0.1 mm/year respectively). Within Afar, the increasing trend in the dry Berha AEZ (0.9 mm/year) is offset by the declining trend in the dry Kolla zone (–0.6 mm/year).

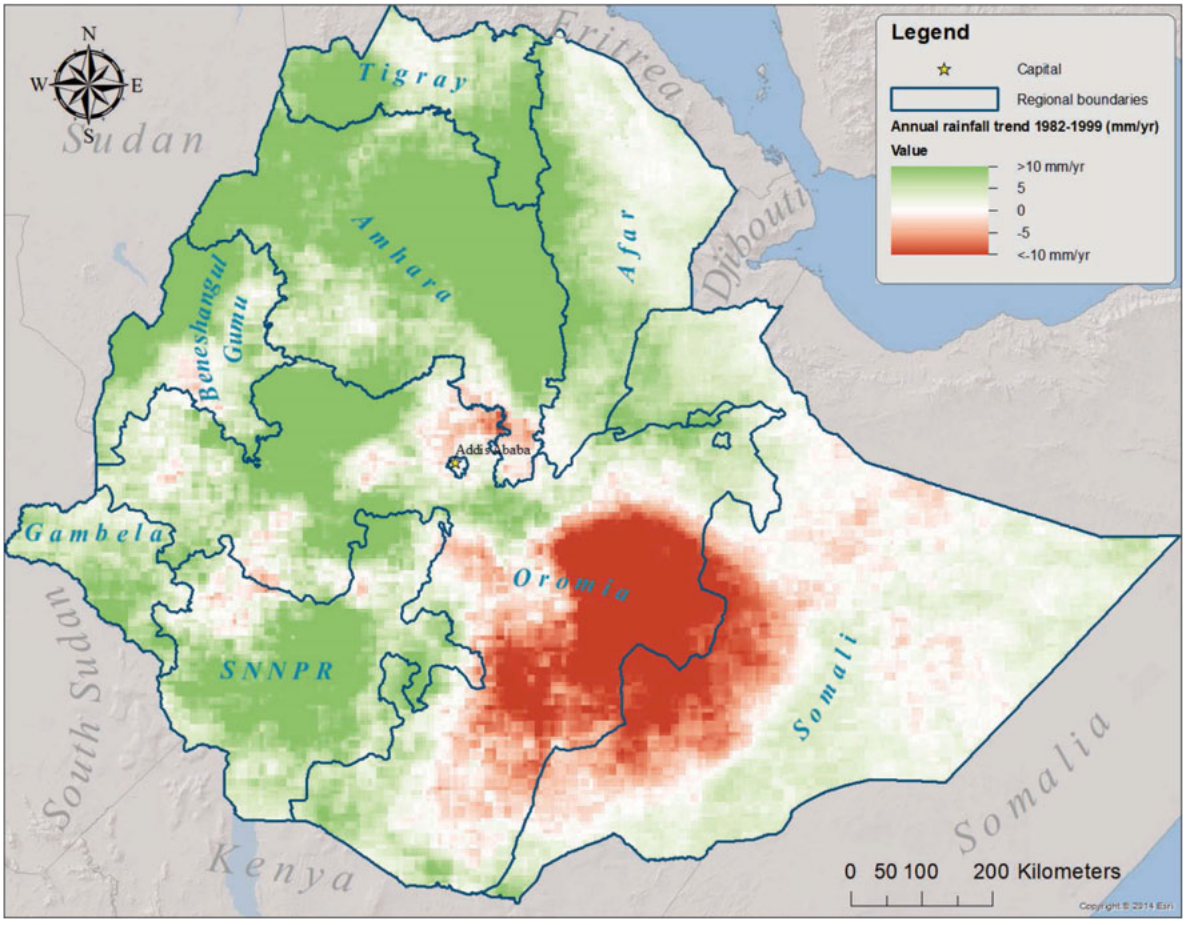
Temperature

Regarding temperature, a clearer picture of recent climate trends emerges. Oxfam reported that "between 1960 and 2006, the mean annual

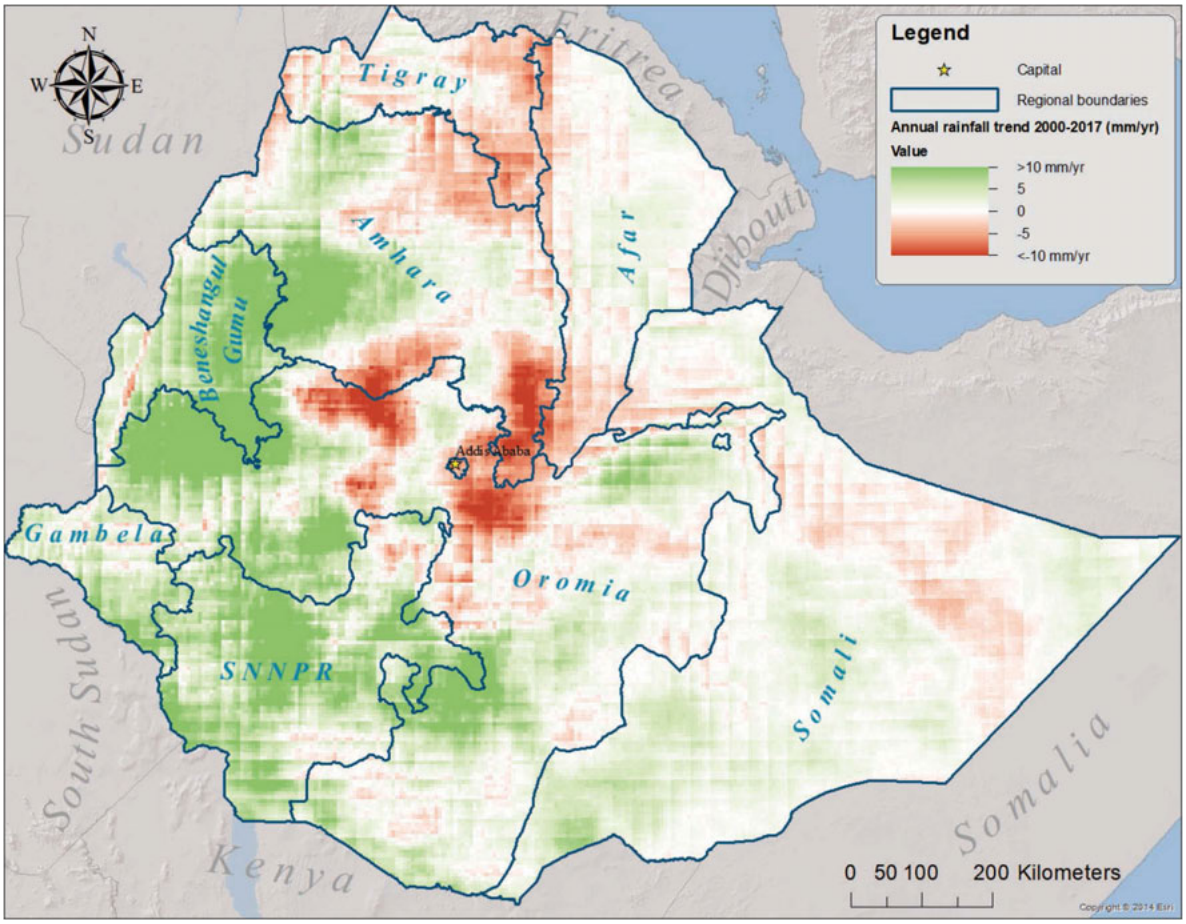
Map 4.3: Trend in annual rainfall 1982–2017 (mm/year)



Map 4.4: Trend in annual rainfall 1982–1999 (mm/year)



Map 4.5: Trend in annual rainfall 2000–2017 (mm/year)



temperature increased by 1.3°C, at an average rate of 0.28°C per decade" (Regassa et al., 2010, 5). Temperature increases reduce soil moisture and put stress on plants, animals, and humans, leading to a variety of negative outcomes, including reduced crop yields and plant and human disease.

The spatial distribution of mean annual temperatures (1986–2016) is shown in Map 4.6. For lowland areas (<1,500 m) annual averages are plotted in Figure 4.1, which tends to show a generally increasing temperature trend. Specifying a simple linear regression where temperature is a function of time indicates that temperatures have been increasing by approximately 0.03 degrees/year, a finding which is aligned with other analyses showing increases of 0.28 degrees per decade (Regassa et al., 2010).

Growing Season

For some lowland areas (i.e., Gambella and SNNPR), an in-depth analysis of a sample of locations indicates an improvement in growing season conditions as implied by an increase in rainfall, a decline in severe drought stress days, and other relevant agro-meteorological variables. However, this analysis also highlights the considerable interannual variability, making it difficult to capitalize on trend improvements in weather conditions.

To complement the long-term trend analysis, an in-depth assessment of recent trends in growing seasons for select lowland locations was conducted.[62] This contributes to the more general understanding of how the changing climate is affecting agricultural and pastoral systems across the lowlands by assessing rainfall and temperature trends during the primary growing season, including the frequency and timing of rains and the incidence of drought-stress days. This analysis uses a large dataset[63] on temperatures, precipitation, relative humidity, and wind speed, a daily 'virtual' ag-meteorology station worth of data for over

[62] This work was carried out by aWhere.

[63] This foundation asset is the innovation of aWhere, Inc., a USA-based agricultural intelligence Benefit Corporation. More information at: http://blog.awhere.com/foundation-big-data-asset

Map 4.6: Mean annual temperature (1986–2017)

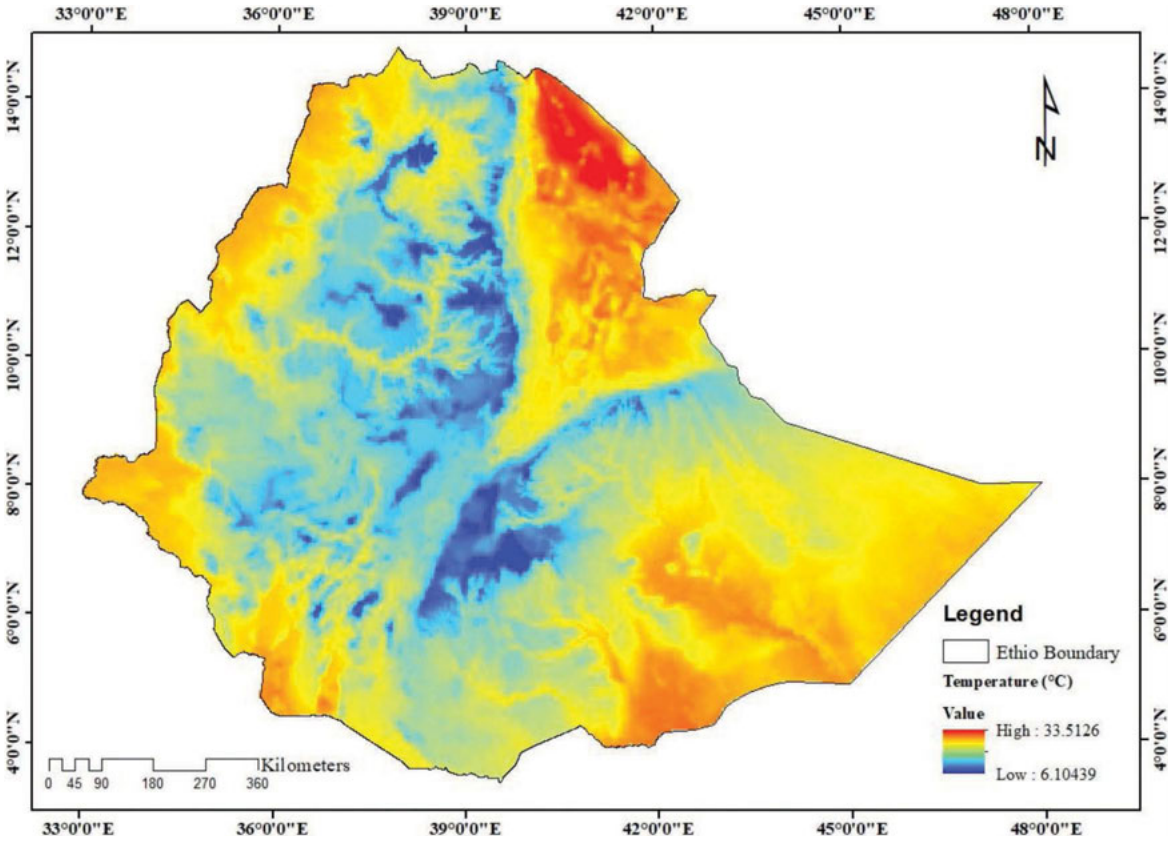
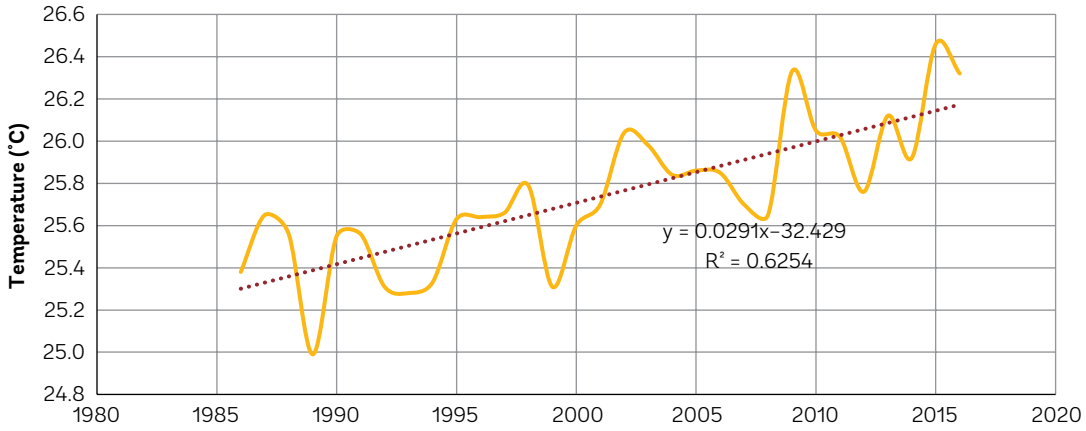


Figure 4.1: Lowland (< 1,500 m elevation) mean annual temperature and trend

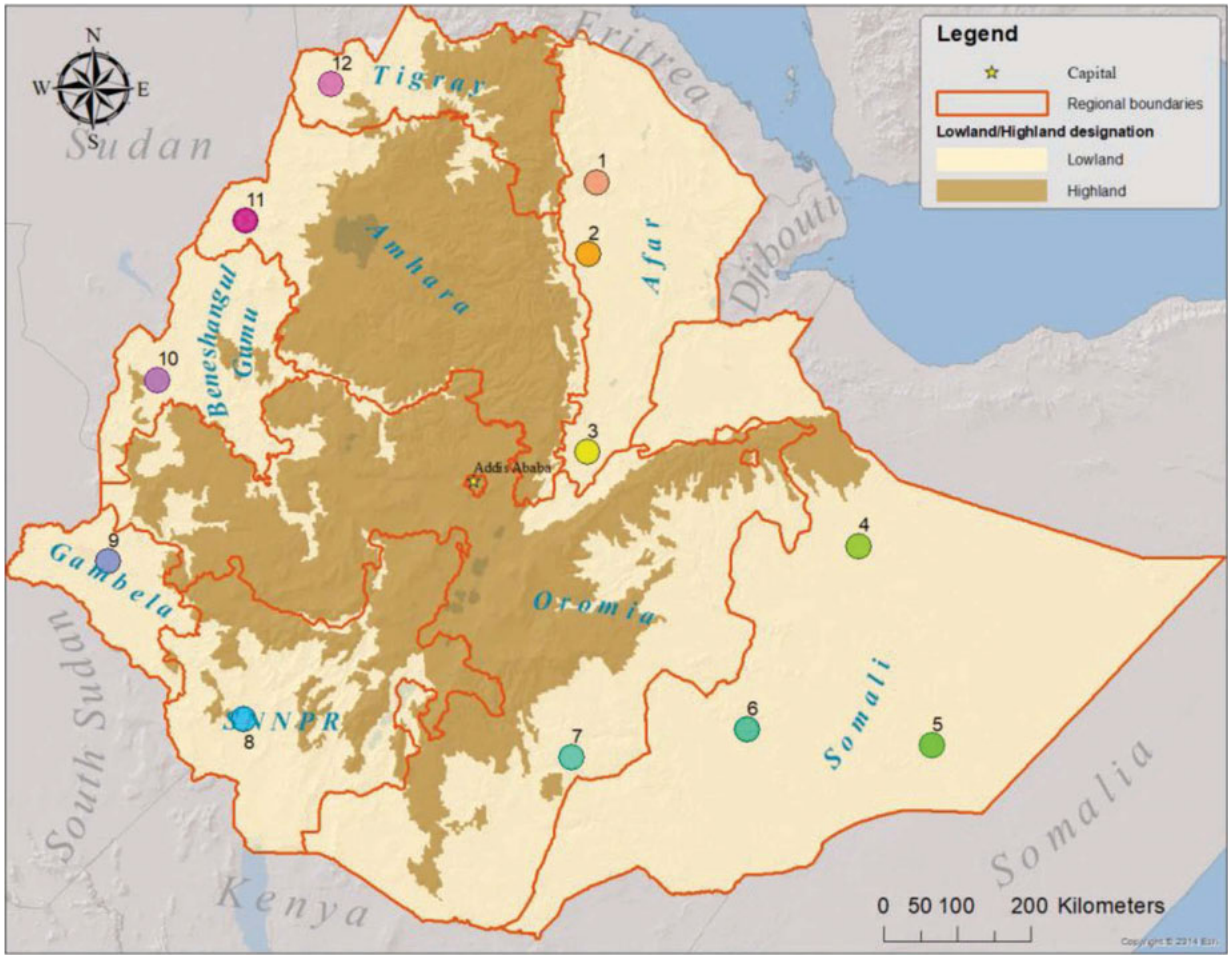


13,000 locations distributed across Ethiopia. Given the data-intensive nature of this exercise, analyses were limited to just 12 locations (see Map 4.7).

While the lowlands of Ethiopia are heterogeneous in terms of the pattern of rainy seasons throughout the year, this study focused on the "best" rainy season for each location studied. For each location, the 'optimal' 90-day growth period was determined based on agroclimatic characteristics and applying the same criteria across sample areas to ensure consistency and comparability.

Trend estimates for annual total rainfall, maximum temperature, and number of drought stress days for each location are given in Table A.4 in Annex 1). Since 2008, rainfall in the Afar and east-central clusters in Somali region have seen increasing rainfall trends, as have the sample locations in SNNPR and Gambella. In contrast, declining rainfall is found for the locations in Oromia (–7.4 mm/year), BG (–3.1 mm/year), Amhara (–15 mm/year), and Tigray (–13.5 mm/year). A trend in high stress drought days is also on the decline for

Map 4.7: Distribution of seed locations for in-depth agroecologic trend analysis



most areas. Only in the far southeast sample areas of Somali #5 and #6 are there trends toward more of these extremely drought stress periods during the 90-day season. For most of Ethiopia, there is a weak trend showing a reduction in extremely dry conditions. The interannual variability, however, is high, reflecting again the variability of dry periods during the growing season across the lowlands.

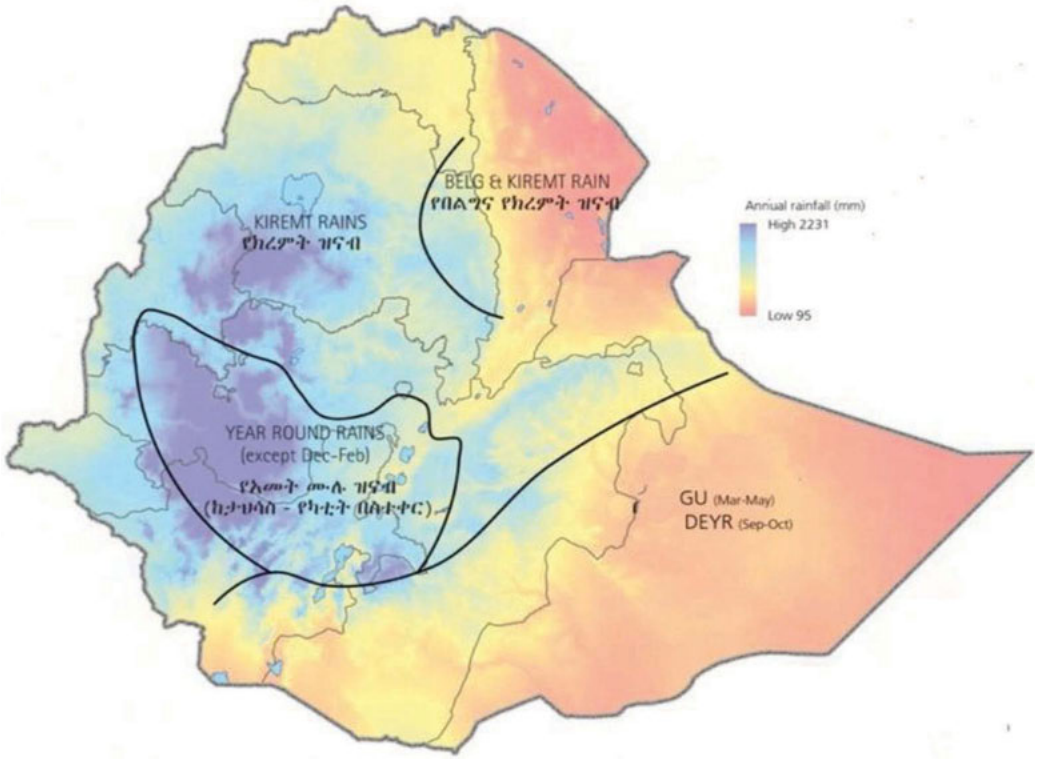
The second trimester, days 31–60, are critical for plant growth. A slight reduction in the number of extreme drought days continues to be observed except for the southeastern areas (#6, #7, and #8), where a weak trend toward more drought stress days continues. Growing season days 31–60 show a mixed signal for the lowland sample areas in terms of moist days. Variability in the number of very moist days dominates the signal in the west and northwest sample areas (#9, #10, #11, and #12), while the weak trend shows some spatial consistency in the southeast (a few more moisture laden days) as well as the southwest (#8 and #9).

In general, an analysis shows that while there are statistically significant trends in several agrometeorological variables in several lowland sample areas, given high year-to-year variability it will be challenging for farmers and/or pastoralists to respond to any potential weather improvements. Without an additional analysis it is unclear how meaningful favorable trends in weather conditions are when faced with such high degrees of variability.

Climate Change

Studies projecting climate change suggest uncertainty regarding the exact impact of future rising temperatures on precipitation. Coastal East Africa, including Ethiopia, is semiarid due to the cool waters offshore Climate models tend to underestimate east-west sea surface temperature (SST) gradients in the Indian Ocean and to weaken them further under greenhouse gas forcing (Yang et al., 2015). Hence, they predict coastal East Africa to

Map 4.8: Seasonal rainfall in Ethiopia's eastern and southern pastoral areas



get wetter as surface water temperatures are projected to rise in the western Indian Ocean. However, in fact coastal East Africa has become drier over the past century (Williams and Funk, 2011). This may partially be due to natural variability. This uncertainty carries over to Global Climate Model (GCM) projections. Funk et al. (2012) project less rainfall through 2039, though this is largely an extrapolation of observed trends. The IPCC Fifth Assessment Report reflects greater uncertainty: "GCM projections over Ethiopia indicate a wide range of rainfall spatial pattern changes and in some regions GCMs do not agree on the direction of precipitation change, for example, in the upper Blue Nile basin in the late 21st century" (Niang et al., 2014, 1210).

Droughts

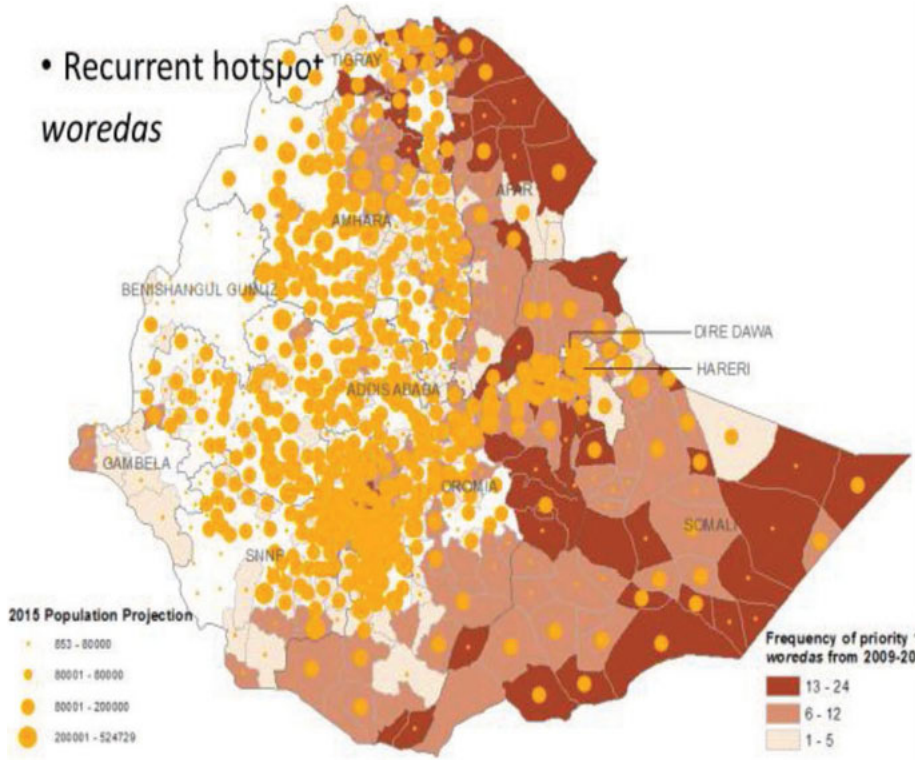
While there are uncertainties about future climate change trends—either wetter or drier—what is clear is the high degree of variation from one year to the next and an increased likelihood of extreme weather conditions in the drought-prone lowlands. Serious droughts in the Horn of Africa are associated with the El Niño–Southern Oscillation (ENSO) phenomena: El Niño episodes result in drought events in Ethiopia's northern pastoral areas; and La Niña and Indian Ocean Dipole[64] episodes result in drought events in the southern pastoral areas. The different pastoral zones and associated seasonal rains are presented in Map 4.8. While not always the case, below average rainfall and drought in one pastoral area is often mirrored by above average rainfall in the other.

Historically, Ethiopia's drought hot spots have occurred in the northeast, southeast, and southern lowlands (see Map 4.9). Eighty-seven percent of the identified 450 drought-prone *woredas* are in lowland regions—169 of these *woredas* are also flood prone. Of the 450 identified *woreda*, 190 are priority 1 hot spots, and 169 are vulnerable to both floods and droughts.

All droughts are characterized by phases: early onset, onset, peak intensity, withdrawal—following the onset of rains—and recovery. The early onset of a pastoral drought is characterized by a reduction in the availability of surface water and drier and poorer quality forage for livestock, resulting in declines in milk production. In the event of a second poor/failed seasonal rain, the onset phase is characterized by further and more dramatic declines

[64] Indian Ocean Dipole episodes are La Niña episodes that are centered on the Indian Ocean as opposed to the Pacific Ocean.

Map 4.9: Drought hot spots



in the availability of water and forage resources. Livestock also expend increasing amounts of time and energy trekking between water and forage resources and hence lose weight, and milk production declines sharply. In the event of a third poor/failed seasonal rain, the distances trekked and the quality of forage become such that significant livestock body weight is lost, and, without rain and access to improved forage and water, animals slowly starve.

There are four types of drought: meteorological,[65] hydrological,[66] agricultural, and pastoral. Agricultural drought in Ethiopia is defined as a 30 percent reduction in crop yield,[67] while pastoral drought has been defined as 'a lack of forage availability as result of a particular sequence of meteorological drought'.[68] The lack of forage might however equally describe an extended dry season, as there are significant variations in the availability and quality of forage in normal years. In this study a pastoral drought is defined as two consecutive poor/failed seasonal rains over 12 months. A prolonged pastoral drought is defined as three or more consecutive poor/failed seasonal rains or 18 months of poor/failed rains. In the last 10 years, Ethiopia's northern and southern pastoral areas have experienced at least one prolonged drought, while some have experienced two such droughts (see Figure 4.2).

Vegetation

Inhabiting some of the harshest ecologies in Ethiopia, livestock convert sparse vegetation—seasonal grasses and the leaves of shrubs and trees—into milk and meat that can be utilized by human populations for food, and hence enable pastoralists to occupy areas of Ethiopia that would otherwise be uninhabitable. The quality and extent of grazing and browsing available are therefore critical to pastoral livelihoods, but assessing trends in lowland vegetation, given the spatial and temporal variability of rainfall in the lowlands, is extremely difficult. Improvements in vegetation cover in one area are frequently offset by deterioration in another. Grasslands also show enormous ability to regenerate after heavy rainfalls. A variety of vegetation

[65] Meteorological drought happens when dry weather patterns dominate an area in Ethiopia when in normal years seasonal rainfall would be expected.
[66] Hydrological drought occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels, usually after many months of meteorological drought.
[67] World Bank (2015).
[68] FAO (2011). Drought. FAO Land and Water. http://www.fao.org/docrep/017/aq191e/aq191e.pdf

Figure 4.2: Prolonged recent droughts recorded by pastoralists

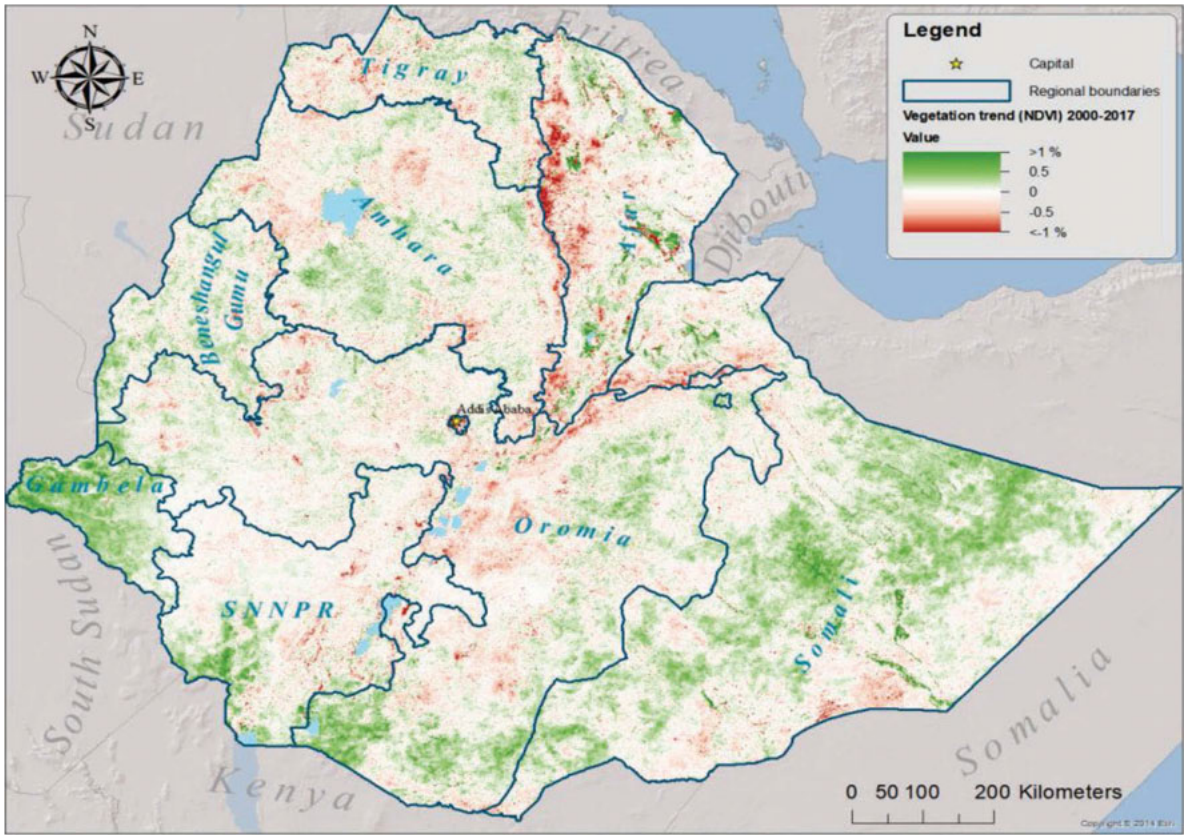
Northern pastoral areas: Afar and Northern Somali regions

- 1984–1985
- 1994
- 2015–2016

Southern pastoral areas: Southern Somali, Southern Oromia, and southwest SNNP regions

- 1984–1985
- 1988–1989
- 2000–2001
- 2010–2011
- 2016–2017

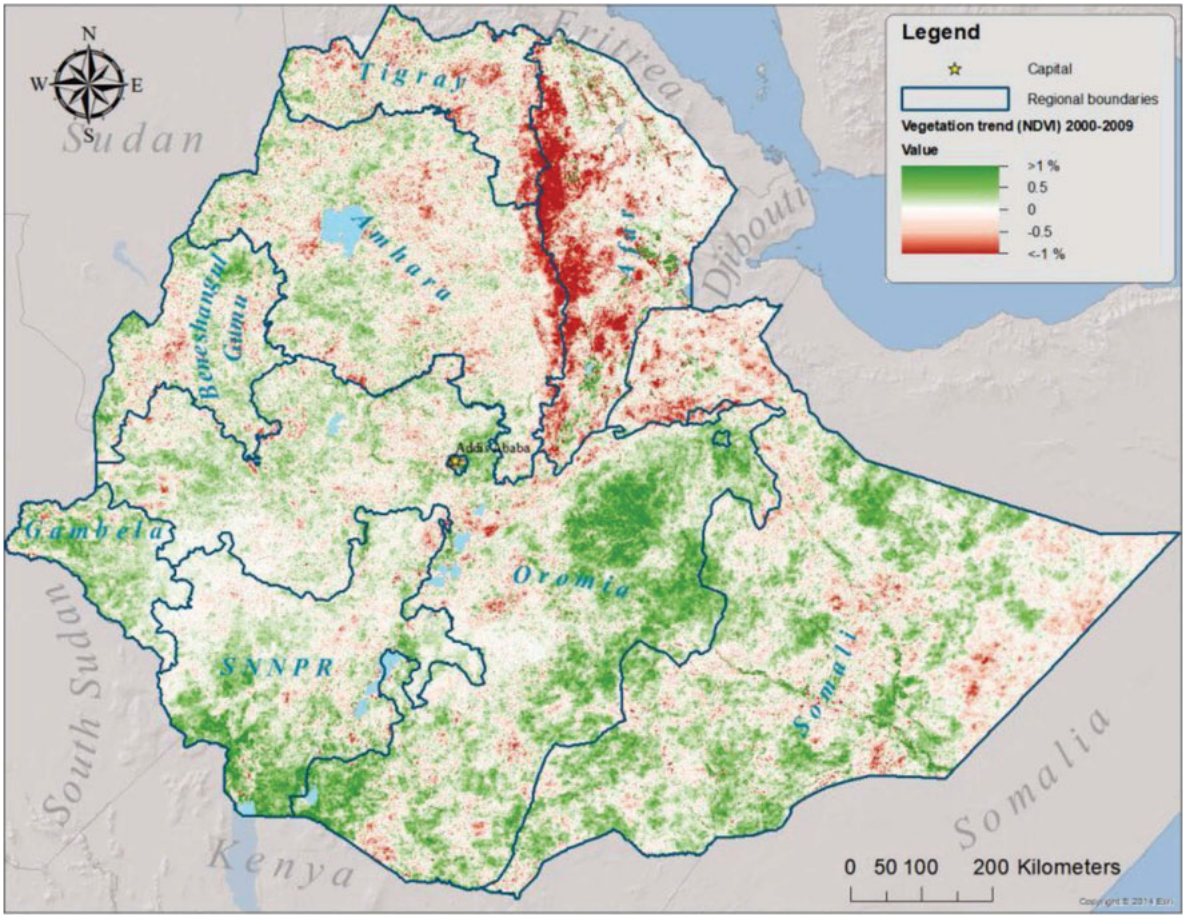
Map 4.10: Trend in NDVI 2000–2017 (%)



indices can be employed to provide empirical measures of vegetation. In this study, trends in vegetation are assessed using two indices: Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI). Each of these indices have been used extensively in the literature for assessing vegetation cover and direction of change. But neither are very good at assessing the quality of vegetation available for livestock grazing. Increases in greening, for example, can also reflect increases in bush encroachment and invasive inimical species to livestock. Nevertheless, despite these limitations, they give some indication of the direction of change and trend information in vegetation cover in the lowlands.

For the period 2000–2017, vegetation in the lowlands as measured by NDVI shows a small increase in contrast to the highlands where there has been a decrease (see Map 4.10, and Tables A.5 and A.6 in Annex 1). During this extended period,

Map 4.11: Trend in NDVI 2000–2009 (%)



vegetation has increased across much of Somali, Oromia, and Gambella. In contrast, lowland areas in Afar, Amhara, and Tigray exhibit a downward trend (SNNP largely unchanged). Looking at the two sub-periods, there are some interesting differences that emerge. For example, between 2000–2009 the lowlands in Afar appear to have experienced widespread declines (Map 4.11) compared to the later 2010–2017 period characterized by widespread increases in the NDVI trend (Map 4.12). In fact, in this later period, all lowlands in all regions except for SNNPR showed growth in NDVI (0.33%) and EVI (0.23%) (see Tables A.5, A.6, A.7, and A.8 in Annex 1). By AEZ, the moist Berha and moist Kolla zones reported large improvements during this period across all regions. In the dry lowlands, the story was a little more mixed with the dry Kolla showing an overall increase (both according to NDVI and EVI) but with regional variations.

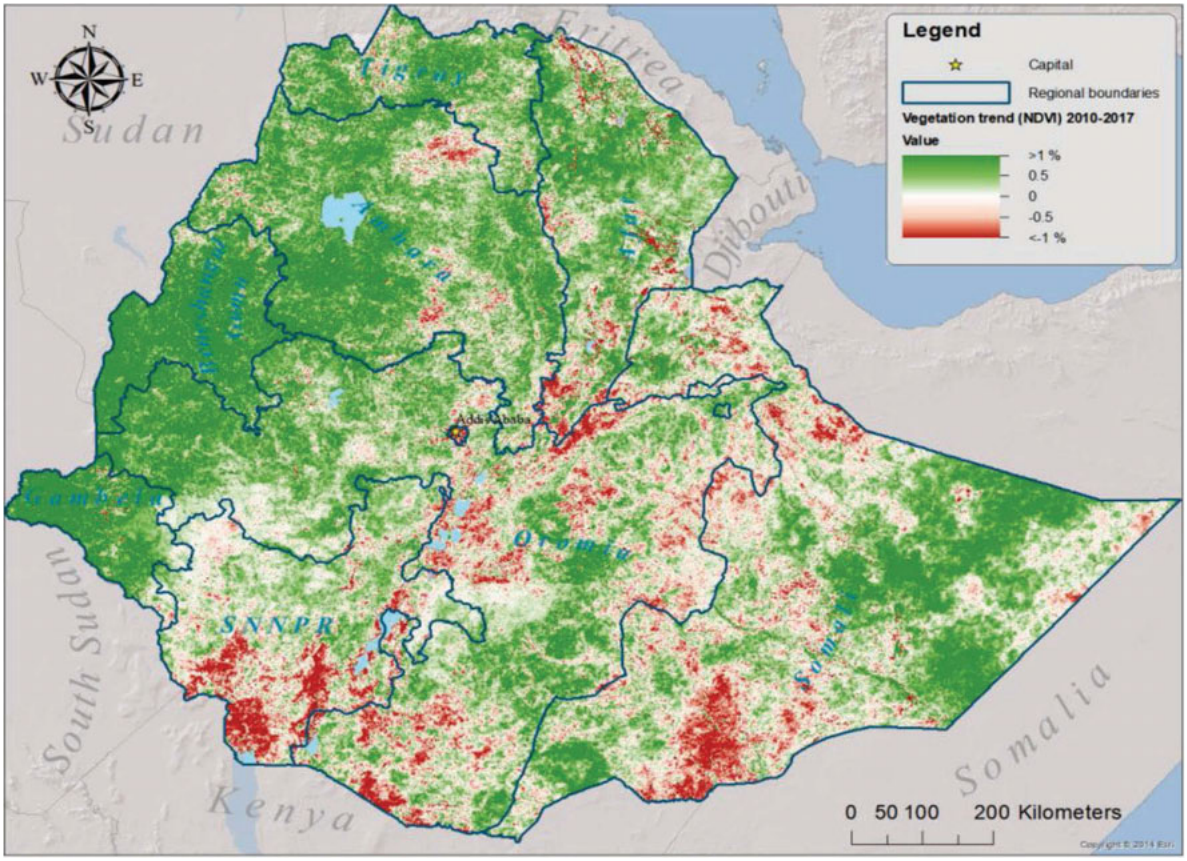
Vegetation, however, is not only responsive to the amount and distribution of rainfall and temperature, but also to human intervention. In pastoral ecosystems the rangelands are a product of human management of the range as well as external interventions. This management may be influenced by a variety of factors, some deliberate such as bush and grass burning, range enclosures, shifts in the composition of herds from grazers to browsers, and introduction of permanent water points, to others which may be unintended, such as the consequences of over- and understocking caused by population increase, conflict, and forced displacement.

Water Availability

Water availability is a critical component of lowland livelihood systems. However, there is a wide variety of conditions in the lowlands related to groundwater presence and availability. Large areas have brackish or salty groundwater with high mineral content that makes it unsuitable for drinking water and most other purposes. As a result, water resources in pastoralist areas, particularly in the two regional states of Afar and Somali, are usually scarce and costly to access for rural water supplies.

Surface water is largely confined to the perennial and seasonal rivers that run through the lowlands.

Map 4.12: Trend in NDVI 2010–2017 (%)



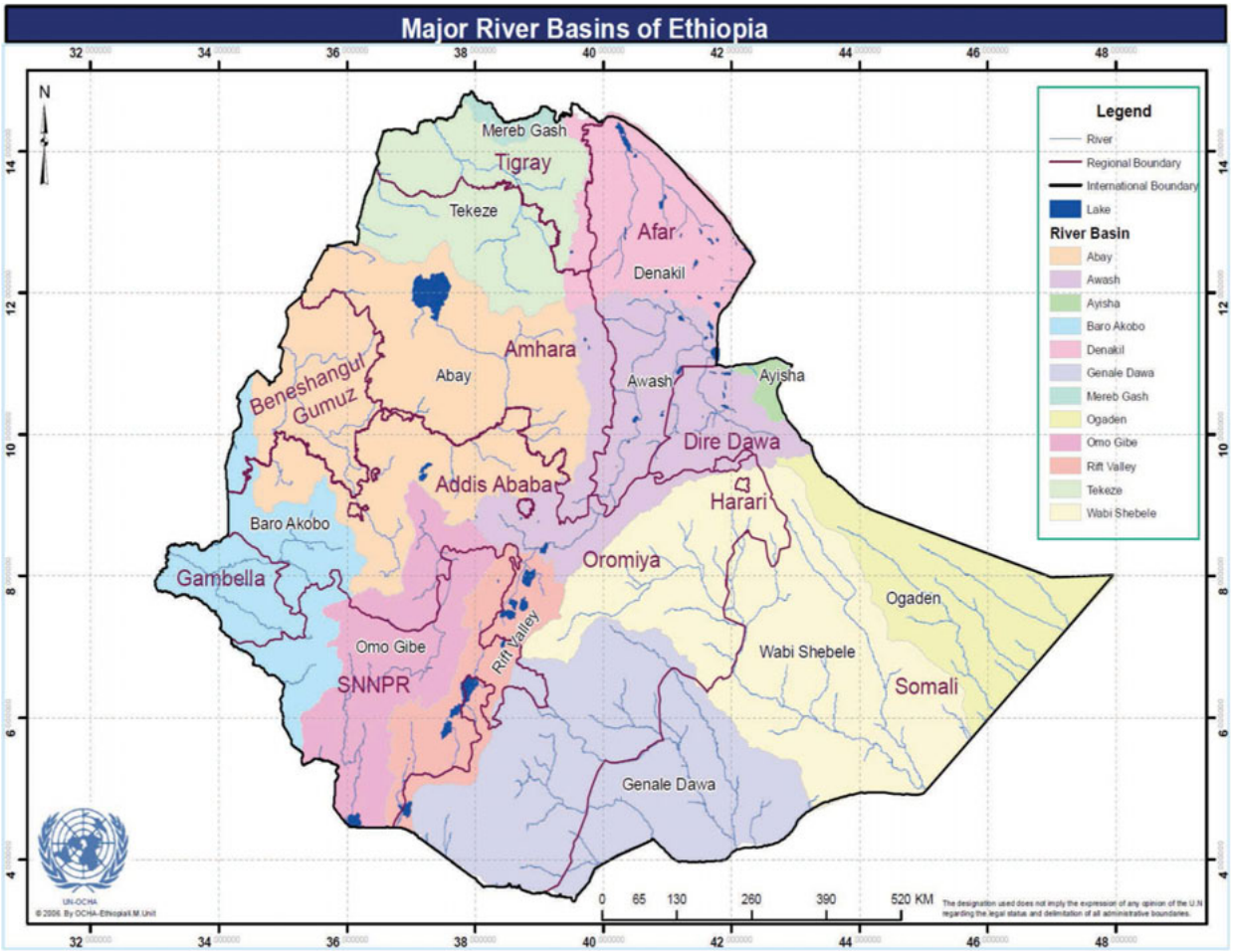
The northern and central highlands drain westward into Ethiopia's most extensive river system, the Abbay, or the Blue Nile, or into the Tekeze River, a tributary of the main Nile, and the Baro river, a branch of the White Nile. The eastern highlands drain into the Awash, Wabi-Shebele, and Genale-Dawa rivers. The Awash River never reaches the sea but is ultimately absorbed into a succession of lakes and marshes near the Djibouti border. The Wabi-Shebele and Genale-Dawa rivers flow across the eastern lowlands. In the south, the Omo River drains into Lake Turkana, and several streams flow into the other Rift Valley lakes. In the southeast, the mountains of Arsi, Bale, and Sidamo drain toward Somalia and the Indian Ocean, but only the Genale or Juba rivers permanently flows into the sea. See Map 4.13 for major river basins in the country.

Groundwater availability varies across the lowlands. Afar regional state is underlain by several deep and prolific aquifers of regional importance. The high salinity of the waters in some areas, however, limits use of the water for irrigation and drinking purposes. In Somali region, by contrast, water tables in some areas run extremely deep and aquifers are low yielding. Notable areas for better groundwater potential include: (i) the Shinile area in northern Somali region, (ii) the Jerer valley, and (iii) the shallow groundwaters in the Fafan valley in the northern part of the regional state. Elsewhere in the region, groundwater of limited extent can be encountered along the banks of the major rivers. Shallow groundwater also occurs in the Ogaden zone.

Access to improved water supply and sanitation facilities in pastoralist areas of Afar, Somali, and pockets of pastoralist areas in Oromia and SNNPR lag highland regions and the national average. Access levels for water and sanitation range from 39–61 percent, and sanitation coverage range from 6–21 percent, respectively, compared to 62–95 percent and 41–76 percent respectively in highland areas (OWNP Phase II program, November 2018). According to the Ethiopian WaSH Poverty Diagnostic study, agrarian highland *woredas* were significantly more likely to have access to improved water than agropastoralist *woredas*—by about 10 percentage points. Map 4.14 highlights regional coverage rates by *woreda*.

According to a survey conducted in lowland *woredas* of Somali, Afar, and South Omo zones of

Map 4.13: Major river basins



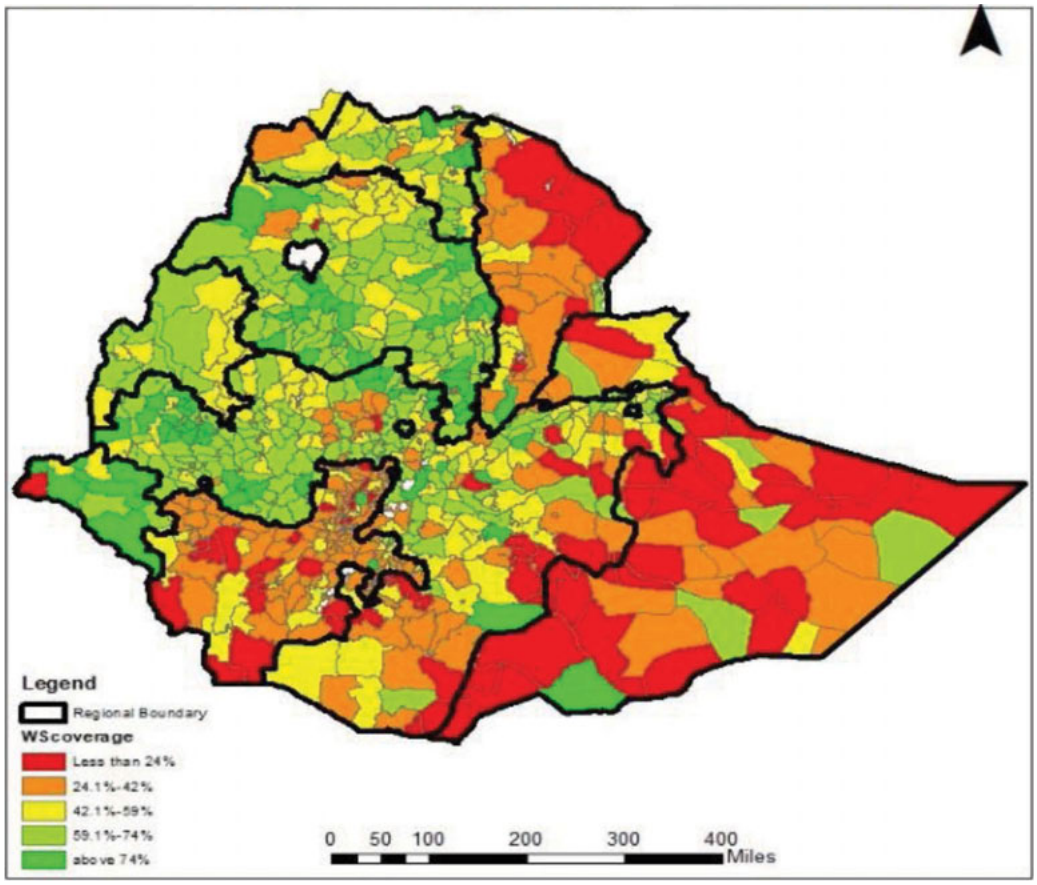
SNNP regions (USAID, May 2016) 48 percent do not have access to improved drinking water sources of which 49 percent were in Afar, 81 percent in Somali, and 15 percent in SNNP. The same survey highlighted that of the 51 percent that have access to water in Afar, 86 percent of households use water from drilled boreholes. Baseline data collected in 366 *woredas* in 2018 also indicated that 80 percent of the *woredas* in SNNP, Somali, and Afar have below the national average access coverage (53%). The same survey also suggests that there is very low sanitation coverage in Afar (23%) and Somali (5%) regions.

Several factors have contributed to the challenges and disparities in water service delivery between highlands and lowland areas. These include:

Pastoralist and agropastoralist areas receive less rainfall than other regions, potential water sources are usually scarce, and groundwater sources are costly to access. While there are shallow aquifers in the alluvial beds of many rivers, they are not perennial and may last a few weeks to a few months after the rainy season. There are also areas that have sedimentary or volcanic formations, with deep to very deep aquifers. However, some of the deep aquifers could have a meager yield or may have poor water quality, often with high mineral content and high temperature, which may make the water unsuitable for drinking, small-scale irrigation, and even for animal watering.

Given the nature of lowland pastoral livelihood systems, provision of permanent water in lowland areas needs to be carefully considered in relation to other natural resources, including its long-term impact on grazing availability for livestock. Too much water can lead to permanent settlement and overgrazing. Environmental change induced by water availability may have permanent and negative land use consequences. As such, water coverage needs in the lowlands and highland communities may not be comparable, as water

Map 4.14: Regional water supply coverage distribution



development in the lowlands needs to be part of an integrated natural resource and livelihoods plan.

The principal challenge in these areas is to understand how water development can contribute to provide adequate water for human consumption and settlement, including exploiting untapped irrigation potential, while not upsetting traditional adaptive strategies to environmental and climate variability on which large numbers still depend for their livelihoods.

The scattered settlement patterns of pastoralist and agropastoralist areas have made water service schemes expensive to maintain. Given the transient nature of some communities, operation and maintenance of sophisticated pumping systems have been inadequate. Systems that require extensive pumping of deep groundwater sources, for example, require diesel to operate pumps and replacement of spare parts that are often imported (electro-mechanical equipment, steel casing, etc.). Consequently, water investments in sparsely populated areas have fallen into disrepair due to lack of accountability, community engagement, and capacity for repairs.

The hydrology and geology in lowland Ethiopia are complex, and little is known about the quality and quantity of water resources, which makes the cost of reconnaissance before drilling expensive. Master plans studies of the different river basins focus only on significant tributaries and detail the surface water resources potential for hydropower and irrigation use. Information available about groundwater resources in the lowlands are fragmented. The hydrogeological data from drilled boreholes in the lowland areas have not been systematically collected and analyzed to assess groundwater potential to orient design and management of water service delivery.

Cost of drilling and groundwater exploitation in many of the pastoralist regions is increasingly expensive, with a technological shift toward deep boreholes and limited drilling capacities in lowland regions. Although the knowledge base to orient investment in groundwater is fragmented, the

reliance on groundwater is increasing. To reverse the high rate of drilling failure or lower than average water yield or chances of boreholes "drying up," the solution to date has been to drill deeper. Borehole drilling in the lowlands is expensive and can be as high as US$291,000 per borehole, against a national median cost of US$128,000. Review of actual drilling contracts in Oromia, SNNPR, Somali, and Afar regions have revealed that average cost of drilling a borehole ranges from ETB 4.69 million in Somali to ETB 0.44 million in Oromia. Besides the high cost of drilling, there is also a higher rate of nonfunctionality—according to the Ministry of Water, Irrigation and Electricity (MoWIE) the national average is 11 percent, while in some lowland regions this rate is three times higher.

As a result of these factors water development in the lowlands needs to be undertaken with careful consideration of its wider environmental impact. Investing large sums of money into widespread borehole drilling may not be the best way to use scarce budget resources and may do more long-term environmental harm than good.

In the next chapter we examine changing land use and land cover trends in the lowlands, and some of the principal drivers behind them.

Chapter 5: Changing Land Use and Land Cover

Summary

This chapter examines long-term trends in land use and land cover in the lowlands. These trends indicate an expansion of cropland, and a decline in grazing availability due to a variety of factors, including significant bush encroachment in some areas, land enclosures, and population increases causing increased pressure on, and competition and conflict over natural resources. Land fragmentation and loss of access to common grazing areas are undermining established coping strategies.

Introduction

Distinguishing long-term environmental changes from short-term fluctuations due to rainfall variability is extremely difficult in many of these lowland environments, but there are some long-term trends which can be identified with reasonable confidence. To better understand the changing landscape across the Ethiopian lowlands, land use and land classification maps were generated for 1986, 2000, and 2016 to look at trends in land use and land cover.[69] Given the spatial extent and need to generate land cover maps temporally comparable, classification is based primarily on Landsat imagery.

In considering the extent of change in grazing and forage areas, lowlands grasslands are one of the most important landscapes in terms of the functions they provide for pastoralists. However, from a land use and pastoral livelihoods point of view, grasslands represent only one portion of the potential land available since grazing and forage typically include areas such as shrub and bush and even woodlands (i.e., non-forest, woody vegetation). Additionally, grasslands are also one of the most difficult classes to accurately map and detect change in, especially in the lowlands, where signals can be easily confused and distinction between bush and shrub and other non-forest woodlands difficult to make given the available imagery. Recognizing that suitability and palatability of vegetation in shrub and woody landscapes varies by livestock species, grasslands are combined in this analysis with non-forest woody vegetation—shrub and bush and woodland Land Use and Land Cover (LULCs)—to represent potential grazing and forage land more broadly.

Potential grazing and forage land, as represented by combining grassland with shrub and brush and woodland LULCs, covers most of the lowlands (Map 5.1). Since 1986 there has been a decline of 3 percent across the lowlands with nearly all major regions experiencing declines (Table 5.1 and Table A.9 in Annex 1). The exception is SNNPR

[69] The main source of data are LULC maps generated by the Water and Land Resource Center (WLRC), Addis Ababa University, for this study. The methods described reflect the approach adopted by WLRC's team of GIS and remote-sensing experts. For 2016, two additional sources of data were used to supplement the LULC map produced by WLRC. First, settlement areas were revised using data from the European Space Agency's 2016 Africa land cover map (ESA, 2018) to more accurately capture villages and the extent of urban areas. Second, data generated on the location and extent of large commercial farms as part of this lowland project were used to update cropland areas.

Map 5.1: Distribution of lowland grazing and forage land (1986 to 2016)

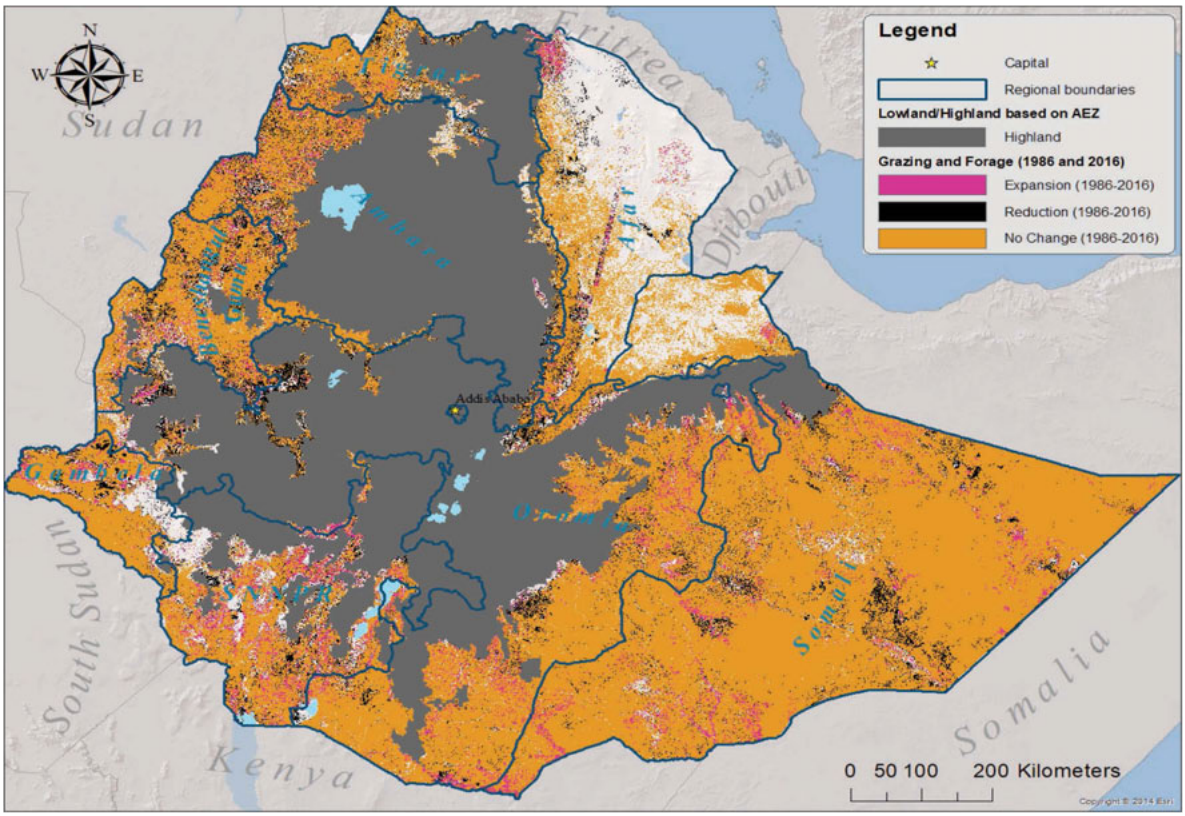


Table 5.1: Lowland grazing and forage (1986 and 2016)

	Area (1,000 ha)		Change (%)
Region	**1986**	**2016**	**1986–2016**
Afar	3,006.6	2,786.8	–7%
Amhara	3,204.6	2,826.6	–12%
Benishangul-Gumuz	3,844.9	3,545.5	–8%
Dire Dawa	49.3	47.2	–4%
Gambella	2,185.2	2,139.0	–2%
Hareri	3.6	3.9	7%
Oromia	12,053.4	11,631.5	–4%
SNNPR	3,939.6	4,136.5	5%
Somali	27,015.8	26,872.4	–1%
Tigray	1,928.2	1,676.1	–13%
Total	**57,231.3**	**55,665.4**	**–3%**

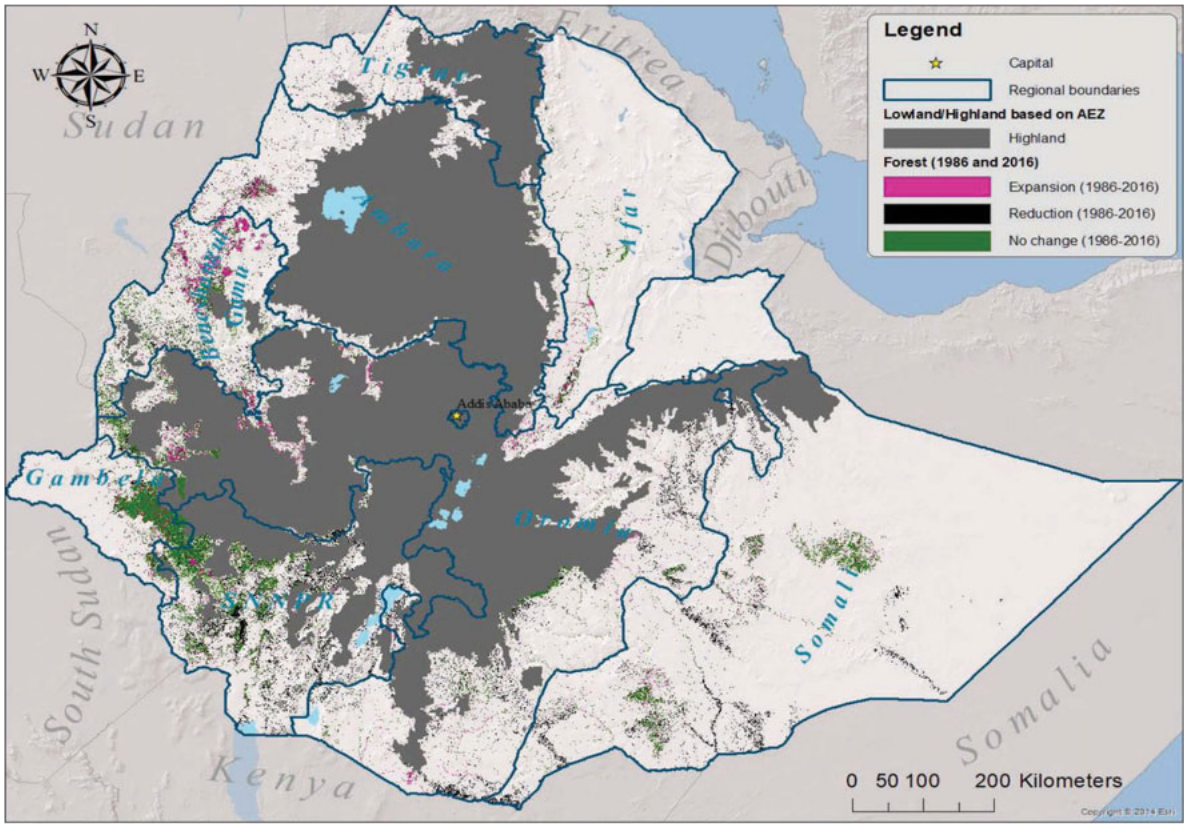
Source: WB calculations based on data from WLRC, ESA, and DevSeed.

where there was a 3 percent increase—although in SNNPR much of the increase appears to correspond to decreases in forest cover (black shaded areas in Map 5.2). In addition, there is a tendency for the declines to appear along the highland/lowland transition, which corresponds to increases in cropland (pink shaded areas in Map 5.3) supporting the claim that cropland expansion is taking over some areas that had previously been used for grazing.

This slight long-term decline in cover may conceal a much sharper decline in access to prime grazing areas. Differentiating access from cover cannot be done by Landsat imagery interpretation but requires a more detailed knowledge of changes in grazing patterns by pastoralists on the ground and the extent to which land fragmentation, in the form of land enclosures, have reduced access to certain areas for a variety of reasons (see below).

Between 1986 and 2016 several trends in land use change were reflected in the highlands. For example, lowland and highland regions both experienced reductions in forest and woodland areas, and increasees in cropland and settlements. However, the relative changes and magnitudes differed considerably, for example, the area of cropland which more than doubled in the lowlands (2.3 M ha to 4.7 M ha) compared to only a 30 percent increase in the highlands. In 1986 the forested area in the lowlands was slightly more than 5 M ha, while in the highlands forest covered approximately 5.9 M ha. The lowlands between 1986 to 2016 have experienced notably large declines in forested area of approximately 1.7 M ha (–34%), a reduction roughly

Map 5.2: Distribution of lowland forest (1986 to 2016)



four times that in the highlands where a decline of 440,000 ha or 7 percent over this 30-year period took place. Including area classifications for 2000 as well, these trends appear to be largely balanced over time with a few exceptions (i.e., bare land showing a decline in 1986–2000 but then increasing in 2000–2016). Regional summaries and net change from 1986 to 2016 in lowland areas are presented for each LULC in Annex 1, Tables A.9–A.19.

While forest area declined in all lowland regions, the largest declines were in Oromia, SNNPR, and Somali, where the combined reduction totaled more than 1.6 M ha, with the area in Tigray nearly halving from 59,000 to 32,000 ha (Map 5.2). Spatially, most of the decline appears to be reductions along river banks, although there are discernible clusters such as in SNNPR which could be due to large-scale clearing for agricultural plantations and in different patches in Somali region, one notable area being along the Kenya border near to Moyale (Map 5.2).

There has been a steady expansion of cropland in lowland areas both in higher potential areas within the lowlands but also along the lowland-highland interface, as farmers have pushed down from the highlands in search of land to crop, with an estimated doubling in cropland between 1986 and 2016. In the last three decades, total lowland cropland more than doubled (2.3 M ha to 4.7 M ha in 2016) with significant increases found in all lowland regions. As a percentage, the cropped area in Afar increased by a factor of four (431%) and in Gambella by a factor of three (292%) with large area increases in Oromia (790,000 ha), SNNPR (440,000 ha), BG (313,000 ha), Somali (263,000 ha), and Amhara (253,000 ha) (Map 5.3 and Table 5.2). These trends are generally in agreement with recent studies covering a similar time frame (Degife et al., 2018), but this contrasts with some recent research such as Mekuyie et al. (2018) who looked at land use change in southern Afar for a similar period (1985–2015) and found a declining trend for cultivated land.[70] Spatially, much of the lowland cropland expansion appears to have taken place along the escarpment, transitioning from highland to lowland (Map 5.3). This expansion along the highland/lowland

[70] While not directly comparable due to different areas involved, the conflicting findings for Afar, such as an increase in area cultivated and bare land, are likely due to our combining data sources (in the case of cultivated area), reference years (i.e., 2015 vs. 2016) or different thresholds and classification criteria (i.e., designation of bare vs. sparsely vegetated land captured by woody vegetation or grassland).

Map 5.3: Expansion of cropland

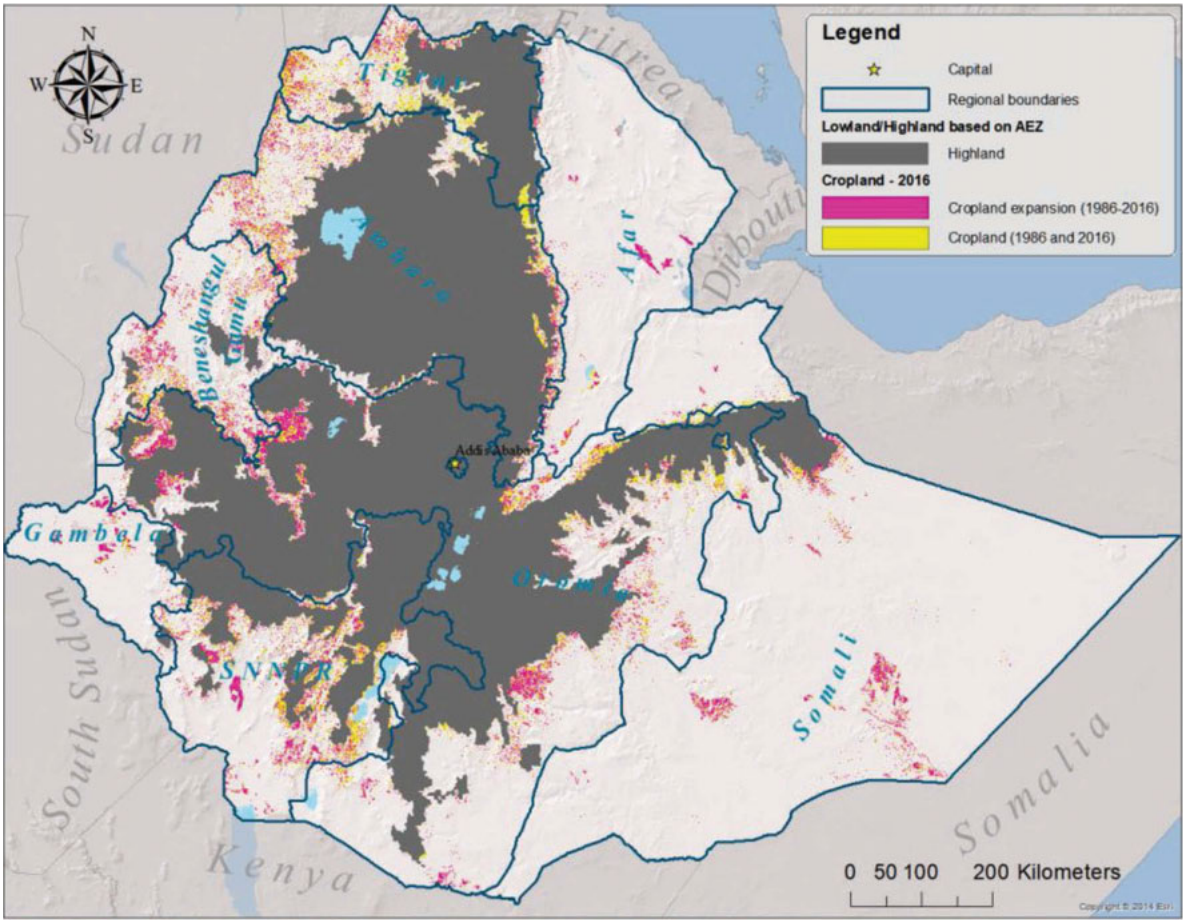


Table 5.2: Lowland cropland (1986, 2000, and 2016)

	Area (1,000 ha)			Change (%)		
Region	**1986**	**2000**	**2016**	**1986–2000**	**2000–2016**	**1986–2016**
Afar	27.7	45.7	147.1	65%	222%	431%
Amhara	463.1	615.7	716.2	33%	16%	55%
Benishangul-Gumuz	205.9	370.2	519.3	80%	40%	152%
Dire Dawa	10.8	9.9	11.6	–8%	17%	7%
Gambella	27.3	39.0	106.8	43%	174%	292%
Hareri	6.2	6.0	7.0	–3%	16%	12%
Oromia	588.9	947.1	1,378.5	61%	46%	134%
SNNPR	414.5	446.7	853.8	8%	91%	106%
Somali	147.1	250.7	410.7	70%	64%	179%
Tigray	342.7	500.8	540.4	46%	8%	58%
Total	**2,234.1**	**3,231.9**	**4,691.3**	**45%**	**45%**	**110%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

transition is likely being driven by changing conditions in the highlands. During the past several decades, an increasing highland population coupled with limited potential land suitable for expanding cultivation has led to a spillover into the lowlands (Hurni et al., 2005; Kassawmar et al., 2018; Zeleke and Hurni, 2001).

The satellite data in Map 5.3 show the expansion of cropland (in pink) over a thirty-year period between 1986 and 2016. This trend is confirmed by data from recent HCE surveys in 2011 and 2016 showing an increasing number of full-time farmers in the drought-prone lowlands (see Chapter 1).

Associated with this expansion in cropped area has been the expansion of land enclosures, both to protect cropland from animals but also for more intensive forage production. These changes are likely to increase the risks in the future of intensified resource competition between pastoralists looking for grazing for their livestock and farmers protecting their crops.

Drivers of Land Use Changes

The drivers behind many of these observed land use changes are complex and interrelated and include: (i) an increase in human population and settlement leading in many areas to increased cropping and land enclosures; (ii) excision of key dry season grazing areas for commercial agricultural plantations along some of the main rivers that run through the lowlands, resulting in loss of riverine forest and grazing; (iii) introduction of permanent and semipermanent water points, such as boreholes and *birkedas* (large cement lined cisterns) in wet season grazing areas, e.g., in the Haud in Somali region, leading to permanent settlement, agriculture, and range enclosure in these once seasonally exploited grazing areas; (iv) bush encroachment by invasive species, such as *Prosopis juliflora,* reducing grassland availability; and (v) increasing resource competition between groups leading to intercommunal violence and the creation of *de facto* grazing exclusion areas, for example, in parts of Borana zone along the Somali-Oromia regional border, and in Afar between Afar and Somali Issa pastoralists.

Population increase and urbanization

The impact of these two on the lowlands is increasing. The highlands, which cover only some 40 percent of the land area of the country, are home to over 80 percent of the population who are dependent on rain-fed agriculture. The high concentration of the population on a little over 40 percent of the land area reflects the close relationship between physiography, climate, economy, and population distribution in the country. The average population density in the highlands is almost eight times that of the lowlands, but the population in the lowlands is growing at a faster pace, with Somali and Afar regions experiencing the highest fertility rates in the country at 7.2 and 5.5, respectively (DHS, 2016).

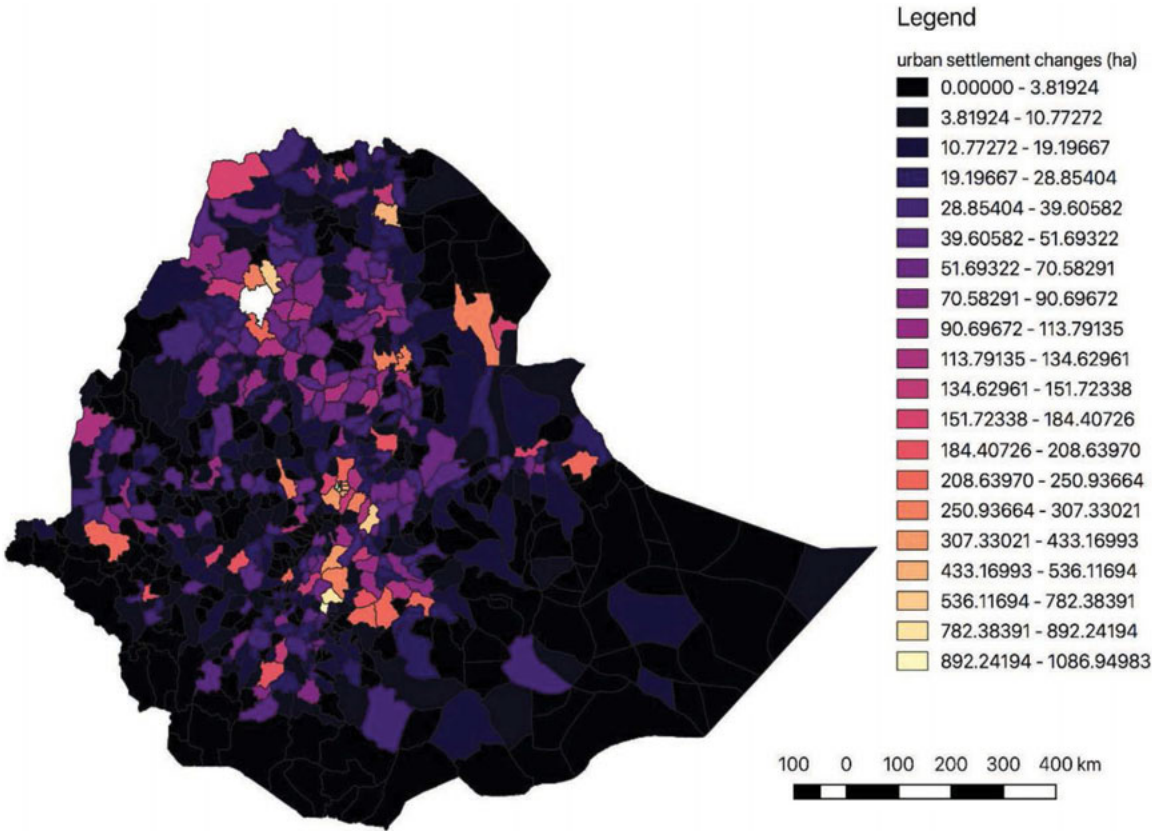
High population growth poses a future risk to Ethiopia's development gains. The country's population more than doubled between 1990 and 2016, rising from 48 million to more than 100 million (World Bank, 2017). With a current annual population growth rate of around 2.5 percent Ethiopia's population is expected to reach 160 million by 2035 and nearly 205 million by 2050 (UN Population Division World Population Prospects, 2019). Afar and Somali regions have seen their populations increase by nearly a quarter in the last decade. The high proportion of people under 18 creates future challenges for labor markets and economic stability, particularly if continued population growth cannot be absorbed in nonagricultural sectors. Given existing pressure on land resources in the lowlands, and limited alternatives to extensive livestock herding, it is unlikely that future productivity gains in lowland economies will be able to absorb such a rapidly growing population. Population growth is likely to exert enormous pressure on traditional lowland livelihood systems and the environment.

Population density increased in the majority of lowland *woredas* from 2000 to 2017, but decreased in 49 *woredas,* including 15 in northern Afar. Several *woredas* in the lowlands of SNNPR have seen an increase of more than 100,000 people in the last 17 years. Night-light analysis shows that Afar, Dire Dawa, and SNNPR have recorded the most significant changes, as well as the area around Jijiga, the regional capital of Somali region (see Map 5.4).

What is notable from the data that have been collected is how population density is increasing in many parts of the lowlands, especially in Ogaden and northeast Afar, recording some of the highest population growth rates between 2007 and 2017 (see Map 5.6).

Combined with the population increase is a growing trend toward increased settlement and urbanization in parts of the lowlands. Between 1986 and 2016 the lowlands saw a 179 percent increase in settlement areas (see Table 5.4). Within pastoral regions themselves there has been a

Map 5.4: Night-light data on urban settlement changes (ha) 2000–2017



steady growth in the numbers and size of small towns. This has been encouraged more recently by humanitarian interventions in settling populations, many of whom have been displaced by drought and conflict, through provision of permanent water (boreholes) and relief supplies. This has eased the burden of service provision but also created many nascent new permanent settlements in once remote pastoral areas, such as in Warder in Somali region. These small settlements open opportunities for development of alternative livelihoods. As a result these nodes of potential growth have attracted both the poor and destitute as well as the wealthy looking for opportunities to diversify their incomes. In Somali region, from 1984–2015, small and medium-sized towns in the region grew at different rates; some like Jijiga grew much faster than others, as they attracted people from rural areas (see Table 5.3). In 1997 the region had 30 towns with a population of at least 5,000 and 7 with more than 20,000. In 2007 the urban population in the region was 623,000 or 14 percent of the total. Over the last decade this increased considerably. In 2006 Devereux predicted: "Together with anecdotal evidence . . . that the aspirations of Somali youth might lie increasingly outside pastoralism, we might predict that levels of urbanization (within Somali Region) and migration (to destinations outside the region) will rise, while the proportion of Ethiopian Somalis who remain engaged in livestock-dependent livelihoods will decline" (p. 30).

Table 5.3: Population of selected urban centers in Somali region, Ethiopia (based on CSA census, and 2015 projected)

	1984	1994	2007	2015	% increase 1994–2015
Jijiga	23,187	56,821	125,876	159,300	180
Gode	NA	45,755	43,234	54,700	19
Degehbur	NA	28,708	30,027	38,000	32
Kebridehar	NA	24,263	29,241	37,000	52

In Afar urbanization has been more pronounced—as some parts of northern Afar have lost population other parts have gained. During 1997–2006 the population of towns with populations greater than 1,000 grew at least 32 percent over this period. In 2007 the urban population in Afar as a percentage of the total was only slightly less than in Somali region at 13 percent (CSA, 2008), but judging from night-light data and changes in the area covered by settlements, Afar has seen a large expansion in

Table 5.4: Lowland settlement (1986 and 2016)

Region	Area (ha)		Change (%)
	1986	2016	1986–2016
Afar	235.0	2,482.0	956%
Amhara	2,029.0	5,490.0	171%
Benishangul-Gumuz	739.0	1,614.0	118%
Dire Dawa	717.0	2,769.0	286%
Gambella	937.0	1,348.0	44%
Hareri	32.0	20.0	–38%
Oromia	3,415.0	5,000.0	46%
SNNPR	466.0	4,765.0	923%
Somali	2,449.0	5,583.0	128%
Tigray	374.0	2,671.0	614%
Total	**11,393.0**	**31,742.0**	**179%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

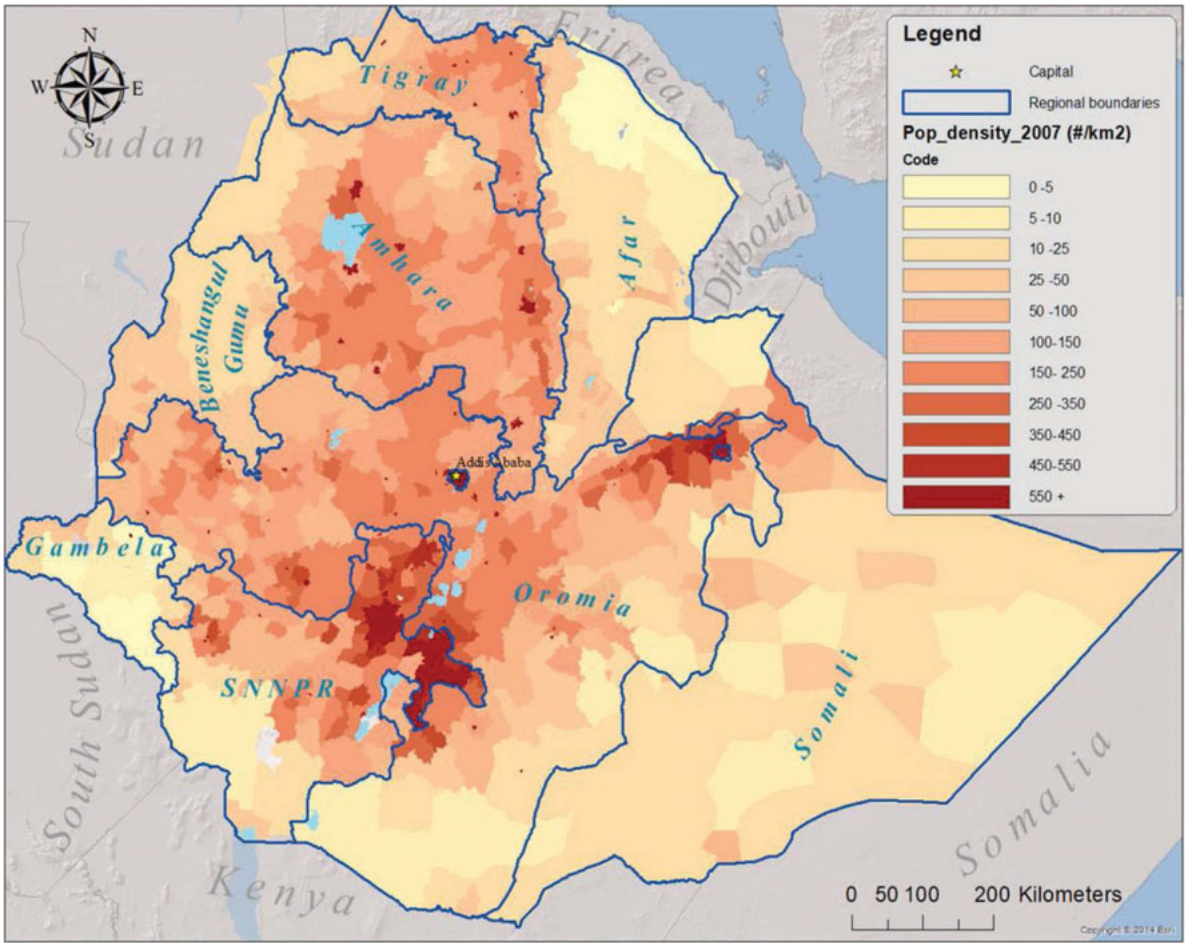
settlement area (see Table 5.4). Some of this expansion has been fueled by highlanders moving down the escarpment looking for work on agricultural plantations. The devastating effects of drought in the region also stimulates migration to towns. Each successive drought damages livestock holdings and forces more stockless and near-stockless herders to towns. Many who have urbanized have done relatively well; poverty has declined faster in urban areas, vulnerability is lower, and access to services is better.

Changes in population density in the lowlands since 2007 are shown in Maps 5.5 and 5.6.

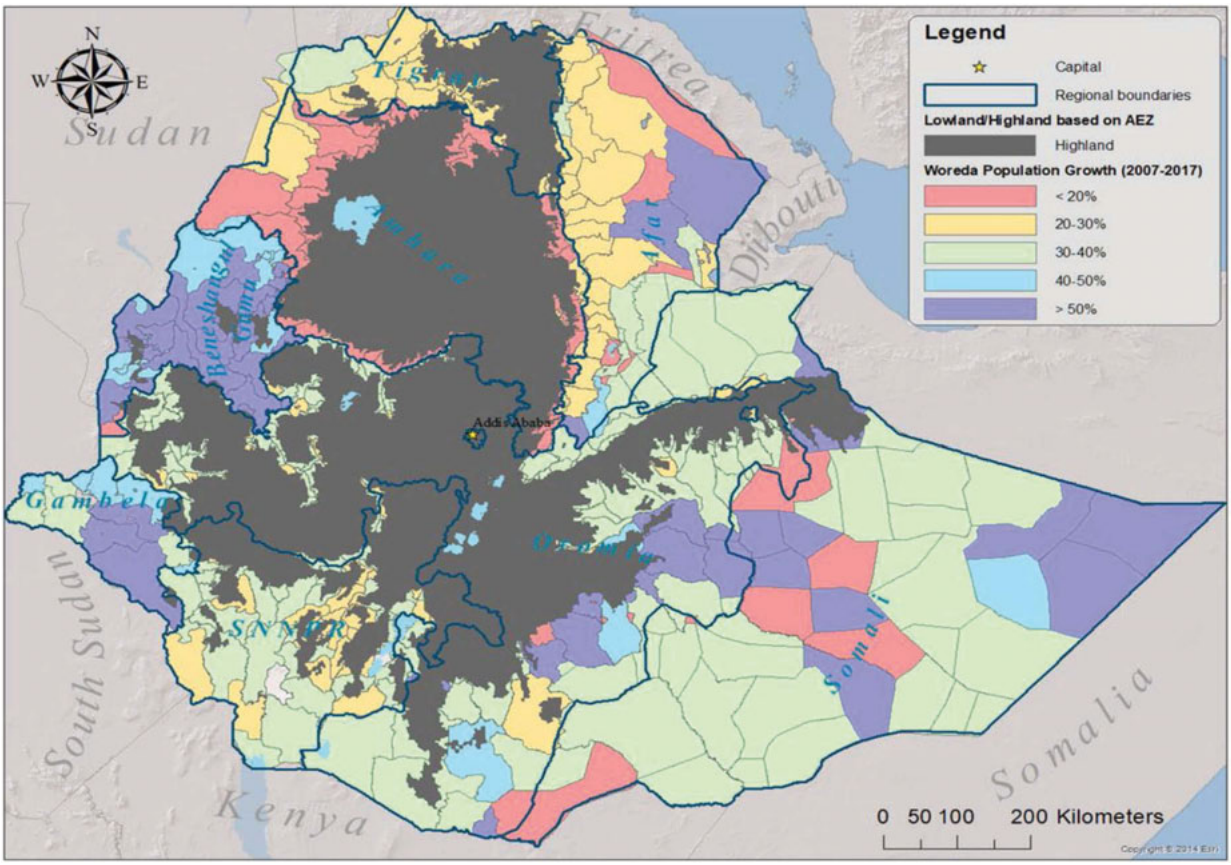
Climate-induced migration

A finding of this study is that future climate change is emerging as a potent factor in the mobility of the population. Lowland climate migration levels

Map 5.5: Population density in the lowlands in 2007 (CSA Census)



Map 5.6: Population growth 2007–17 lowland *woredas*



are high and make up a higher proportion of total climate migration than in the highlands (Map 5.7). According to various scenarios (Figure 5.1) the lowland areas will see the following levels of climate in-migration by 2050:[71]

- Pessimistic/reference scenario (SSP4/RCP8.5): 5.9 m migrants
- Climate-friendly scenario (SSP4/RCP2.6): 4.5 m migrants
- Inclusive development scenario (SSP2/RCP8.5): 4.2 m migrants
- Optimistic scenario (SSP2/RCP2.6): 3.6 m migrants

Even under the most optimistic climate scenario, there will be a significant in-migration to lowland areas.

Map 5.7 shows the hot spots of climate change in-migration (in red) and out-migration (in blue). The results suggest that the great majority of the movement in Ethiopia will be within the highlands—that is, out of the northern highlands and into the southern highlands (to the south and east of the Great Rift Valley). For the lowlands, according to the models run, the largest areas of in-migration are in the Somali Region, particularly around Denan and Kebri Dehar, and farther to the northeast near Aware. The water model inputs suggest modest increases in water availability in this region of zero to two times the baseline, which is very low. The ecosystem model inputs suggest that these regions will also see increases in net primary productivity.

Excision of critical dry season grazing areas

Pastoralists have been losing parts of their rangelands to other users for years as population pressure in the highlands pushes people down the escarpment looking for land to crop, and governments look for making use of higher potential areas in the lowlands for commercial agricultural plantations. The overall area of land lost to grazing

[71] Based on a report prepared for the World Bank, 2019, *Ethiopia Climate Change-Induced Migration Modeling*, by Center for International Earth Science Information Network (CIESIN), Columbia University, and the CUNY Institute for Demographic Research (CIDR) with contributions of Jacob Schewe and Fang Zhao of the Potsdam Institute for Climate Impact Research (PIK), who provided ISI-MIP sectoral projections for crop production, water availability, and flood risk to 2050.

Map 5.7: Hot spots of climate in-migration and out-migration for 2050

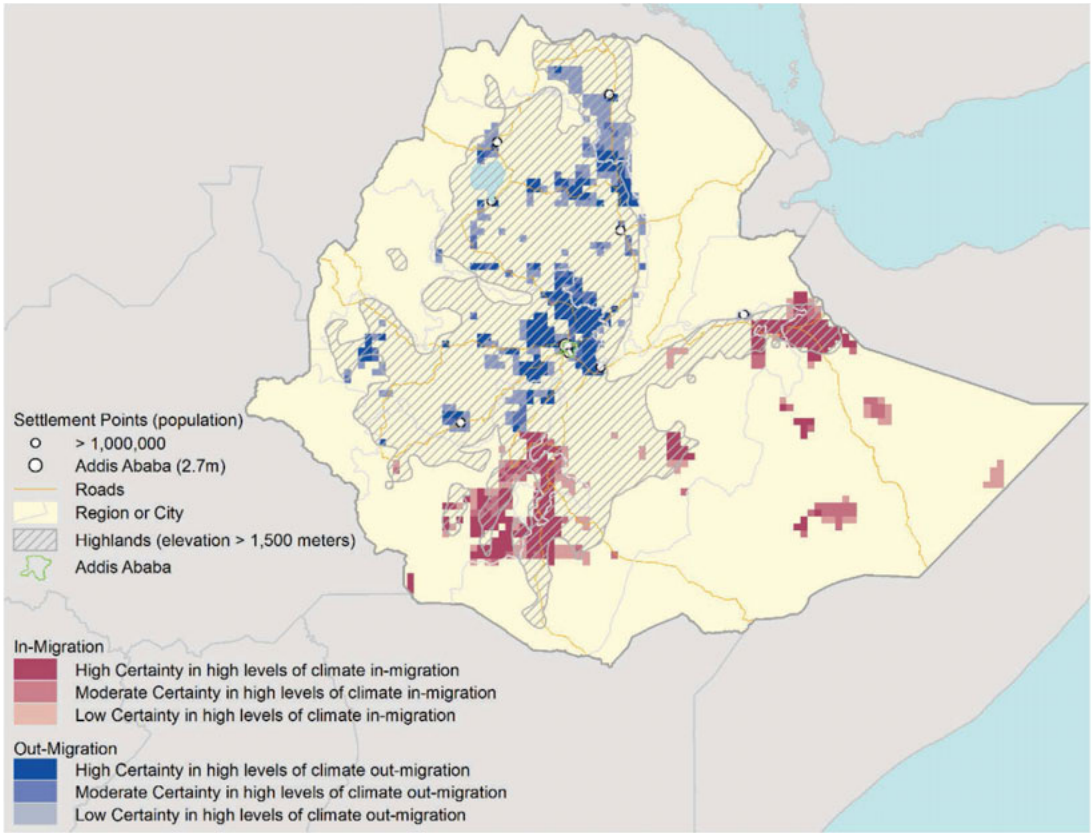
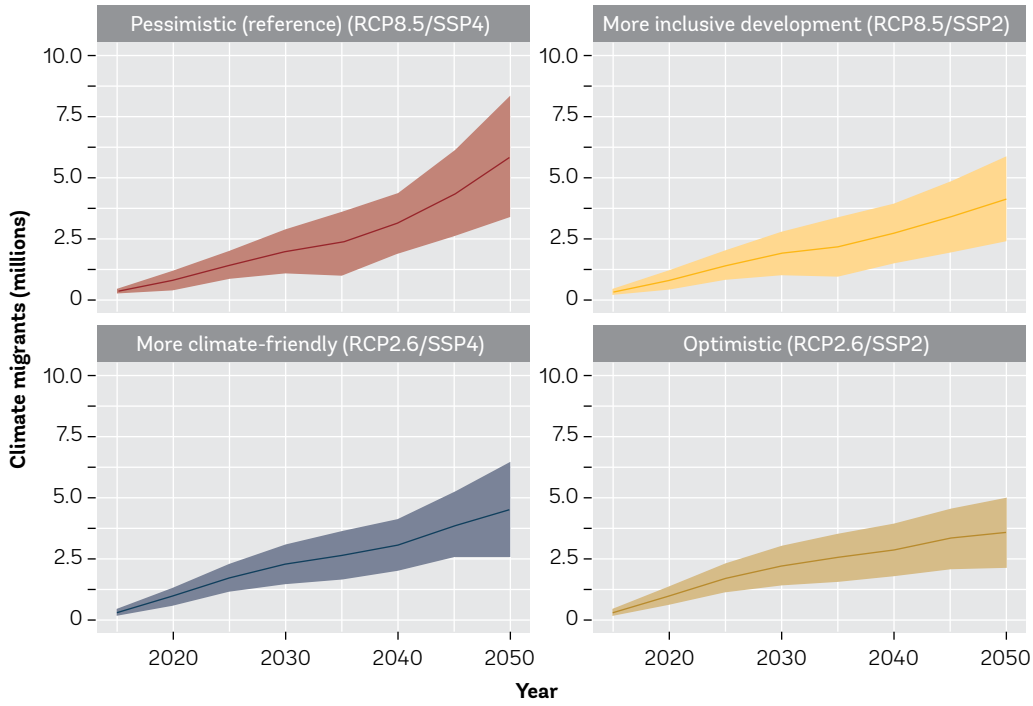


Figure 5.1: Lowland climate migrants, 2015–2050 (shaded areas represent the 95 percent confidence intervals)



may be small, although in some regions still significant, such as in Gambella where it is estimated some 15 percent of the land area has been taken up by agricultural concessions, many of which remain underutilized or unutilized, but the impact on the wider rangeland ecosystem may be significant, given that many of these are the best watered parts of the rangelands. As pointed out by Hatfield and Davies (2006, 24) "Pastoralism is a system, in which small pockets of rich resources render vast tracts of low-grade rangeland productive."

Establishment of commercial farms in the Awash Valley began in the 1960s, displacing pastoralists from their traditional dry season grazing lands. Between 1950 and 1970 alone, 52,000 hectares of land were taken out of the prime grazing areas and converted to agricultural lands by private and government firms (Harbeson, 1978, 481). After the military government came to power in 1974, it nationalized all commercial farms and managed them as state farms. The size of the state farms considerably expanded under the military government, increasing to 69,000 hectares in the late 1980s (Said, 1994).

Finding complete and up-to-date data on land concessions is difficult. Partial data on land concessions were provided by the Ethiopian Horticultural and Investment Agency (EHAIA) covering BG, Gambella, and SNNPR. According to EHAIA, these data represent most land concessions granted from 2015–2017. The data do not, however, appear to include earlier land concessions. For example, a previous analysis indicates that for the years 2004–2009 there were over 400 large land acquisitions covering nearly 1.2 M ha in Ethiopia (Deininger et al., 2011). To supplement this analysis, spatial data on large 'commercial' farms in Afar were generated that involved processing of high-resolution satellite imagery supplemented with information from open sources (DevSEED, 2018). When combining these sources of information, total land concessions appear to be over 1 M ha (Table 5.5). Gambella (438,000 ha) has the highest share of concessions representing nearly 15 percent of total lowland area (Map 5.8), covering a strip running north-south through the region (Map 5.8). This also covers large areas of BG (245,000 ha) and SNNPR (134,000 ha) representing 5.5 percent and 2.2 percent of their respective lowland areas. In the eastern lowlands, large commercial farms are primarily located along rivers and rely on irrigation. In Somali, the majority is located along the Shebelle River and along the Awash River in Afar. Details on commercial farming along the Awash River show much of this is located within 5–10 km of the Awash River (Map 5.9).

Table 5.5: Large farms and concessions by region

Region	Area (ha)	% of lowland area
Afar	84,889	0.90%
Amhara	16,998	0.42%
Benishangul-Gumuz	254,448	5.50%
Gambella	437,932	14.81%
Oromia	24,595	0.17%
SNNPR	134,369	2.20%
Somali	12,542	0.04%
Tigray	44,060	1.80%
Total	**1,009,833**	**1.36%**

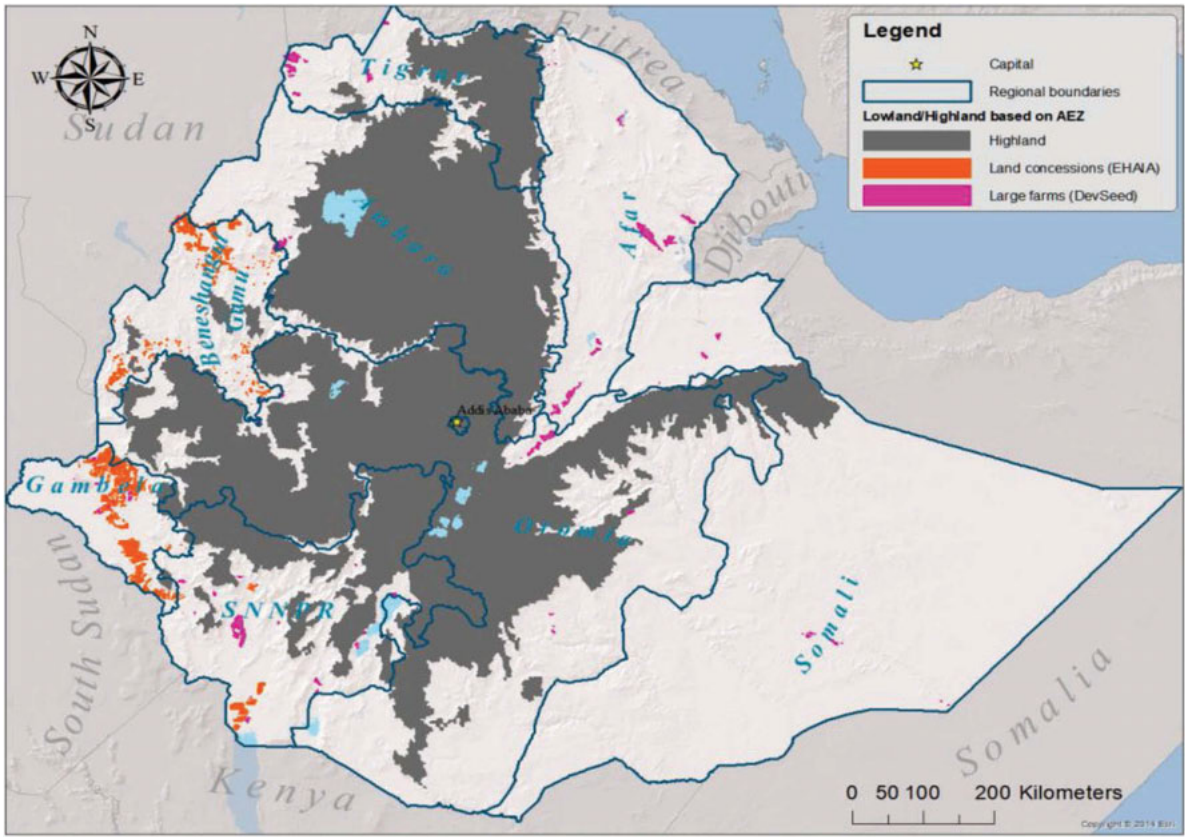
Source: WB calculations using information on land concessions from Ethiopian Horticulture and Agriculture Investment Agency (EHAIA) plus DevSeed. Area reflect areas identified as land concessions (from EHAIA data), DevSeed, or where these datasets overlap.

Developing the irrigation potential of the lowlands may be a national public good, but the tradeoffs in terms of increased vulnerability among lowland populations to shocks and longer term impacts on the environment and rangeland productivity need to be carefully assessed. Many concessions remain dormant, while others have proven extremely costly to develop and the benefits exaggerated (Heady, Tafesse and You, 2013).

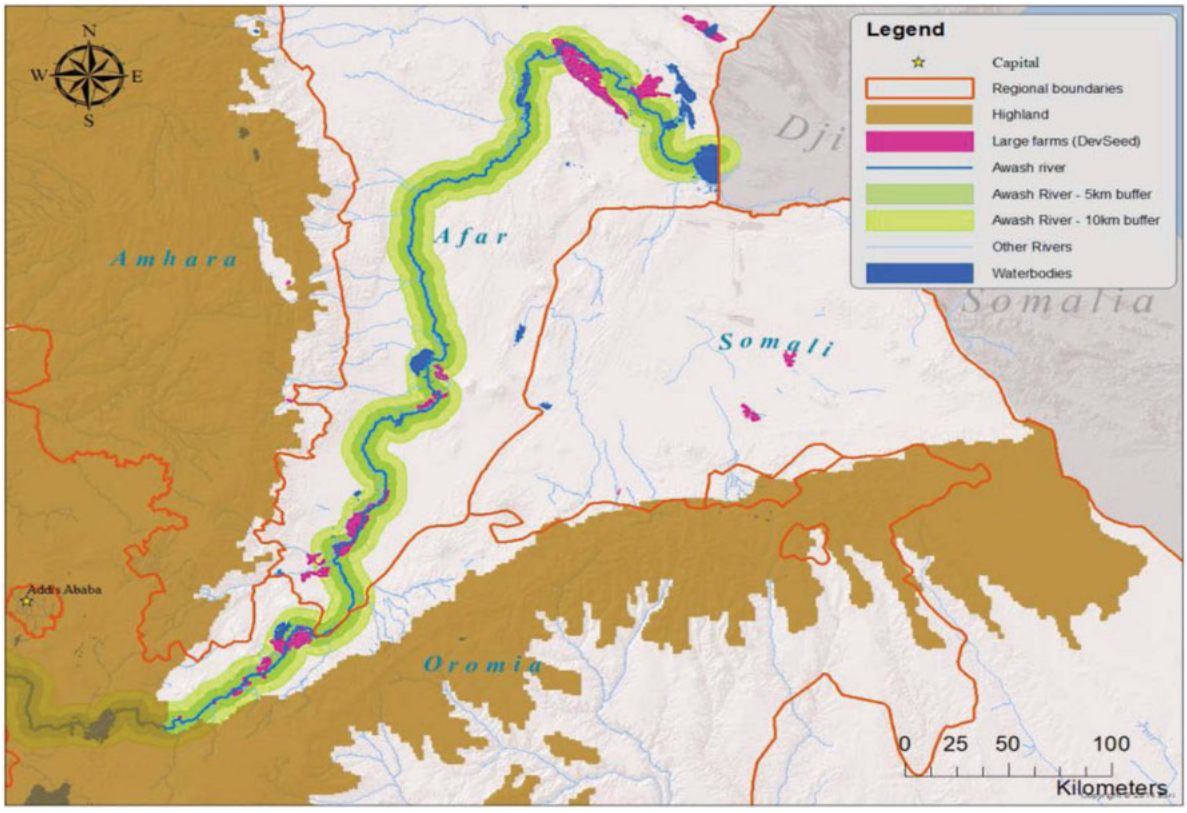
Introduction of permanent and semipermanent water points

The potential negative effects of introducing permanent water points in wet season grazing areas are well researched (Sandford, 1983). Lack of well-planned water interventions in rangeland areas have caused extensive land degradation in parts of Borana zone between Yavello and Arero and in parts of Somali region. While it is easy to characterize rangeland areas as lacking water, it is not water per se but water in relation to grazing which is key. Introducing large dams or *birkedas* or boreholes into normal wet season areas may open these areas to permanent occupation and overgrazing. This has already happened in the Haud in the Ogaden area of Somali region, where the extensive development of *birkedas* (large cement lined cisterns) over many decades, has led to permanent settlement and cropping in areas marginal to agriculture, and the same may be currently happening in areas of

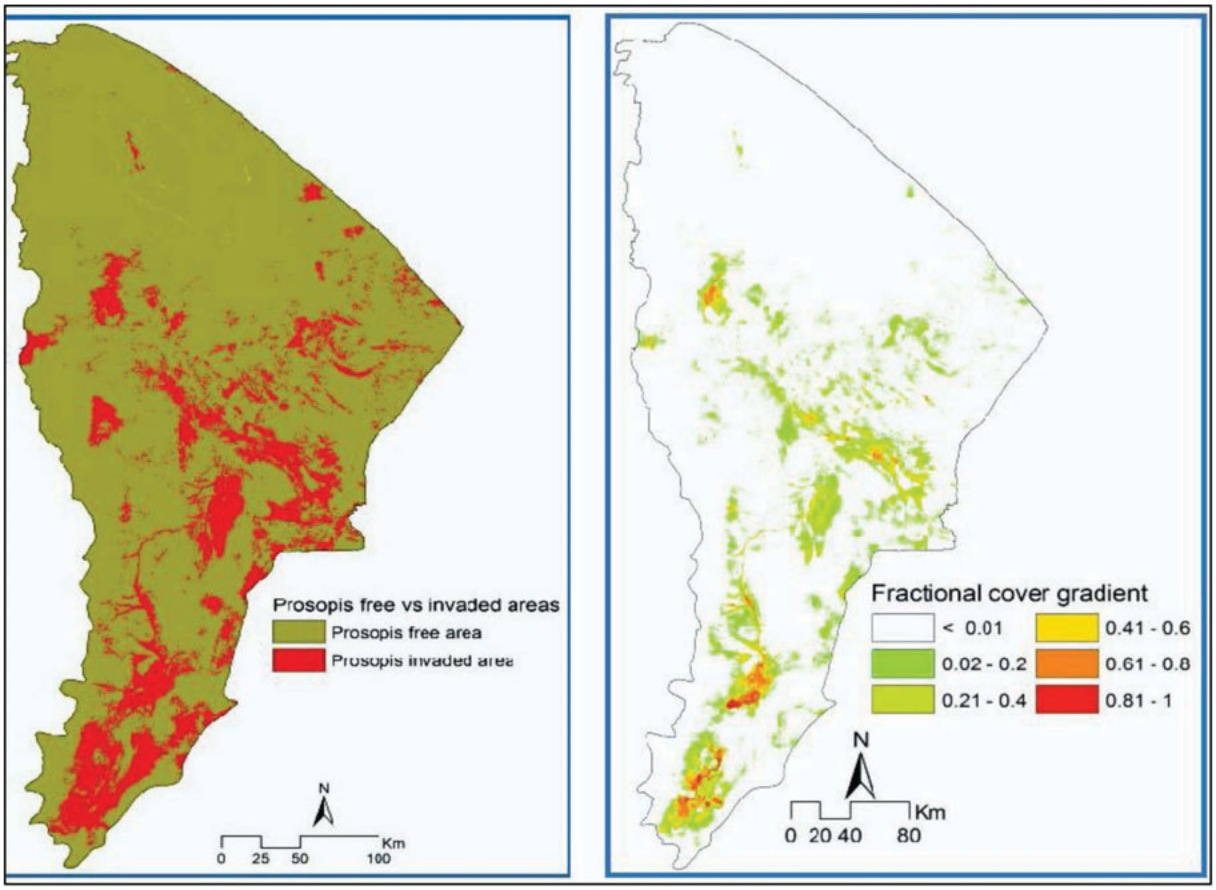
Map 5.8: Land concessions and large farms 2016–2017



Map 5.9: Afar—large farm detail 2016–2017



Map 5.10: Afar—*Prosopis juliflora* extent (left) and intensity (right) in 2016/17



Source: WLRC.

Table 5.6: *Prosopis* expansion in Afar 2000–2016/17

	2000		2016/17		% change 2000–2016/17	
	***Prosopis* present**	**High infestation**	***Prosopis* present**	**High infestation**	***Prosopis* present**	**High infestation**
Area (ha)	828,411	41,529	1,173,300	306,409	42%	638%
% of lowland area	8.8%	0.4%	12.4%	3.2%		

Source: WLRC.

humanitarian relief intervention where boreholes are drilled to support the settlement of IDPs.

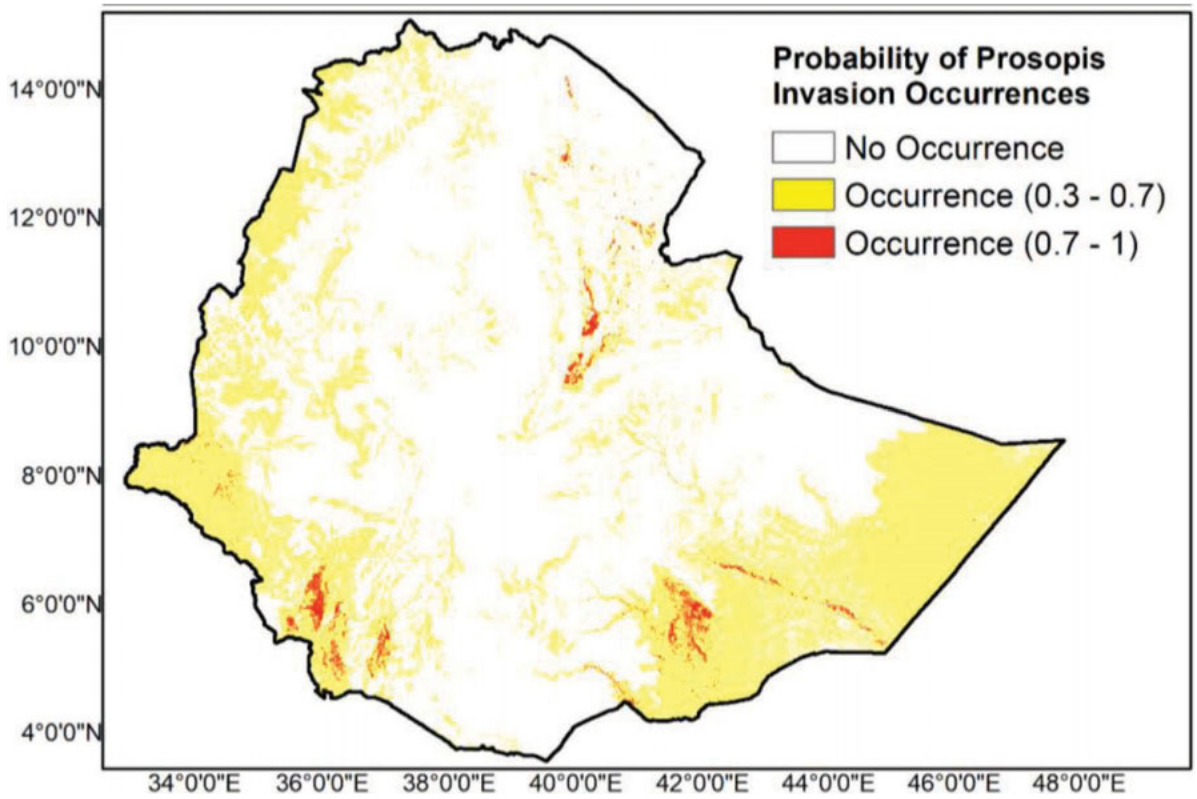
Bush encroachment

While the data show a positive greening in parts of the lowland, particularly for the 2010–17 period, this may be due to increased bush encroachment as result of grassland degradation, overgrazing, and lack of rangeland management techniques designed to manage bush, such as annual "burn-offs," which were banned under previous governments. This appears to be the case in many parts of Afar, Somali region, and Borana zone in Oromia.

The expansion of *Prosopis juliflora* in Afar, for instance, has increased at a rapid rate. Presence of *Prosopis juliflora* has increased by 42 percent between 2000 and 2016 and now covers nearly 1.2 M ha, while the portion of this characterized by heavy infestation (where 80 percent or more of the land is covered) is over 300,000 ha, an increase of over 600 percent from 2000 levels (see Map 5.10 and Table 5.6).

Prosopis juliflora was first introduced into Ethiopia in the late 1970s in Dire Dawa and was later planted over large areas including under the Food for Work Program from 1986 to 1988 for soil and

Map 5.11: *Prosopis juliflora* coverage 2016/17



Source: WLRC.

water conservation. One of the main invasive species in Ethiopia, *Prosopis juliflora* has been declared a noxious weed and has been aggressively invading pastoral areas, including in the Middle and Upper Awash Valley, and Eastern Harerge (Mwangi and Swallow, 2005).

To better understand the potential threat posed to agricultural and pastoral systems by *Prosopis juliflora*, we look at the incidence and expansion of this invasive species in Afar.[72] The results of this analysis are summarized in Table 5.6 with the spatial extent and intensities shown in Map 5.10. The results in Map 5.10 show the coverage of *Prosopis juliflora* based on whether its presence is detected (even at a small amount) and whether the grid cell is nearly covered (i.e., high infestation with 80 percent of area covered). In 2000 *Prosopis juliflora* was present in nearly 830,000 ha (8.8 percent of the lowland area). These results are higher than, but consistent with earlier reports that as much as 700,000 ha of land in Afar was invaded in the early 2000s (Tegegn, 2008). By 2016/17 the area with *Prosopis juliflora* present was nearly 1.2 M ha, increasing by an additional 345,000 ha, or a 42 percent increase, since 2000.

Nationwide, *Prosopis* poses a threat far and beyond just Afar (see Map 5.11). There are significant infestations of the bush in parts of SNNP and in Somali region as well.

Prosopis is not the only bush invading the rangelands. Coppock reports extensive bush encroachment by *Acacia drypanalobium* in the southern rangelands in Borana zone (Coppock, 1994). As the bush takes hold it is increasingly difficult to control, resulting in loss of access to large areas of grazing land. Pastoralists cope either by abandoning the area or by switching to herding camels and goats that can cope much better with the bush.

Conflict and displacement

Competition over water and grazing resources between pastoral groups and between pastoralists and farmers in the lowlands is long standing. This competition has been exacerbated in recent years by reduction in grazing areas as a result of population increase, land excision, localized enclosures, expansion of cropland, and permanent

[72] This analysis was undertaken by the Water and Land Resource Center (WLRC), Addis Ababa University.

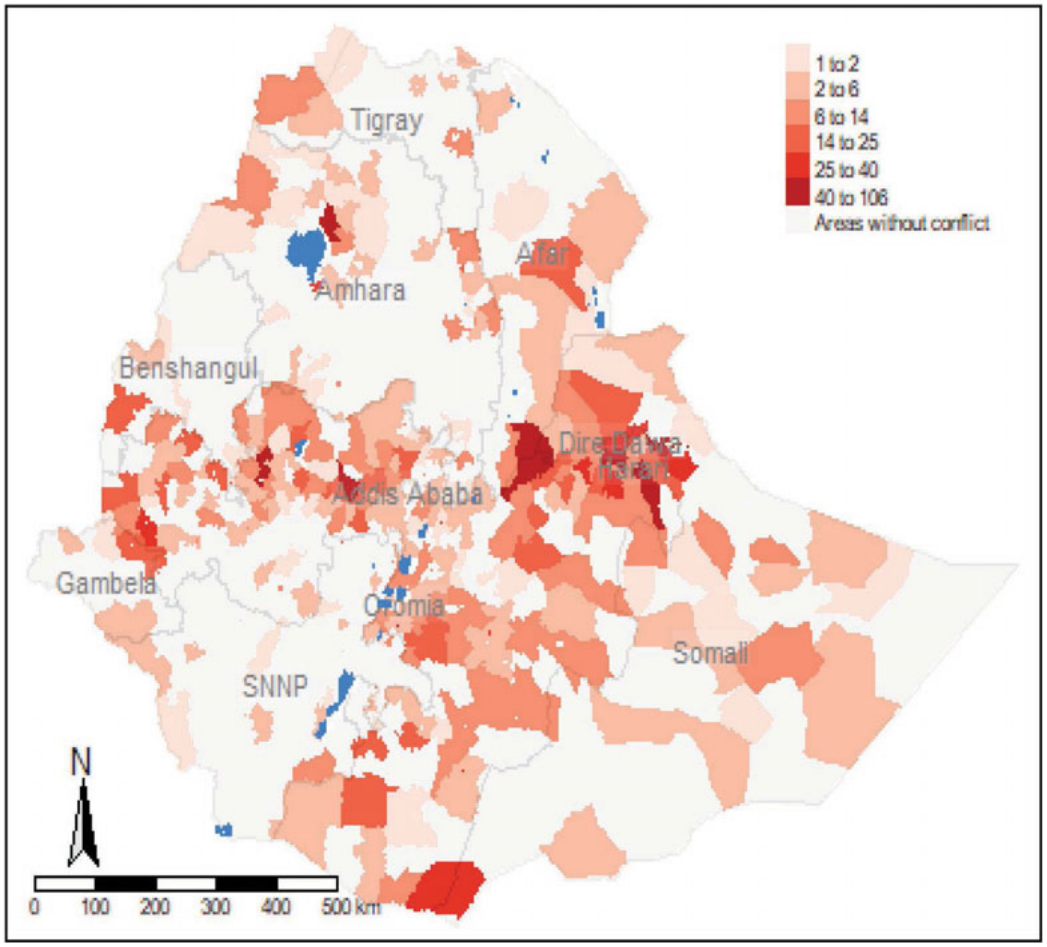
settlements. The 1995 Constitutions' recognition of regional borders based on ethnicity has also hardened what were once more fluid natural resource boundaries between different groups. As a result some groups have found they have lost access to traditional grazing and wells across regional-ethnic borders. Conflict is both a consequence and cause of land pressure, as in some areas it has created widespread human and livestock displacement, resulting in the abandonment of some areas, and increased pressure on other areas.

Land use change in the Afar basin since the 1960s has contributed to deteriorating Afar relations with their neighbors. The conversion into cropland of prime dry season grazing areas has restricted pastoralists' customary access to riverine resources. Therefore, "Many Afar clans have been forced to move their livestock further into the highlands where they have come into conflict with crop cultivators" (Rahmato, 2007, 5). The Afar most commonly come into conflict with the Issa Somali to the east, Karayyu Oromos to the south, and the Wajirat highlanders in the Tigray Region of northern Ethiopia (Kelemework, 2013). The major reasons for the recurrent conflicts between the Afar and Issa Somali is competition over scarce pastoral resources that has been exacerbated by what Afar considered the unfair absorption of some of their traditional grazing areas into the Somali region. This conflict affected the customary system of rangeland management along the border between these two groups (Oba, 2009, 41).

Human Rights Report (2015, 2) indicated that "the drivers of the conflict in the South Omo zone include economic marginalization of local communities, loss of traditional grazing lands to large-scale, government-financed sugar plantations, and restrictions on hunting."

In the Borana pastoral area, even though low-scale conflict has existed for many years between Boran and Somali over rangeland use, it has intensified in recent years following the rezoning of the border between Oromia and Somali region after the 2003 referendum, which transferred a part of the Borana traditional grazing areas and deep wells to the south of Wachile to the Somali Region. These

Map 5.12: Frequency of conflict events per *woreda*, 2015–2018



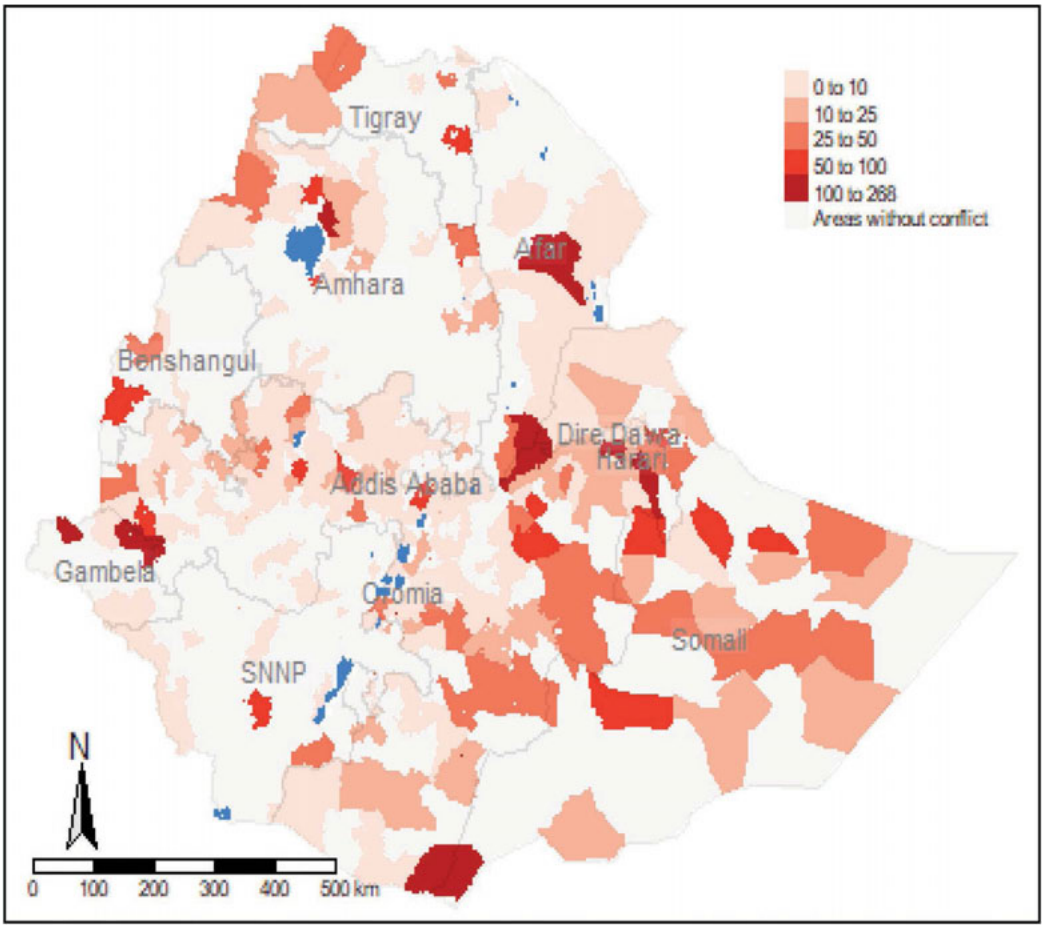
long-standing land claims culminated in the recent large-scale conflict in 2017/18 between the Borana and Somali in the Moyale area.

In 2015/16 ethnic violence escalated in many parts of Ethiopia, together with violent protests against the EPRDF government (ICG, 2009). Much of this violence was allegedly stoked by political actors but fed off of underlying and long-standing grievances. Tensions between Somalis and Oromos along their joint border exploded into open conflict in 2016–17. Maps 5.12, 5.13, and 5.14 show the incidence, fatalities, and displacement caused by recent conflict outbreaks between 2015–2018 in Ethiopia according to data collected by ACLED and UN-OCHA. The scale of the interethnic conflict has been large, resulting in the displacement of over a million Ethiopians. While not confined to lowland areas, many of the conflict incidents are in lowland areas along the border between Somali and Oromia regions.

The overall effect of these conflicts has been to create a humanitarian crisis in some areas with large numbers of IDPs crowded into camps and dependent on external food relief. In other areas, social services have been disrupted as teachers and health staff have abandoned schools and clinics. Table 5.7 shows the number of IDPs by cause of displacement. Conflict is the overwhelming reason given for displacement, with the majority of IDPs in Oromia (85 percent), Somali region (65 percent), and Gambella (85 percent) citing conflict as the main reason for displacement (see Table 5.8 for percentages by cause)

While the government is keen for IDPs to return to their areas of origin, many are reluctant to do so as long as the underlying causes of the conflict remain. These conflicts may create long-term environmental and economic damage in border areas, creating "no go" areas between ethnic groups and sharpening already acute interethnic differences.

Map 5.13: Number of deaths from conflict events per *woreda*, 2015–2018



Map 5.14: Internal displacement in the lowlands as result of conflict and extreme climate events (drought and floods) 2016–2018 (WB based on data from IOM)

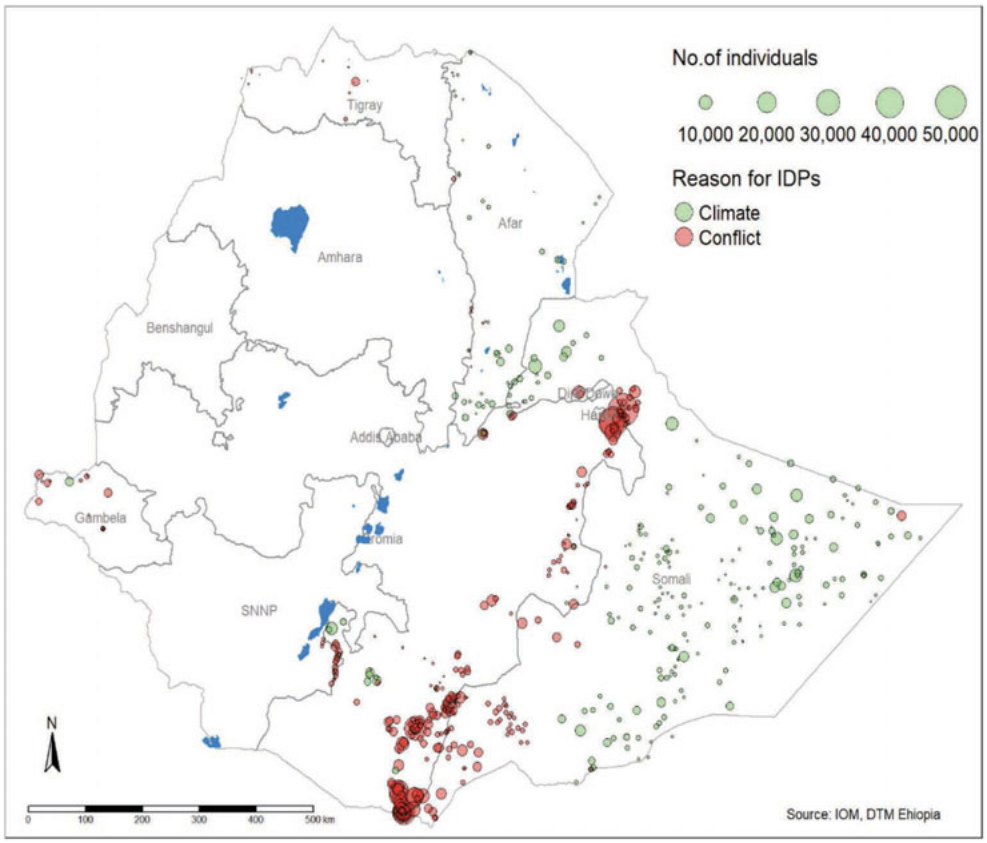


Table 5.7: Total number of IDPs by cause and region

	Tigray	Afar	Oromia	Somali	Gambella	Dire Dawa	Total IDPs by cause
Conflict	7,062	3,417	325,533	658,582	20,943	11,245	**1,026,782**
Climate		42,115	32,681	347,694	3,746		**426,236**
Other		5,087	22,591				**27,678**
Total IDPs by region	**7,062**	**50,619**	**380,805**	**1,006,276**	**24,689**	**11,245**	**1,480,696**

Table 5.8: Percent of IDPs by cause and region

	Tigray	Afar	Oromia	Somali	Gambella	Dire Dawa
Conflict	100	6.75	85.49	65.45	84.83	100
Climate		83.2	8.58	34.55	15.17	
Other		10.05	5.93			
	100	**100**	**100**	**100**	**100**	**100**

Chapter 6: Regional Governance

Summary

This chapter highlights some key political economic risks in the lowlands. Vulnerability in the lowlands is not only a function of low human capital and a highly variable climate but also of the long history of political and economic marginalization of the area. Historically, the lowlands have existed on the margins of the Ethiopian state. The 1995 Constitution sought to redress the marginalization of these areas by conferring special status on the regions of Afar, Somali, Benishangul-Gumuz, and Gambella. Despite this recognition, and the benefits it has brought, weak governance and accountability has continued to limit the development of the area. Opening the space to greater accountability and dialogue, combined with a deeper understanding of the vulnerabilities of its inhabitants, will be key to addressing this marginalization.

Introduction

Ethiopia's lowland regions were formally incorporated into the Ethiopian state in the late nineteenth century. Three regimes—imperial, socialist, and federal—have imposed their own cultural, political, and economic governance arrangements on the lowlands (Markakis, 2013). Although federalism has led to greater government access for groups previously excluded (Vaughan and Tromvoll, 2003), decision making has remained largely centralized. The lowlands are heavily dependent on the federal government for their public finances, including humanitarian assistance. In more ethnically diverse western Ethiopia, the regional states of Gambella and Benishangul-Gumuz continue to be defined by contestation over ethnic 'ownership' of land and resources.

Markakis[73] termed the phrase 'lowland periphery' to describe the southernmost regions of Oromia and SNNPR, along with the so-called 'Developing Regional States (DRS)' of Gambella, Benishangul-Gumuz, Afar, and Somali regions—effectively highlighting their difference from the highland core (Tigray, Amhara) and the highland periphery (Oromia, northern SNNPR). The lowland periphery refers to land and people spread across a large proportion of Ethiopia's borderlands. Largely pastoralists and agropastoralists, to the east and north (Somali Regional State and Afar) they are overwhelmingly Muslim and less diverse in terms of language and ethnicity than in the south and west (Borana in Oromia, South Omo, Bench Maji in SNNPR, Gambella, and Beneshangul-Gumuz). These lowland areas were formally incorporated into the Ethiopian state in the late nineteenth century after the conquests of Emperor Menelik.

During the *Derg* regime all land was nationalized. People could hold usufruct but not ownership rights. Under the 1995 Ethiopian constitution, land administration was devolved to the regional governments.[74] The constitution introduced the Ethiopian Peoples' Revolutionary Democratic Front (EPRDF) coalition of ethnically defined parties running ethnically demarcated regional governments and operating in their own languages. Ethiopian federalism encouraged political parties to organize along ethnic lines and championed an ethnicized

[73] Markakis, Ethiopia: The Last Two Frontiers, 2013.
[74] Ibid.

federal state.[75] It has also allowed the federal government to follow a path of political expediency over time (Van Der Beken, 2017).[76]

Regional Governance

Administrative decentralization has taken place across the country with the architecture of the state now reaching the remotest areas. Each region has its own elected regional government charged with overseeing a structure of zones, districts (*woredas*), and wards (*kebeles*). The process of devolution took place in two phases. Initially in 1995 the bulk of public service provisions were devolved to the subregional units. In 2002 substantial authority was devolved to the *woreda* administrations in the form of subsidiarity. The constitutional principle of subsidiarity informs the division of responsibility between different levels of government; each regional unit provides public services at its level as well as implementing social and economic policies and law and order. The federal government maintains all powers that were not delegated to the regional level, as well as shared responsibilities.

Public expenditure in the regions is based on federal transfers combined with local revenue collection (see Chapter 7). The decentralization of public sector governance in Ethiopia has been extensive, and regional governments have the discretion to prioritize where to spend their funding allocations. Yet, administrative and budgetary decentralization has been insufficient to substantially make up for the low capacity of the public sector in lowland regions.

Politics of Regional Governance

Ethiopia's model of local governance is interventionist; it has been designed and implemented from the center to effect change in the regions (Vaughan, 2017). In many areas this change has been rapid and profound,[77] with interventions designed to transform socioeconomic, education, health, and cultural norms. But, in the lowland periphery—the impact of this system has been mixed.[78] Top-down decision-making has led to challenges around accountability in many regions. Ethnic parties affiliated to the federal government formally govern the developing regional states, but these parties are not part of the ruling federal coalition. In some regions disagreements between regional officials and federal officials have developed over the level and nature of federal intervention in their respective regions.

Lowland Contexts

Lowland regions, including southern areas of SNNPR and Oromia, share several similarities as well as important differences. These similarities include:

- *Federal patronage defines federal to regional government relations.* Although regional autonomy in Ethiopia is grounded in the federal constitution, it is also subject to the federal economic, social, and development framework. In addition, the limitations on political space, which have led to a dominant one-party system at the center, restrict opposition, debate, and participation at regional levels. Regional governments in the lowland periphery are affiliated with the ruling party and subject to its centralized policy making.
- *Customary governance.* Various forms of customary governance systems endure across the lowlands of Ethiopia. In pastoralist areas these customary systems operate alongside government, and claims from people—for relief, justice, and services—are often made and heard within both systems. Practically, this requires engagement with two forms of governance for many of the people of the lowlands. With time and as the reach of government has increased, hybrid forms have developed that unite systems and bring together clan and state leadership, for example, the Borana and Guji elect tribal leaders to the *kebele* council or as cabinet members to intentionally bring together the clan and state.[79] In some cases, hybridization has been used to undermine the informal structures of governance in favor of strengthening the state.
- *Long-standing, unresolved conflict dynamics.* All the developing states have a legacy of separatist movements that fought the state for the liberation of material and human resources. Added to these (now mainly defunct, but not extinguished) liberation struggles are multiple conflicts. Federal

[75] Habte, Ethnic Federalism in Ethiopia: Background, Present Conditions and Future Prospects, 2003.
[76] Van Der Beken, The Challenge of Reform within Ethiopia's Constitutional Order, 2018.
[77] Pankhurst, (Ed), Change and Transformation in Twenty Rural Communities in Ethiopia, 2017.
[78] Vaughan, Revolutionary democracy as an uncompromising political strategy: Revolutionary democratic state-building: party, state and people in the EPRDF's Ethiopia, 2012.
[79] Brocklesby et al., 2010, IDS working papers.

forces regularly intervene to manage these, but few have been conclusively resolved. At the root of many of these conflicts are political power and representation, resource scarcity, and competition over land and water, as well as the preservation of ethnic or tribal identity. Conflicts operate between groups, within groups, between perceived outsiders and indigenes, between highlanders and lowlanders, and between the state and the people (Feyissa, 2010). Conflicts have also been carried across the long and porous borders. Weapons are common. Herders have traditionally carried small arms, but proximity to violent conflicts in the region has also made weapons readily available. It is not unusual for a localized incident to rapidly escalate into violence. And, mechanisms for either restorative or retributive justice are often not available or are inadequate.

- *Large and growing concentration of refugees.* Benishangul-Gumuz, Gambella, and the Somali region—three out of the four developing regions—are major refugee hosting areas. Given the proximity of international borders, and the fact that ethnic groups may straddle both sides of the border, the distinction between host[80] and refugees is complicated. The definitions 'host' and 'refugee' are often fluid and can merge, with family groups adopting one or other identity based on calculations of self-interest.[81] The implication is that a formal encampment policy is often not enforced, with people moving in and out of camps and engaging in informal economic activity. This situation has heightened tensions in some areas between groups along multiple lines (inter-clan, intra-clan, highland-lowland, cross-border, and state-clan), including driving greater resource competition in some areas. The influx of refugees has also led to an increase in international funding, which has contributed to growth in some local economies. Gambella town, for instance, has gone through a relative 'boom' period.
- *Limited implementation capacity.* All lowland regions and zones suffer from limited capacity to implement projects. In Somali and Afar regions the federal government provides direct implementation support. This lack of capacity is a major constraint to raising revenues and to the delivery of social services.
- *Limited formal economic opportunities.* Despite large investments in rural roads by regional governments, many lowland areas remain difficult to reach, especially to the southeast. The very remoteness of these areas creates difficulties for pastoralists who choose to or have no option but to transition away from pastoralism. The absence of nearby urban centers severely limits economic opportunities and has encouraged informal migration out of Ethiopia. Even in areas reasonably close to urban settings, research has shown a marked difference between jobs that young people are prepared to do in another country compared with those they are willing to take close by in their own communities. In Sitti zone, of Somali region, peer pressure appears to prevent young people from taking menial jobs under the potential scrutiny of their peers and contributes to migration to Djibouti to undertake similar work illegally (Gray, 2016).[82] Illicit trade in contraband over the borders, including in *Chat*, livestock, and electronics, has also grown, adding to the informal economy. The result has been economic disempowerment from the formal Ethiopian economy and reliance on informal economic opportunities. Lowlanders, especially those from subsistence backgrounds, have found it difficult to access capital and in general have not been able to compete with highlanders in the Ethiopian economy (see Feyissa, 2013).

While lowland pastoralist societies share similar traits, there are also distinct variations across the region. The pastoralist belt stretching through Afar, Somali region, and southern Oromia have more in common given shared livelihoods and the relative lack of ethnic and religious diversity in these areas. Southern SNNPR, Gambella, and Benishangul-Gumuz are considerably more ethnically diverse and more varied in terms of livelihoods, customs and traditions. As a result, their forms of governance vary, as do their customs, traditions, and levels of integration into the dominant highland Ethiopian political and economic system.

Somali Regional State

Somali Regional State (SRS) covers a large part of Ethiopia's low-lying eastern plateau, internally bordering Afar and Oromia and sharing international borders with Djibouti, Somalia, and Kenya.

[80] UNHCR defines 'host' as communities in a 20 km radius of refugee camps.

[81] DFID assessment of conflict risks in Gambella, 2017.

[82] Save the Children International Briefing Note on Migration for Employment. David Gray, 2016.

Its population is overwhelmingly Somali speaking, a language shared with the peoples of its adjacent international borderlands with who Ethiopian Somalis share close clan ties. A 2007 census estimated the Somali regional population at over 4.3 million; in 2018 it was projected to be approximately 5.5 million, making Somalis the third largest ethnic group in Ethiopia. The population constitutes about 6 percent of the total Ethiopian population.

Despite historically low levels of development, over the last five years, the Somali region has seen considerable improvements. The pace of increase in regional expenditure over the past ten years has been about 33 percent annually. International development funding has also increased in the last few years. Yet, a succession of droughts has led to an increase in humanitarian need. There is a large internally displaced population. Dependence on government welfare has increased. Ethnic conflict has flared, and the regional president was recently removed by the federal government.

The political settlement in this region has been closely tied to the national political context. Somali region was unique in the lowlands in forging a relatively autonomous relationship with the state that transcended the more normal expectations of federal-regional relations. Here, the political settlement was based on a combination of heavily securitized governance, supported by the Ethiopian National Defense Forces (ENDF), and a highly personalized, president-led style of regional governance. Abdi "Iley" Mohamoud Omar, deposed as president in 2018, was extremely effective at seizing opportunities to consolidate his powers in the region, first as head of regional security and then as the regional president. He presided over a regional executive that was unusually resilient and able to wield an unprecedented level of autonomy from the center. This resilience was partially due to the president's ties with the ENDF, earned through the impact of the long-standing campaign against the Ogaden National Liberation Front (ONLF). The liberation struggle led the federal government to replace federal security units in Somali region with the Liyu (special) police in 2007. Recruited from local Somali communities, the Liyu police maintained close ties with the ENDF despite nominally falling under the authority of the regional president.

Having gained control of the insurgency in the region, Abdi Iley was able to change the usual patron-client relationship between the regional and the federal government. He also demonstrated equally adept handling of the clan politics within his region. In 2016 the regional government increased the number of *woredas* from 68 to 102 and the number of zones from 9 to 11. Funding disbursed to these *woredas* was used to reward clans and allies that had stayed loyal to the president.[83]

Presidential power largely dictated how Ethiopian Somalis in the region participated in the system of governance. Daily processes of bargaining to get things done, access to services or welfare, or engagement in the regional economy were all determined by the degree of influence or marginality of a clan group to the president. Under Abdi Iley there were a set of winners and losers, with some pastoralist groups consolidating and increasing their wealth and influence. Others, who were either marginal or made marginal due to the president's network saw their vulnerability increase. Political-economic factors were important in directing humanitarian relief, both between different areas of the region and in the overall volume of assistance the region received, which in 2016 and 2017 reached over 50 percent of the population (see Chapter 8).

Afar national regional state

Afar covers the northeastern part of Ethiopia. The northern part of the region is largely desert scrubland with shallow, salty lakes and a long chain of volcanoes. The Awash River valley forms the southern part. The region is characterized by an arid and semiarid climate with low and erratic rainfall and has frequently been affected by drought. The majority of Afar people live in the region, but there are significant minorities in neighboring Eritrea and Djibouti. Afar is the principle language of the region and Islam (Sunni) the principle religion.

The region has 32 *woredas* that receive block grants to provide services to their respective communities. The population of Afar constitutes about 2 percent of the country's population; Afar's share of block grant transfers from the federal government has remained around 3 percent over the past decade. As in Somali region implementation capacity in the region is very weak, necessitating reliance on federal institutions. Economic sectors (including agriculture and water) and social sectors received a large proportion of total regional expenditures, though in comparison with other regions investment in economic sectors is higher than in social services. In keeping with the federalist system, Afar

[83] Conciliation Resources Political Unsettlement and the Somali Regional State of Ethiopia, 2017.

is formally governed by the Afar National Democratic Party (ANDP), an affiliate of the EPRDF. Customary governance systems also coexist with formal governance in the region. Decision-making power regarding land and other natural resources rests with the clan council, which consists of clan leaders, elders, the *feima*,[84] and local wise men. Resource users are divided into two categories, primary right holders, those who have the right to use the resources on the rangelands but also to exclude others and transfer rights to their heirs, and secondary right holders. This second tier consists of groups of neighboring pastoralists whose demands for pastoral resources go beyond their own endowments, particularly during drought years.[85] The interests of pastoralists in Afar and the federal government have often been in opposition. Major flash points have been the use of land and provision of services, particularly in the riverine areas and in connection with the development of the sugar industry.

Along the regional border with Somali region there have been frequent clashes between Afar and Issa Somali pastoralists. Many Afar lay historical claim to grazing lands which are now incorporated within Somali regional state.

Gambella and Benishangul-Gumuz regional states

The Benishangul-Gumuz and Gambella regions have a history of marginality that has been reinforced by recent politics. For many titular groups in the western lowlands, the perception that the centralized state expropriates indigenous land in a quest for economic growth is fairly widespread today.

Due to their location at the border with the Sudan and South Sudan, the two regions have long been exposed to refugees fleeing the fighting across the border. Gambella, for example, has provided shelter for Sudanese refugees since the 1960s. At present, the number of Sudanese refugees almost equals the total population of Gambella. The presence of such a large number of refugees, many of whom are Nuer, is a source of growing concern to Anywaa who fear being outnumbered in their own territory (Ohta and Gebre Yintiso 2005). Jobs are largely being taken by experts from the highland, leaving little opportunities for the indigenous population. Like in Benishangul-Gumuz the wider economic developments seem to favor the highland population; contractors are mostly recruited from the non-titular population, and the secondary industry, restaurants and hotels, are also staffed by nonindigenous groups.

Patterns of segregation in terms of occupation and living spaces can be observed between the two groups in the emerging regions. The titular groups are often mostly active in the political sphere in the administration, but otherwise pursue traditional rural activities. Investment and businesses are largely run by the non-titular groups. Shops, businesses, and major market activities are often in the hands of nonindigenous groups. Since the banking sector is also often staffed with *foreigners* (read non-titular) who keep alliance with their fellow migrants, the indigenous often find accumulation of credit and capital to start their businesses difficult. Competition is uneven as highlanders have better access to credit and are often attached to wealthier communities in the highlands.

With a tradition of north-south migration and large-scale resettlement of highland populations, the regions have become the home of migrant workers, investors, and other business people. The changes to livelihoods as a result of villagization, and the removal of forest land for hunting and honey farming, have affected local livelihoods. Casual labor on investment farms has attracted more settlers and migrants to the regions, and not necessarily benefited the local population. Low levels of human capital among local populations have also contributed to limited access to the benefits of growth and increased risk of marginalization in political processes. In addition, unlike in the drought-prone lowlands, there is no safety net program in the form of PSNP to support the chronically poor.

The current situation in Benishangul-Gumuz and Gambella is volatile, with tensions prevailing between the Nuer and Anywaa. In summary, the western lowlands are prone to multiple factors that impede their economic development. At the core is a contestation between local, regional, and federal actors over the abundant natural resources of the area, and a fear among indigenous groups of their further marginalization.

Southern SNNPR and Oromia

Both Oromia and SNNPR have southern areas that share similarities with the developing regions. In both regions these borderlands are home to

[84] *Feima* is a rule-enforcing authority in Afar traditional administration. It consists of a principal leader (*feima-abba*), a deputy leader (*erenna-abba*), and ordinary members.

[85] Cloudburst Group, USAID, 2017. Land use rights, land governance institutions and tenure security indicators in pastoral community: evidence from a baseline study in the Afar region, Ethiopia.

nomadic herders who belong to an array of different ethnic groups. Like the developing regions, they are defined by their proximity to international borders, as well as their relationship to those peoples who live across the border. In Oromia the main pastoralist area is Borena and Guji zones. In SNNPR a variety of peoples inhabit the southern Omo valley and Bench Maji areas with distinct customs and traditions. Given the level of ethnic fragmentation along the Omo with a variety of small agropastoralist groups, these groups have lacked political voice when it has come to protecting their natural resources from state encroachment. As result the land on which they live has often been categorized as unproductive or underutilized by government officials seeking to make way for large sugar plantations or other large-scale investments in the Lower Omo River valley.

SNNP region is composed of 14 zonal administrations and about 135 *woredas* including 5 special *woredas*, which are similar to autonomous areas. The zonal administrations in SNNP have greater administrative authority compared to similar administrations in other regions, which tend to carry out a coordination role. Pastoralists are grouped into three areas: South Omo, Bench Maji, and Kaffa, which account for about 14 percent of the regional population. Like the practice in the other regions, the SNNP regional government allocates budgetary resources to the zonal administrations and the *woredas* under these zones in the form of block grants. Over the past five years, allocation to the pastoral zones in SNNP accounted for about 15 percent of the total block grants allocated by the region to zonal administrations and *woredas*. The share of administrative and general services expenditures in the pastoral zones was higher than the regional average. However, allocation to agriculture and water resource development followed a largely similar trend with the regional average.

Oromia region is the largest regional state in Ethiopia, both in terms of land and population. It is divided into 20 administrative zones, 2 of which have been added over the last two years. Of the 20 zones, 5 are predominantly pastoral and/or agropastoral: Borena, Bale, Guji, East Hararghe, and West Hararghe. The combined population in these zones accounts for about 30 percent of the total population in the region. Similarly, the proportion of the block grants resources allocated to the pastoral zones in Oromia over the past seven years was around 30 percent of the total block grants allocation.

Much of the recent tension between regional states in the lowlands has occurred between Somali and Oromia. In Borana zone, Boran pastoralists lay historical claim to wells and grazing within Somali region. This has frequently resulted in clashes between Somali and Boran pastoralists in the area.

Conclusions

Ethiopia's federal system has enabled the federal government to move forward from a legacy of war, famine, and poverty. Interventionist policies have in many cases brought rapid, far reaching, and positive social and economic changes to Ethiopians. Yet, uniting the country under common economic policies and a centrist, one-party system has come at a cost. The difficulties that have developed in recent times at the national political level are reflected at regional levels. Ethnic federalism has brought greater autonomy and self-governance, and ultimately has delivered a higher level of services to all regions. But state penetration in the lowlands has remained top-down and is perceived by many lowlanders to be driven by the priorities and needs of the highland majority.

What is perhaps more telling is the fragility of the gains that have been made to date. There appear to be huge pent-up demands for approved accountability and voice among lowland communities who feel that their economic interests have often been overlooked. Ultimately, governance in the lowland regions has not always protected the interests of lowland peoples. State development strategies, including villagization and land appropriation which turns pasture or cropping land into commercial farms, have not always produced their intended results, and have often come at a high cost. In many areas these approaches have further marginalized lowland peoples, while also increasing tensions between different ethnic groups, as well as between highlanders and lowlanders.

As a follow-up to the diagnostic analysis carried out so far, the next part of the report focuses on the role of public policy through the intergovernmental fiscal transfer system, and the coordination of the safety net system working with humanitarian interventions, in supporting the promotion of resilience and development in the lowlands.

Part 2: Promoting Resilience and Development in the Lowlands

Chapter 7: The Role of Public Finances

Summary

This chapter explores the role of intergovernmental fiscal transfers in supporting the lowlands. The lowland regions have less capacity to raise their own revenues and depend more on block grants from the center than the other regions. In terms of intergovernmental fiscal transfers from the federal government, the lowlands have done well compared to highland regions. But significant regional differences exist in terms of expenditure priorities. In general, the Somali and Afar regions have spent per capita much less on human development (education and health) than Gambella and Benishangul-Gumuz. None of the SDG capital grants in Somali and Afar regions, for example, have been spent on education and health.

In the future, consideration should be given to more closely aligning the provision of block grants to need and the costs of service delivery, rather than population size, and earmarking funds for human development as a key national priority.

Introduction

In terms of intergovernmental fiscal transfers from the federal government, they have done well and compare favorably with highland regions. This section analyzes trends in public expenditures in the lowland regions. The analysis looks at both the sources and uses of budgetary resources in lowland regions and zones in comparison with the highlands.

Sources of Funds

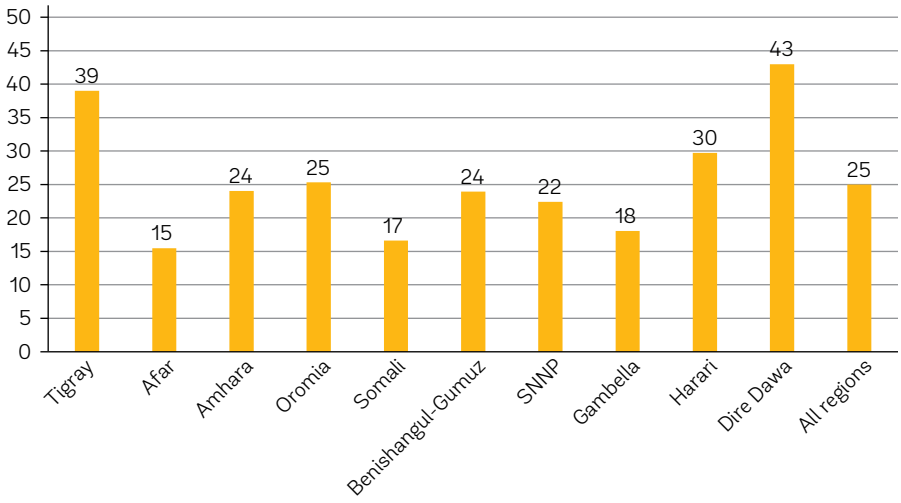
For the regional governments in Ethiopia's federal system, there are essentially two major sources of budgetary resources. The first important source is fiscal transfers from the federal government, while the second one is own revenue collection by the regions.

Own revenue collection

The revenue assignments between the federal government and the regional governments in Ethiopia's federal structure are stipulated in Ethiopia's Constitution. The most lucrative sources of revenue, including customs taxes and duties, domestic indirect taxes, and business profit taxes on medium- and large-scale businesses, are assigned to the federal government. On the other hand, regional governments can collect taxes and fees from employment income, agriculture and land use, and profits of small businesses. The Constitution also stipulates revenue sharing mechanisms for some of the revenue sources between the federal government and the regional governments.

As the federal government controls the bulk of the revenue sources, the regional governments largely rely on transfers from the federal government to carry out their expenditure assignments. The extent to which own revenue collection contributes to total budget shows significant variations across the regions. Between FY12–18 the average contribution of own revenue collection to total budget in all regions (excluding Addis Ababa) was around 25 percent, implying that the regions relied on the federal government to cover about 75 percent of their budgets (see Figure 7.1). The Dire Dawa City Administration had the largest share of own revenue to total budget during the period, while the other predominantly urban regional state, Harari, also had one of the largest shares at 30 percent.

Figure 7.1: Percent of own revenue to total budget, FY12–18



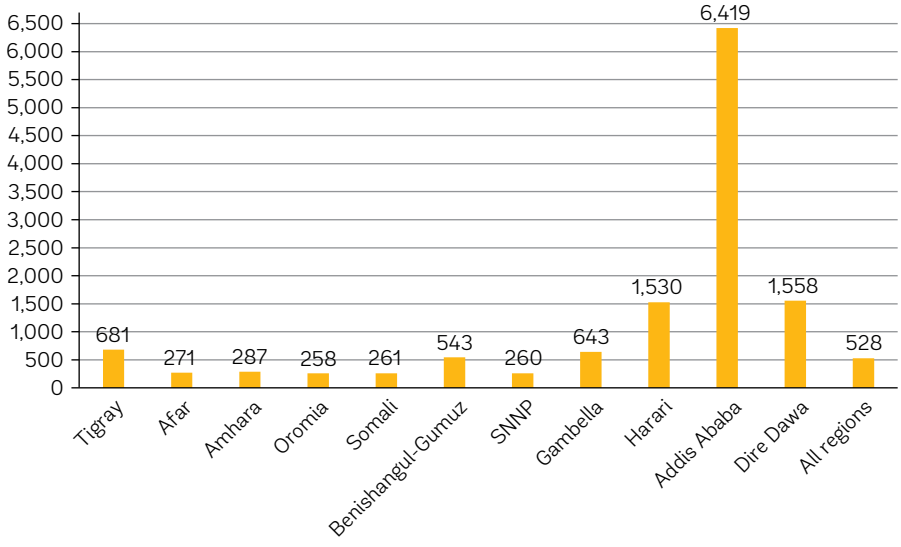
Source: MoFEC.

This shows the significant association between the level of urbanization and the amount of revenue that can be mobilized by the regions. Tigray is an exception in this regard as the regional government managed to mobilize revenue which was much larger than the regional average.

In the lowland regions of Afar, Somali, Benishangul-Gumuz, and Gambella, the contribution of own revenue to total regional budget during the period was much lower than the regional average. Afar had the least contribution from own revenue sources of all the regions, while Benishangul-Gumuz had a share close to the regional average and higher than some of the larger regions (e.g., SNNP).

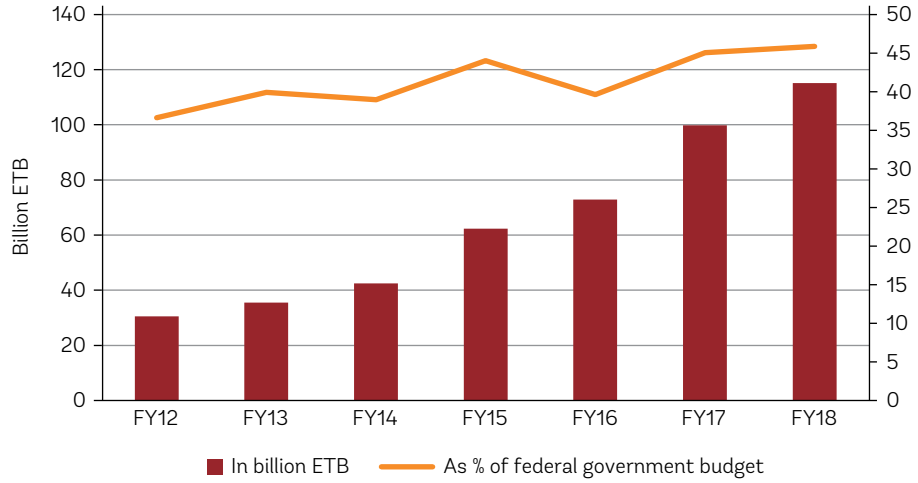
Revenue collection in per capita terms varied significantly between the regions (Figure 7.2). Addis Ababa is an outlier with a per capita own revenue collection which is higher than the regional average by more than ten-fold. The two predominantly urban regions (Dire Dawa and Harari) also had per capita revenue collections that are significantly higher than the other regions. The larger regions including Oromia, Amhara, and SNNP (which are considered to have much better public administration and service delivery capacity) had per capita revenue collections that were significantly lower than the regional average. The dominance of small-scale agricultural activities (which have relatively low revenue raising potential) could be one possible

Figure 7.2: Per capita own revenue collection in ETB, FY12–18



Source: MoFEC and CSA.

Figure 7.3: Federal block grant allocation to regional governments



Source: MoFEC.

explanation for this very low level of revenue collection in these larger regions. Again, Tigray is an exception to this as well, as it had a per capita revenue collection that was significantly higher than the regional average. Afar and Somali had a per capita revenue collection significantly below the regional average, while in Gambella and Benishangul-Gumuz it was slightly higher than the regional average.

Fiscal transfers from federal government

a) Block grant transfers

Under Ethiopia's federal system, allocation of grants by the federal government to regional governments is a constitutional requirement. Accordingly, the federal government has been transferring resources to regional governments since 1995, based on annually approved allocations. The transfers are provided to regional governments as "block grants," implying that the regions have discretion on the sectoral allocation of the resource. The distribution of the grants among the regions is governed by a block grant allocation formula. The House of Peoples Representatives approves the formula behind the block grant allocations. Once the formula is approved, it remains in effect for about five fiscal years before being revised.

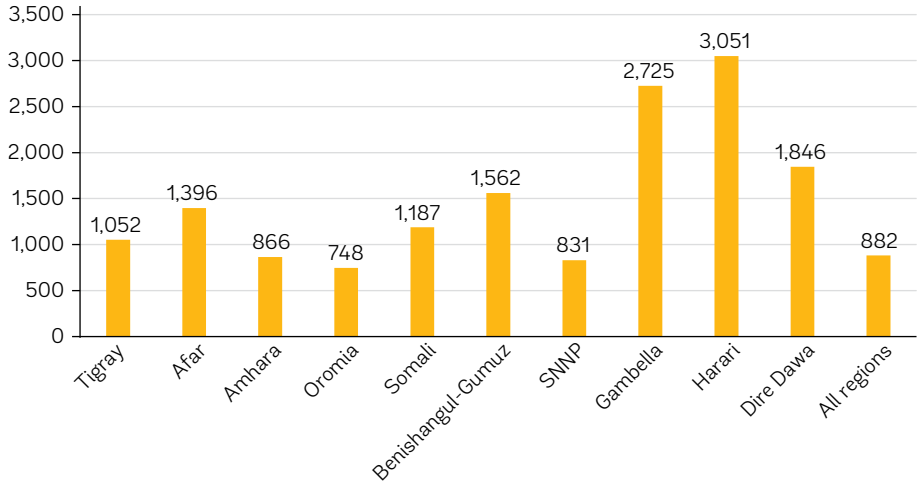
The predominant objective of earlier transfer formulae prior to the mid-2000s was equalization of fiscal needs. These formulae attempted to compute weighted indices of expenditure needs for the regions, which would then serve as a basis for the distribution of grants among the regions. The subjectivity in the selection of indicators/variables of fiscal needs and the weights assigned to the variables, as well as the fact that it did not consider regional differences in the capacity to collect revenue, were the major flaws of this approach. In later formulae, the focus shifted more toward attempting to fill the fiscal gaps of regions, which were estimated using representative tax and expenditure data. At least three iterations of the formula have so far been implemented using this approach. The major drawback encountered is the challenge in the availability and quality of data to reliably measure expenditure needs and revenue raising capacities of regions. Regardless of the approaches used, however, the final output of all the formulae has been to decide on the share of each region from the total pool[86] allocated to be transferred to the regions.

Block grant allocation from the federal government to regional governments has shown sizable increases in nominal terms in recent years. During the FY 2013–17 period, the federal government increased its block grant allocation to regions at an average rate of about 26 percent annually. The share of block grant transfers from total federal government expenditures picked up significantly over the past two years, increasing from about 40 percent to almost 46 percent (Figure 7.3).

Block grant transfers to regions have also shown sizable increase in per capita terms, increasing annually by about 24 percent over that past five fiscal years. Of the lowland regions, Gambella received the highest block grant allocation in per capita terms, followed by Benishangul-Gumuz,

[86] The determination of this pool is entirely at the discretion of the federal government and is approved on an annual basis by the Council of Minsters as part of the Medium-term Macroeconomic and Fiscal Framework, which is a rolling five-year framework.

Figure 7.4: Per capita block grant transfers in ETB, FY12–18



Source: MoFEC and CSA.

Afar, and Somali (Figure 7.4). In general, per capita block grant allocations to the lowland regions were above the regional average. Per capita block grant allocations to the larger regions, including Oromia, Amhara, and SNNP, were less than the regional average, with the exception of Tigray which was higher than the average.

Looking at per capita transfers to pastoral zones in regions that are partially lowland (i.e., Oromia and SNNP), average per capita transfers to the pastoral zones in Oromia are higher than the other zones, as well as the regional average, they are while lower in the case of SNNP (Table 7.1).

Over the past 10 years, the share of regions from total block grant allocation showed no significant variations despite the application of at least three different allocation formulae (Table 7.2). However, the current formula, which was introduced in FY18, has resulted in some changes to the regional shares. In the lowland regions, Somali experienced a significant increase in its share (about 2 percentage points), Benishangul-Gumuz and Gambella experienced declines, and the share of Afar remained the same. Of the regions that are partially lowlands, Oromia's share got a relatively significant boost, while that of SNNP was largely unchanged.

Table 7.1: Per capita transfers to lowland (pastoral) zones in Oromia and SNNP in ETB, FY11–16

Oromia	
Pastoral zones	
Bale zone	789.5
Guji zone	587.6
Borena zone	630.3
East Hararge zone	544.4
West Hararge zone	585.4
Pastoral zones average	**627.4**
Non-pastoral zones	**608.7**
Regional average	**614.2**
SNNP	
Pastoral zones	
South Omo zone	742.4
Kefa zone	614.5
Bench Maji zone	571.3
Pastoral zones average	**642.7**
Non-pastoral zones	**689.7**
Regional average	**681.4**

Source: MoFEC.

b) MDG/SDG Transfers

In FY12, the federal government introduced a new fiscal transfer instrument for regional governments, which it called Support to the Millennium Development Goals; this was in addition to the Federal Block Grant which has been in place since the beginning of the decentralization process in the early 1990s. The stated aim of the MDG Transfers is to help regions achieve the MDGs by supporting them in areas where they lag. Accordingly, the sectoral allocation of the MDG Fund was decided through a consultative process involving all regions. When the MDGs were replaced by the Sustainable Development Goals (SDGs) in 2015, the transfers were renamed as Support to the SDGs.

Table 7.2: Regional share of federal block grant allocation

	FY07–FY09	FY10–FY12	FY13–FY17	FY18
Tigray	6.7%	6.9%	7.1%	6.0%
Afar	3.3%	3.3%	3.1%	3.0%
Amhara	24.3%	23.3%	23.4%	21.6%
Oromia	33.7%	32.6%	32.5%	34.5%
Somali	6.6%	8.4%	8.0%	10.0%
Benishangul-Gumuz	2.0%	2.0%	2.1%	1.8%
SNNP	19.5%	20.0%	20.0%	20.1%
Gambella	1.4%	1.6%	1.5%	1.3%
Harari	1.0%	0.9%	1.0%	0.7%
Dire Dawa	1.4%	1.0%	1.2%	0.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: MoFEC.

The MDG/SDG Transfers are used only for capital projects related to the five pro-poor sectors (i.e., agriculture and rural development, water, rural roads, education, and health). The resources transferred through this channel are managed at the regional level, with concerned regional bureaus responsible for implementing the projects/investments, though *woredas* also play a crucial role (especially in the monitoring and evaluation process). The MDG Transfers are performance-based grants whereby disbursements are made based on progress assessments on the utilization of previously transferred funds. The allocation is largely based on the same formula used to allocate the Federal Block Grants (Table 7.3). Oromia and Somali regions received a relatively large boost in their shares while Benishangul-Gumuz and Gambella saw their shares reduced. The shares of SNNP and Afar were largely unchanged.

The sectoral allocation of the MDG/SDG Transfers are not uniform in all regions. In the larger regions including Oromia, Amhara, and SNNP, the rural roads sector was allocated the bulk of the transfers, while in the pastoral regions of Afar and Somali, the entire MDG Transfers were allocated to the water sector (Table 7.4). Of the smaller lowland regions, Benishangul-Gumuz region also allocated the bulk of the transfers to rural roads, while the allocation in Gambella was more evenly distributed between the five sectors.

The allocation by the federal government to the MDG/SDG Transfers, which reached nearly

Table 7.3: Regional share of MDG/SDG Transfers

	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Tigray	7.0%	7.2%	7.2%	7.2%	7.2%	7.2%	6.0%
Afar	3.3%	3.2%	3.2%	3.1%	3.1%	3.1%	3.0%
Amhara	23.3%	23.2%	23.2%	23.2%	23.2%	23.2%	21.6%
Oromia	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	34.5%
Somali	8.4%	8.1%	8.1%	8.1%	8.1%	8.1%	10.0%
Benishangul-Gumuz	2.0%	2.1%	2.1%	2.2%	2.2%	2.2%	1.8%
SNNP	19.9%	20.1%	20.1%	20.1%	20.1%	20.1%	20.1%
Gambella	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.3%
Harari	0.9%	1.0%	1.0%	1.0%	1.0%	1.0%	0.8%
Dire Dawa	1.0%	1.2%	1.2%	1.2%	1.2%	1.2%	0.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

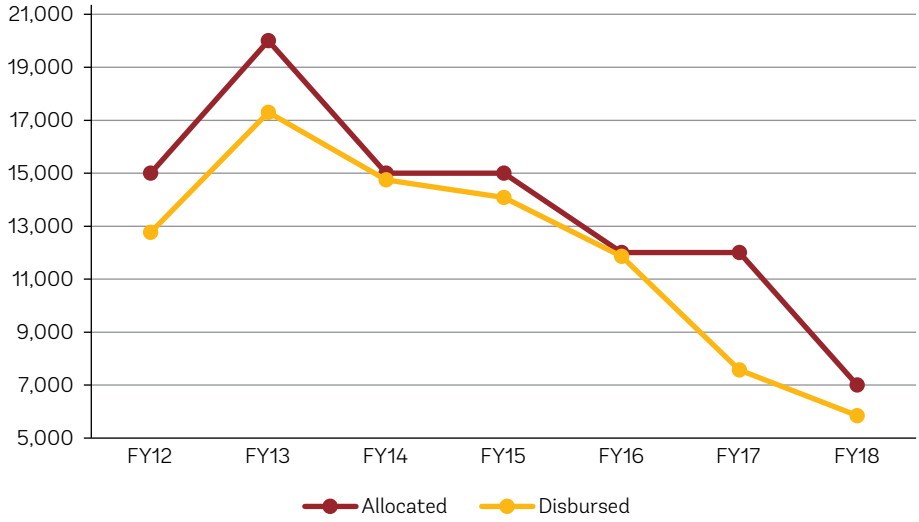
Source: MoFEC.

Table 7.4: Sectoral allocation of the MDG Transfers in FY12 by region

	Agriculture	Water	Rural roads	Education	Health
Tigray	3.9%	63.5%	28.4%	4.0%	0.2%
Afar	—	100.0%	—	—	—
Amhara	5.7%	14.1%	57.8%	10.3%	12.2%
Oromia	2.8%	8.9%	68.0%	11.3%	9.0%
Somali	—	100.0%	—	—	—
Benishangul-Gumuz	14.3%	10.5%	51.0%	17.9%	6.2%
SNNP	18.4%	7.0%	57.0%	8.0%	9.5%
Gambella	11.2%	29.3%	21.1%	19.9%	18.5%
Harari	1.9%	23.9%	41.6%	27.2%	5.4%
Dire Dawa	11.8%	32.1%	12.8%	22.3%	20.9%
Total	**6.8%**	**25.0%**	**50.8%**	**9.1%**	**8.4%**

Source: MoFEC.

Figure 7.5: MDG Transfers allocation and disbursements, million ETB



Source: MoFEC.

20 billion birr in the initial years, has been reduced significantly in recent years (Figure 7.5). However, the disbursement rate of the transfers to the regions, which was relatively low during the first couple of years after the introduction of the transfers, has improved over the years, with entire allocations disbursed in all regions in subsequent fiscal years (Table 7.5). The disbursement rate during the initial years varied among the regions. The lowland regions generally had below average utilization rates in the early years but significantly improved in the later years. In the last couple of years, however, there was a relatively large gap between the allocation and disbursement of the MDG/SDG Transfers, especially in the larger regions. This gap was less due to a deterioration in the utilization capacity of the regions than to the diversion of some of the funds to other priority areas, including the building of regional agroindustry parks, particularly in the larger regions.

Table 7.5: Rate of disbursement for the MDG/SDG Transfers

	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Tigray	94.3%	86.6%	100.0%	99.6%	99.4%	60.0%	80.0%
Afar	80.6%	85.0%	100.0%	100.0%	99.9%	87.7%	100.0%
Amhara	89.1%	87.1%	100.0%	92.9%	100.0%	60.0%	80.0%
Oromia	93.4%	87.1%	97.9%	93.1%	97.6%	60.0%	80.0%
Somali	58.4%	88.5%	100.0%	100.0%	100.0%	87.3%	100.0%
Benishangul-Gumuz	95.3%	80.9%	96.8%	81.0%	97.7%	60.0%	100.0%
SNNP	76.3%	87.2%	95.8%	93.1%	100.0%	60.0%	80.0%
Gambella	79.3%	52.2%	98.3%	99.9%	100.0%	60.0%	100.0%
Harari	68.0%	88.3%	99.8%	100.0%	99.7%	60.0%	100.0%
Dire Dawa	79.5%	85.6%	94.3%	67.3%	76.6%	60.0%	100.0%
All regions	**85.1%**	**86.5%**	**98.3%**	**93.9%**	**98.8%**	**63.1%**	**83.6%**

Source: MoFEC.

Expenditures

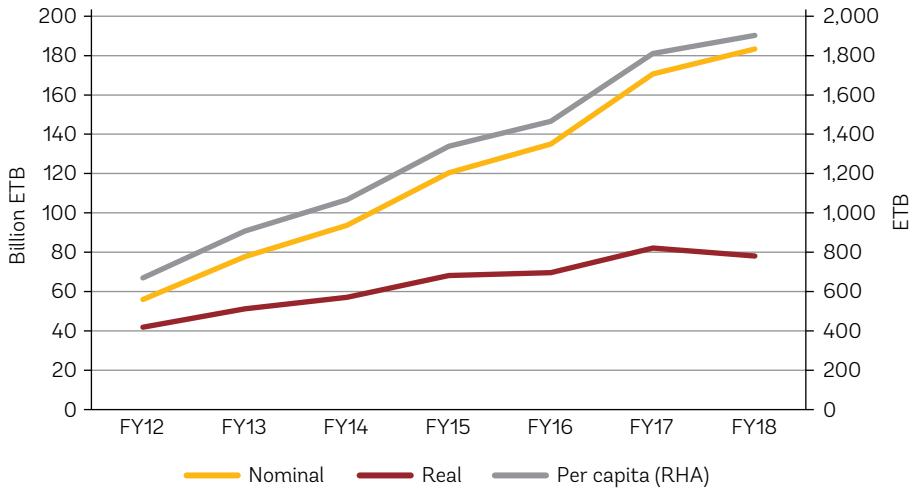
Overview of regional expenditures

Regional governments combine the transfers they receive from the federal government with their own revenue collection and allocate to expenditures that fall under their constitutional mandate. At the regional level, the sectoral allocation of the regional budget is approved by the Regional Council. The Regional Council also approves the block grant allocation to the *woreda* administrations within the region. *Woreda* Councils in each *woreda* then decide on the sectoral allocation of the block grants they receive from the regional level. The regional expenditures analysis presented in this section includes spending at both the regional as well as *woreda* levels.

Following the upward trends in the regions' own revenue collection and fiscal transfers from the federal government, regional spending has been increasing in recent years (Figure 7.6). In nominal terms, total expenditures by the regions increased by about 22 percent annually over FY13–18. When adjusting for inflation, the increase was much more modest at around 11 percent over the period. There was also a strong increase of about 19 percent in regional per capita expenditures.

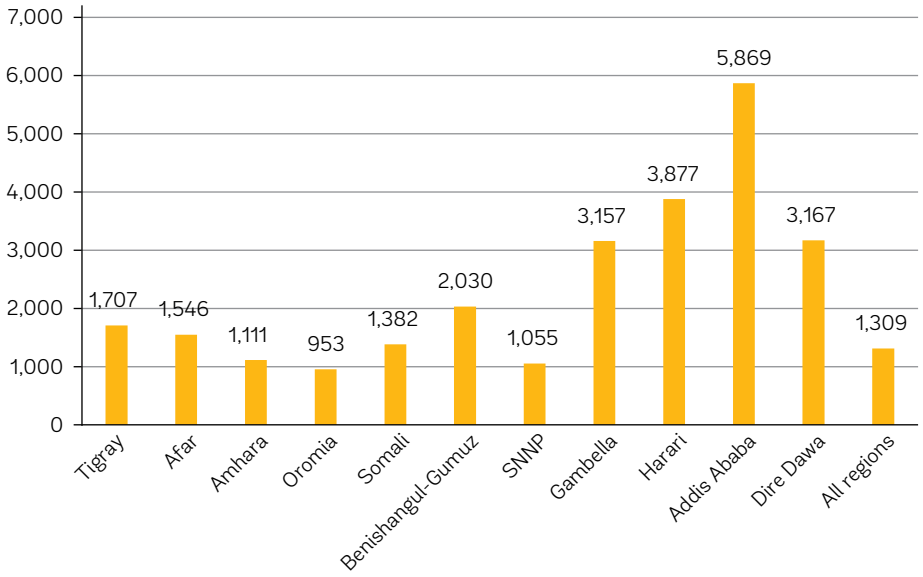
Per capita expenditures across the regions during the FY12–18 period show a largely similar pattern as per capita revenue collection. Addis Ababa is an outlier with per capita expenditures of more than four times the regional average (Figure 7.7). The predominantly urban regions of Harari and Dire Dawa also had per capita expenditures that were

Figure 7.6: Trends in regional expenditures



Source: MoFEC and CSA.

Figure 7.7: Per capita regional expenditures in ETB, FY12–18

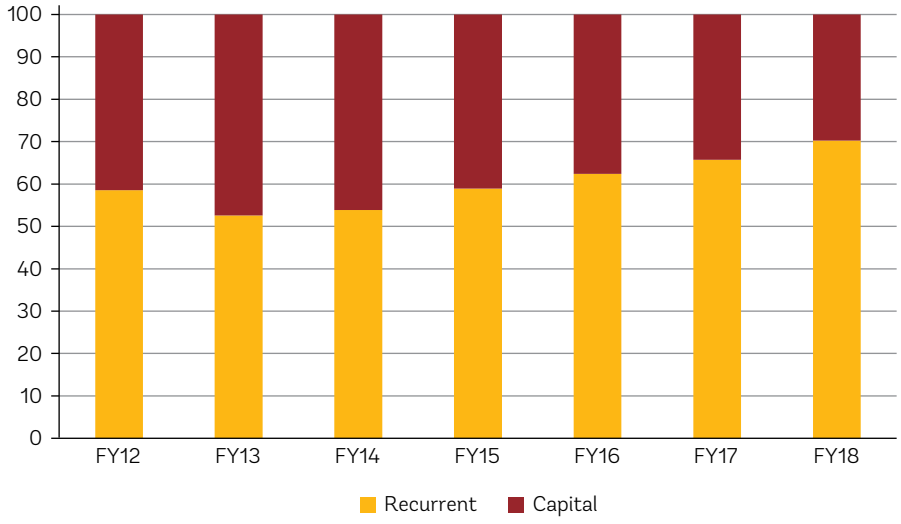


Source: MoFEC and CSA.

significantly higher than the regional average. All the lowland regions had per capita expenditures above the regional average, but to varying degrees. Gambella had the highest per capita expenditures, which were more than double the regional average, followed by Benishangul-Gumuz. The predominantly pastoral lowland regions of Afar and Somali had significantly lower per capita expenditures than Gambella and Benishangul-Gumuz despite being above the regional average. Somali had the least per capita expenditures, which was very close to the regional average. The predominantly highland regions, except for Tigray, had per capita expenditures well below the regional average.

Recurrent spending absorbed about 60 percent of total regional expenditures during the FY12–18 period. This share has, however, been increasing in the last two years as the amount of MDG/SDG Transfers from the federal government was reduced (see Figure 7.8). The predominantly urban regions, Addis Ababa, Harari, and Dire Dawa, allocate a relatively larger portion of their budgets to capital spending compared to the other regions (Table 7.6). In the lowland regions, Somali region had the highest allocation to capital expenditures while Gambella had the lowest, which is also the least of all the regions. The predominantly pastoral regions of Somali and Afar had a better allocation to capital

Figure 7.8: Composition of regional expenditures, FY12–FY18



Source: MoFEC.

Table 7.6: Share of capital spending to total regional expenditures, in percent

	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY12–18
Tigray	44.5	47.1	47.3	40.5	40.1	34.6	30.5	**40.7**
Afar	50.9	55.0	49.6	46.6	43.6	40.8	19.2	**43.7**
Amhara	35.0	43.8	41.2	34.2	31.3	27.0	23.5	**33.7**
Oromia	33.5	42.6	40.0	34.0	30.9	26.3	18.6	**32.3**
Somali	48.6	56.1	46.2	54.5	57.2	58.2	58.4	**54.2**
Benishangul-Gumuz	28.7	45.6	35.1	36.2	32.1	28.6	20.7	**32.4**
SNNP	40.7	41.9	41.9	37.0	32.4	27.4	26.5	**35.4**
Gambella	39.9	23.3	27.2	19.5	28.0	14.1	13.3	**23.6**
Harari	53.8	57.1	61.1	55.8	52.7	57.1	45.4	**54.7**
Addis Ababa	62.0	62.3	64.1	59.2	52.0	52.8	48.4	**57.3**
Dire Dawa	47.6	44.8	45.2	44.2	46.3	47.3	37.9	**44.8**
Total	**41.5**	**47.4**	**46.2**	**41.1**	**37.6**	**34.3**	**29.8**	**39.7**

Source: MoFEC.

expenditures compared to the moisture reliable lowland regions of Benishangul-Gumuz and Gambella. From the predominantly highland regions, Tigray had the largest allocation to capital expenditures while Oromia had the lowest.

Spending on education absorbed the largest chunk of regional expenditures, taking up almost 25 percent of total regional spending during FY12–18 (Table 7.7). Administration and general services, roads, and health were also among the sectors with relatively large allocations from regional budgets. The sectoral disaggregation of regional expenditures exhibits some variations across the regions. In the four predominantly highland regions (i.e., Oromia, Amhara, SNNP, and Tigray), the education sector was allocated the largest share of regional expenditures followed by administration and general services. Other important sectors include health, roads, agriculture, and water. Meanwhile, the lowland regions allocated the largest share of their budgets to expenditures on administration and general services. In Afar and Somali, agriculture was the second most important sector, while in Gambella and Benishangul-Gumuz it was education. Spending on the water sector absorbed the third largest allocation in Somali region while in

Table 7.7: Sectoral disaggregation of regional expenditures during FY12–18, percent of total expenditures

	Administration & general services	Agriculture & rural development	Water	Roads	Education	Health	General development	Others
Tigray	17.1	7.9	11.2	2.5	25.0	8.3	6.6	21.3
Afar	24.2	17.0	13.9	2.2	16.0	10.8	4.8	11.1
Amhara	16.8	7.5	7.0	9.0	31.6	11.5	6.4	10.2
Oromia	19.4	7.9	6.9	15.0	27.6	12.3	2.1	8.8
Somali	26.5	15.5	14.8	3.7	13.9	8.0	8.9	8.7
Benishangul-Gumuz	25.2	11.9	3.3	7.8	23.7	13.5	2.7	11.8
SNNP	18.6	10.5	3.3	2.7	26.4	11.0	8.4	19.0
Gambella	31.0	13.7	4.1	3.6	21.0	10.6	6.9	9.1
Harari	16.0	2.4	5.6	15.9	16.6	9.0	8.3	26.3
Addis Ababa	12.4	0.4	6.2	23.4	13.1	6.7	10.3	27.5
Dire Dawa	17.5	3.5	2.4	1.8	20.2	13.0	22.2	19.5
All regions	**18.2**	**7.8**	**7.1**	**10.9**	**24.2**	**10.4**	**6.5**	**15.1**

Source: MoFEC.

Afar it was the fourth largest following education. Health and agriculture also absorbed a relatively significant portion of regional expenditures in Gambella and Benishangul-Gumuz.

Regional expenditure outturn against budget over the past five years was much better for recurrent spending than for capital expenditures. As there were supplementary budgets for FY15 and FY17, the budget outturn for recurrent expenditures was above 100 percent for almost all the regions during these two years. There was relatively lower recurrent budget utilization in FY18 in some of the regions, including Harari, Gambella, Addis Ababa, and Somali (see Tables 7.8 and 7.9). Of the predominantly highland regions, Tigray and SNNP had the highest utilization of capital budget, while Amhara had the lowest utilization rate. On the other hand, Somali had the highest capital budget utilization rate of all the lowland regions, while Gambella had the lowest. Afar and Benishangul-Gumuz had a largely similar capital budget utilization rate.

Table 7.8: Budget outturn—recurrent

	FY14	FY15	FY17	FY18	FY14–18
Tigray	97.0	118.4	105.6	100.0	**105.2**
Afar	94.0	123.1	115.7	96.3	**107.3**
Amhara	102.1	136.9	114.6	98.5	**113.0**
Oromia	102.6	114.1	106.3	99.1	**105.5**
Somali	90.9	109.2	87.0	84.1	**92.8**
Benishangul-Gumuz	97.4	114.5	113.0	96.2	**105.3**
SNNP	94.6	108.0	106.0	96.1	**101.2**
Gambella	92.0	105.5	124.1	75.1	**99.2**
Harari	102.2	111.3	105.9	62.1	**95.4**
Addis Ababa	80.2	87.0	100.4	81.8	**87.3**
Dire Dawa	96.9	109.9	107.7	91.1	**101.4**
All regions	**96.2**	**112.8**	**106.7**	**94.6**	**102.6**

Source: MoFEC.

Table 7.9: Budget outturn—capital

	FY14	FY15	FY17	FY18	FY14–18
Tigray	99.0	101.0	96.5	102.7	**99.8**
Afar	91.3	112.1	97.6	36.2	**84.3**
Amhara	86.4	73.9	77.0	80.9	**79.5**
Oromia	88.8	87.7	106.1	63.3	**86.4**
Somali	80.4	130.7	98.8	84.3	**98.5**
Benishangul-Gumuz	88.0	103.5	79.4	68.5	**84.8**
SNNP	106.2	108.0	83.9	85.2	**95.8**
Gambella	74.8	51.0	31.8	143.6	**75.3**
Harari	100.7	82.9	70.8	67.0	**80.4**
Addis Ababa	95.0	73.1	69.2	74.2	**77.9**
Dire Dawa	85.1	79.2	78.8	58.1	**75.3**
All regions	**92.5**	**86.8**	**83.7**	**75.9**	**84.7**

Source: MoFEC.

Expenditures in the lowland regions

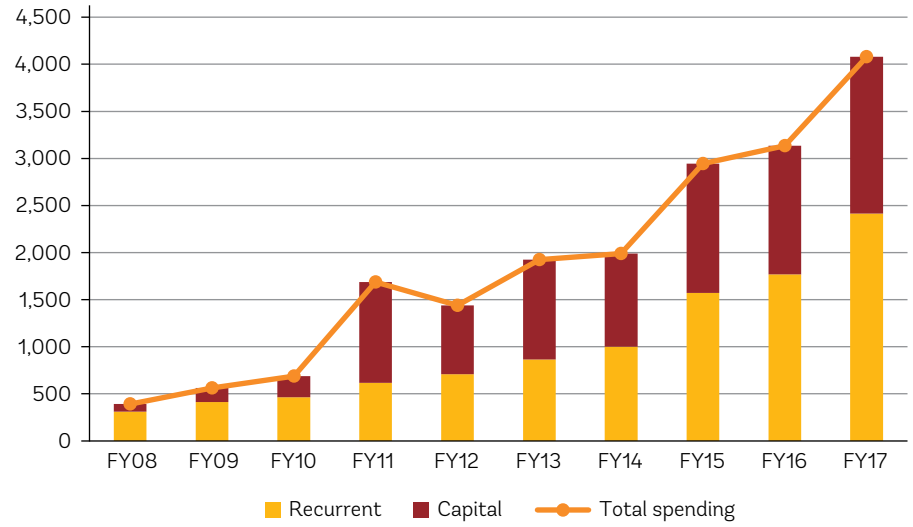
Afar region

Afar region has over 30 *woredas* that receive block grant resources from the region to provide services to their communities. The population of Afar accounts for about 2 percent of Ethiopia's population. Afar's share of block grant transfers from the federal government has remained around 3 percent over the past decade. Over the same period, total expenditures by the region (including *woredas*) has increased on average by about 35 percent annually. The share of capital spending to total regional spending has increased significantly in recent years (Figure 7.9). While this might indicate improved capacity of the region to implement capital projects, such capacity in the region is still relatively weak, as Afar is one of the two regions (Somali being the other one) that rely on federal-level institutions to implement capital projects undertaken using the MDG/SDG Transfers.

Economic sectors (including agriculture and water) took up a large chunk of total regional expenditures in Afar over the past decade (Figure 7.10). Social sectors (which include education and health) also absorbed a large share of regional expenditures. In comparison with other regions, the allocation to the economic sectors has been relatively high, while allocation to the social sectors was on the lower side. Administration expenses absorbed a slightly higher share of regional spending in Afar than in other regions, presumably due to the relatively less developed infrastructure to start with.

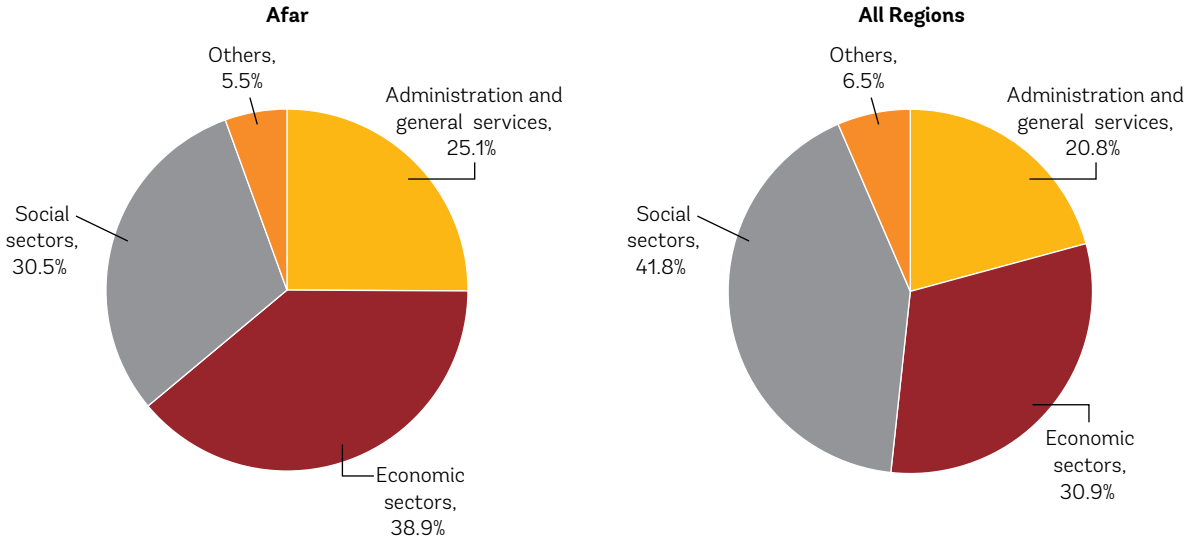
The region's spending on agriculture and pastoral development increased by about 60 percent annually over the past decade. Accordingly, its share of total regional expenditures doubled in recent years from 10 percent, 10 years ago. This was mainly reflected through increased capital expenditures in the agriculture sector, which drove its share of the region's total capital spending from 6 percent, 10 years ago to above 30 percent last year. The increased spending on agriculture in Afar was mainly driven by the provision of additional resources from the federal government through the MDG/SDG Transfers over the past seven years.

Figure 7.9: Regional expenditures in Afar, in million ETB



Source: MoFEC.

Figure 7.10: Sectoral breakdown of regional spending, FY08–17



Source: MoFEC.

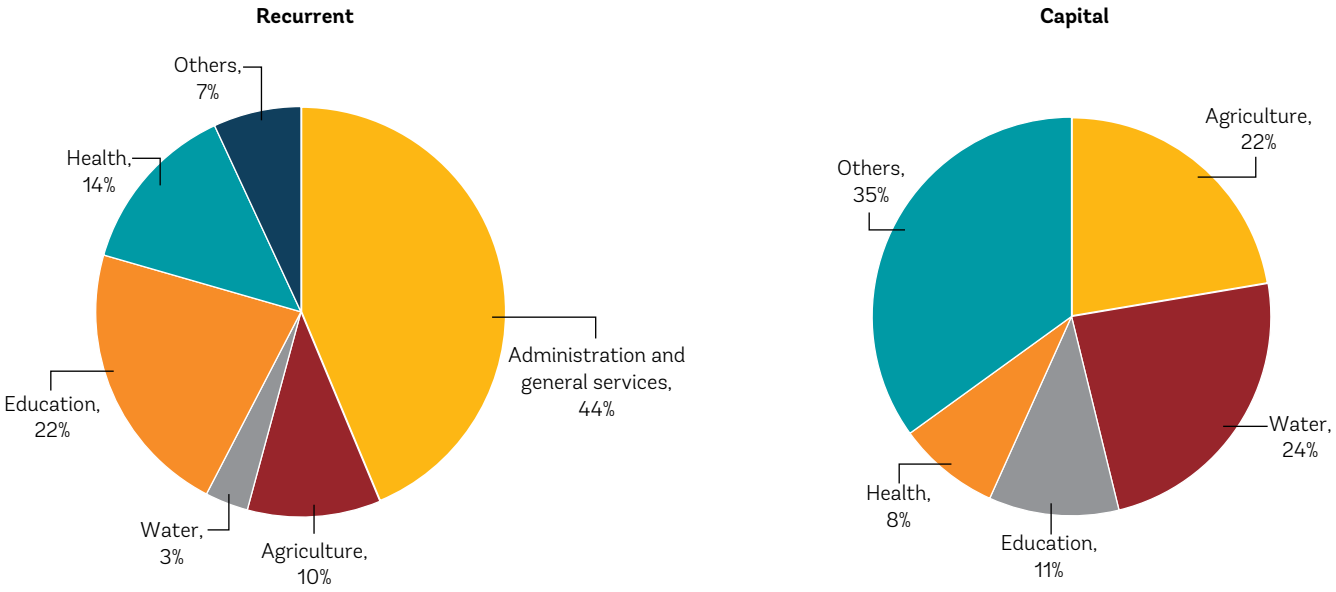
Spending on water resource development has also been increasing rapidly (by about 50% annually) over the past 10 years. This was also mainly driven by higher investment expenditures in the water sector. On average, about 13 percent of regional expenditures over the past 10 years was allocated for water sector development (Figure 7.11).

Somali region

Somali region, which had about 50 *woredas* five years ago, has increased the number of its *woredas* to more than 70 over the last couple of years. The share of the region from block grant transfers from the federal level increased from about 6 percent, 10 years ago to 8 percent in recent years. The proliferation of *woredas* in the region is likely to have exerted increased pressure on the allocation of resources to the *woredas*. The population size in Somali region constitutes about 6 percent of the total population of the country.

The pace of increase in regional expenditures in Somali region over the past 10 years has been much more modest than in Afar (about 33 percent annually). Like Afar region, regional spending on infrastructure investments was very small a decade ago, especially considering the huge infrastructure gap in the region, and only picked up in recent years mainly due to the MDG/SDG Transfers from the

Figure 7.11: Functional and sectoral disaggregation of regional spending in Afar, FY08–17



federal government. Because of capacity limitations, infrastructure projects built using the MDG/SDG Transfers are implemented by federal-level institutions. The sectoral allocation of regional spending in Somali region also seems similar to Afar in that the economic sectors took a larger share than social services (Figure 7.12)

Until recently, the region's spending on agriculture and pastoral development was minimal, with the sector absorbing just over 10 percent of total regional spending. This has improved in recent years with the share reaching more than 15 percent. While this compares favorably with the total regional average (which on average is a little under 10 percent), it seems to be on the low side in comparison with the significant investment needs of the sector in the region. Investment on water resource development also improved in the region in recent years, with the region allocating up to 20 percent of its capital budget to the sector compared to under a 10 percent allocation a decade ago.

Benishangul-Gumuz

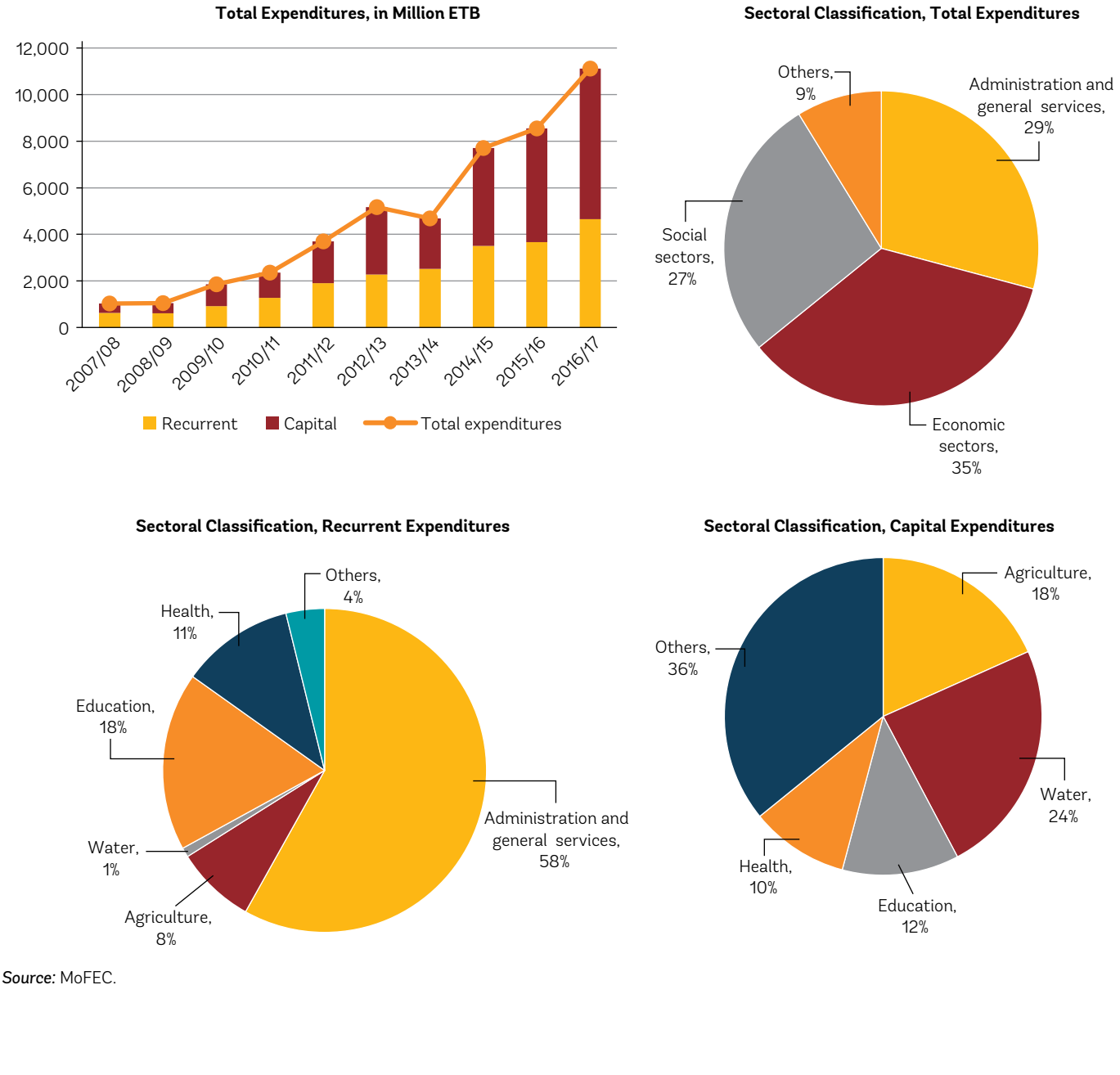
Benishangul-Gumuz is a relatively small region with only 22 *woredas*. The population of the region constitutes only about 1 percent of the country's population. The share of the region from block grant transfers was 2 percent for the past decade but declined to just under 2 percent in the latest formula applied at the beginning of FY17.

Public spending by the regional government in Benishangul-Gumuz region increased on average by about 30 percent annually over the past decade. Allocation to capital expenditures was virtually nonexistent prior to the introduction of the MDG/SDG Transfers from the federal government. The share of capital budget to total regional spending, which was about 15 percent prior to FY12, jumped to nearly 35 percent after the MDG/SDG Transfers were introduced.

Social services, including education and health, have been important priority sectors in Benishangul-Gumuz, with the social sectors absorbing more than 40 percent of the total regional budget over the past 10 years (Figure 7.13). Economic sectors, which include agriculture, water, trade, and roads, in turn accounted for about 30 percent of the regional budget. The sectoral disaggregation of public expenditures in Benishangul-Gumuz reflects different priorities from Afar and Somali but is generally closer to the overall regional average. It would appear that the increased investment correlates with higher levels of human capital, and in particular better educational enrollment rates.

Allocations to agriculture and water in Benishangul-Gumuz have been well below those found in Afar and Somali regions over the past 10 years. The capital investment allocated to the two sectors was just about 18 percent over the past 10 years compared to 44 percent in Afar and 42 percent in Somali. Education and health sectors took up a significant portion of the regional budget, both for recurrent as well as capital expenditures.

Figure 7.12: Regional expenditures in Somali region, FY 08–17



Source: MoFEC.

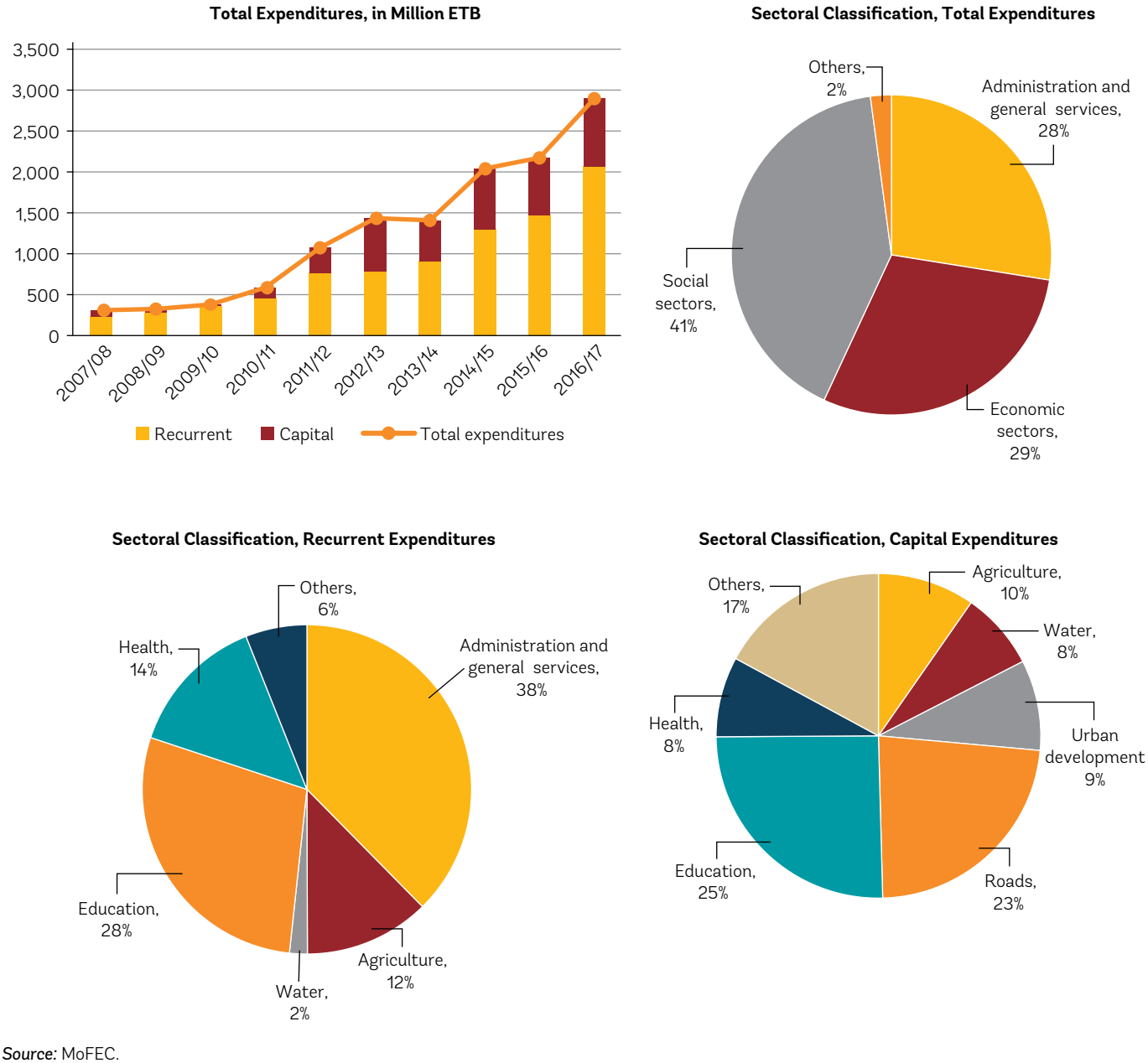
Gambella

Gambella region has only 14 *woredas* that are constituted under three zones. Its population size roughly accounts for about 0.5 percent of Ethiopia's population. The region's share in block grant transfers from the federal government has remained around 1.5 percent over the past decade.

Public spending in Gambella by the regional government has shown only a modest increase over the past 10 years. There has been very limited spending on capital investment by the region, although the MDG/SDG Transfers helped to partly redress this. The proportion of the regional budget allocated for capital spending was as low as 6 percent a decade ago but has improved in recent years. The reduction in the volume of the MDG/SDG Transfers over the past few years, however, has again led to a reduction in the allocation to capital expenditures by the region.

Similar to Benishangul-Gumuz, social services including education and health took up a large share of public spending by the region, while allocation to economic sectors was largely lower than in the other lowland regions. Education and health sectors jointly absorbed nearly 40 percent of both recurrent and capital budgets of the regional government over the past 10 years.

Figure 7.13: Regional expenditures in Benishangul-Gumuz region, FY08-17



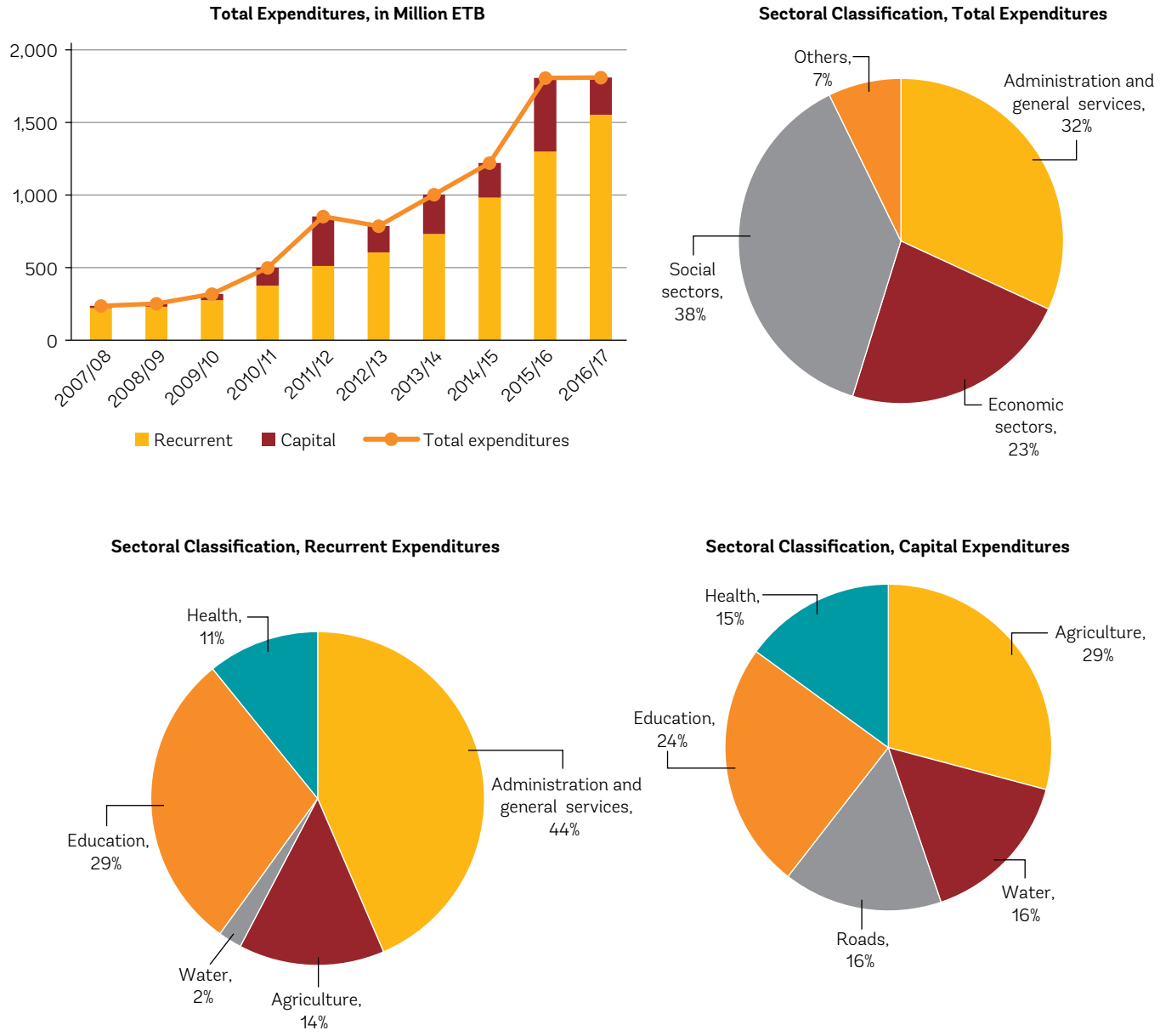
Source: MoFEC.

SNNP

SNNP region is composed of 14 zonal administrations and about 135 *woredas*, including 5 special *woredas*. The zonal administration in SNNP has greater administrative autonomy compared to similar administrative units in other regions. Of the 14 zones in the region, the pastoral zones are South Omo, Bench Maji, and Kaffa which account for about 14 percent of the total population in the region. Similar to the practice in the other regions, the SNNP regional government allocates budgetary resources to the zonal administrations and the *woredas* under these zones in the form of block grants. Over the past five years, allocation to the pastoral zones in SNNP accounted for about 15 percent of the total block grant allocated by the region to zonal administrations and *woredas* (Figure 7.15).

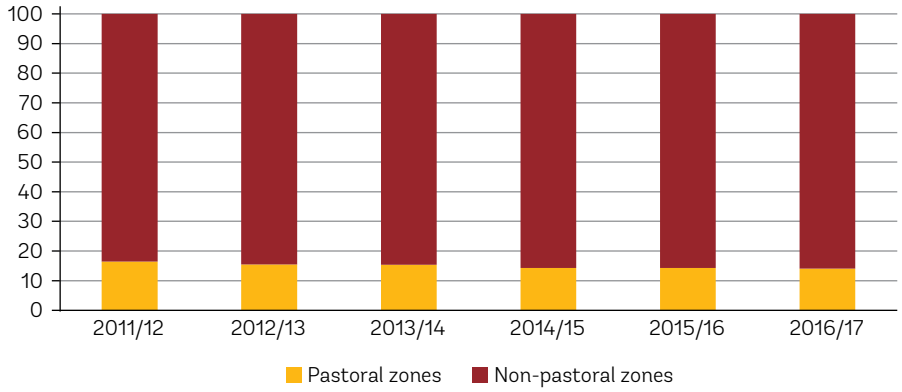
The sectoral disaggregation of the budget in the pastoral zones is largely similar to the overall regional average in SNNP. Over the past five years, education was allocated a significant portion of the budget, both at the regional level as well as in the pastoral zones (Figure 7.16). The share of administrative and general services expenditures in the pastoral zones was higher than the regional average. However, allocation to agriculture and water

Figure 7.14: Regional expenditures in Gambella region, FY08–17



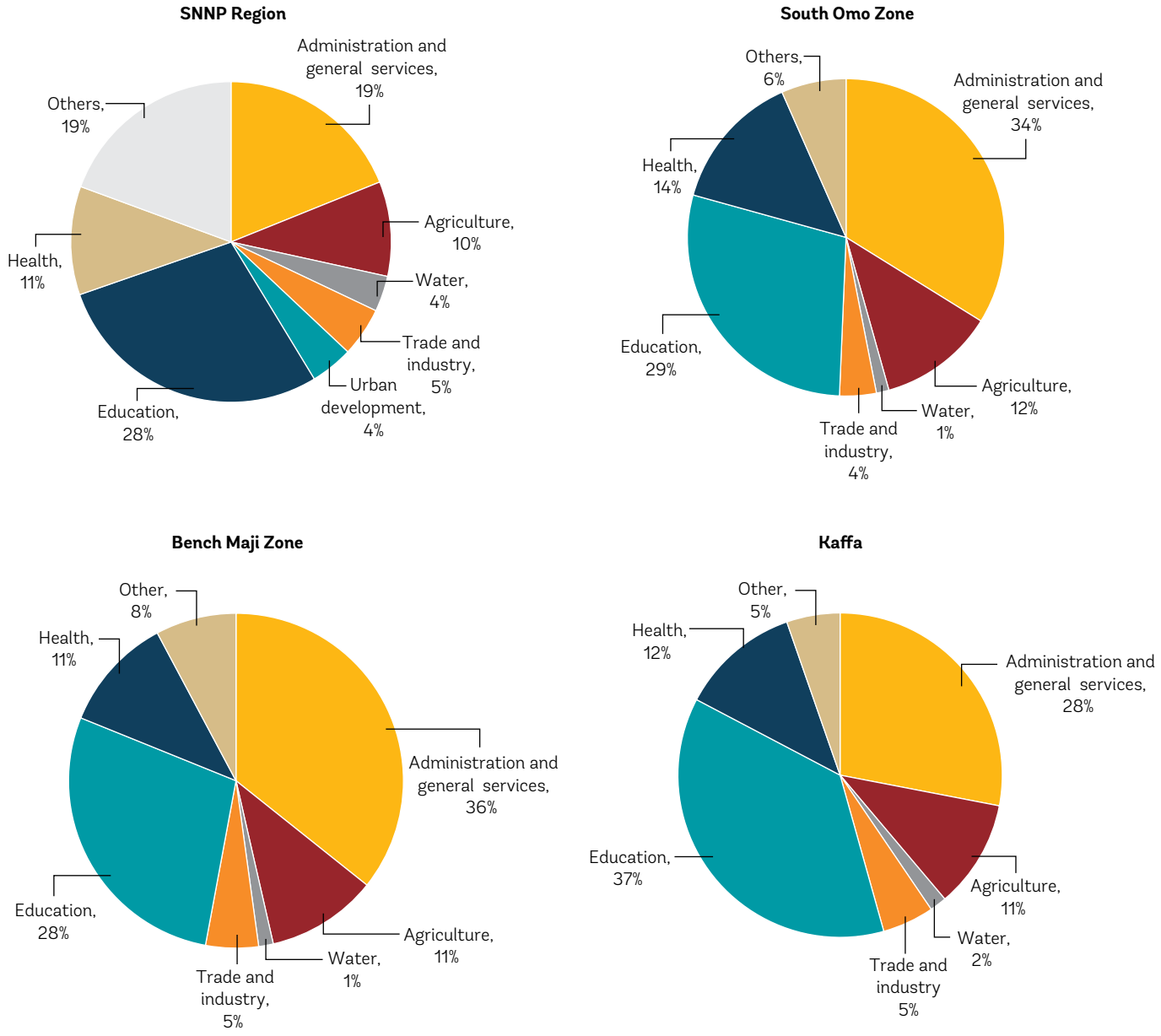
Source: MoFEC.

Figure 7.15: Block grant allocation to pastoral and non-pastoral zones in SNNP, FY 12–17



Source: MoFEC.

Figure 7.16: Public expenditures in pastoral zones of SNNP, FY15–17



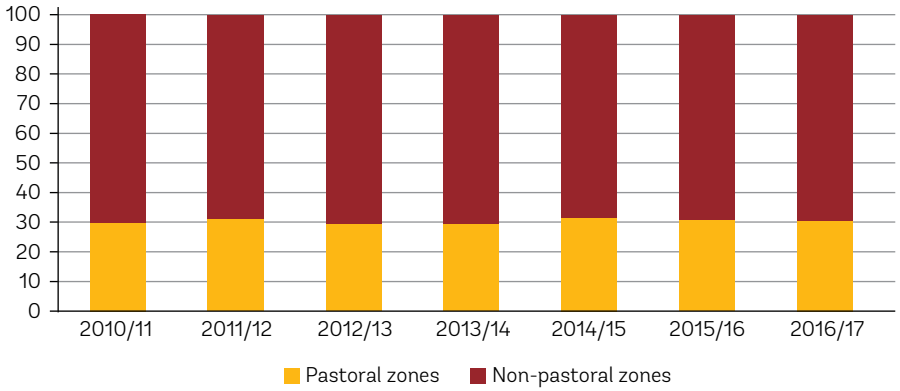
Source: SNNP BOFED.

resource development followed a largely similar trend as the regional average.

Oromia

Oromia region, the largest regional state in Ethiopia both in terms of land and population, is divided into 20 administrative zones (two of which were newly added over the last two years). Of the 20 zones, there are 5 which are predominantly pastoral, including Borena, Bale, Guji, East Hararghe, and West Hararghe zones. The combined population in these pastoral zones accounts for about 30 percent of the total population in the region. Similarly, the proportion of the block grants resources allocated to the pastoral zones in Oromia over the past seven years hovered around 30 percent of the total block grants allocation (Figure 7.17).

Figure 7.17: Block grant allocation to pastoral and non-pastoral zones in Oromia region, FY11–17



Source: MoFEC.

Conclusions

Despite the use of different allocation mechanisms over the past two decades, fiscal transfers from the federal government to regional governments has shown very little change in terms of the share that regions receive from the total pool. Allocations to each region have closely followed population size. Given the scale of the need in many parts of the lowlands and the much higher costs of delivery in these areas, there may be an argument for even higher allocations than those received (see Chapter 9).

Until recently, the lowland regions, including Afar, Somali, Gambella, and Benishangul-Gumuz, allocated only a very small part of their budget to capital expenditures, preferring to spend money on recurrent expenditures (i.e., salaries and operating expenditures). It was only after the introduction of the MDG/SDG Transfers that some relatively meaningful levels of allocation to capital investments started to be made. Different regional authorities have made different choices about the sectoral allocation of capital investments. Afar and Somali regions, for example, have predominantly focused on investments in water and agriculture to the relative neglect of education and health, while in Gambella and Benishangul-Gumuz the regional authorities have preferred to allocate expenditures to rural roads and the social sectors, particularly education and health. The pastoral areas of SNNP also allocated a large proportion of their budgets toward education and health. Given the large human capital deficits in Afar and Somali regions, there may be strong case for the regional governments to allocate more resources to the education and health sectors in their regions. In general, given the very tight fiscal space available to the federal government, more generous allocations to lagging lowland regions may be politically and financially difficult. But there may be a strong argument for such additional allocations to boost human capital development.

The next chapter examines the role of humanitarian and safety net responses to emergency and chronic needs in the lowlands.

Chapter 8: Humanitarian Interventions[87] and Safety Nets Working in Tandem

Summary

This chapter examines how government and the international community have responded to emergency and chronic food needs in the lowlands. Building the resilience of lowland populations to shocks requires the ability to respond effectively to both rapid onset emergencies, such as conflict, as well as slow onset environmental and other changes, such as drought and extreme weather events, which are affecting a household's ability to cope and recover from shocks. The instruments to do both should complement rather than undermine each other so emergency response should seamlessly transition to a safety net system to support chronic and predictable need.

Building resilience is ultimately about building sustainable systems that can both tackle the short-term crisis but also the long-term needs of the population to protect themselves against future shocks and smooth out the high degree of variability and risk in lowland environments. To date, the two have not always worked in close tandem, as short-term humanitarian interventions have been relied on to too great of an extent to tackle predictable and chronic needs. Long-term needs should be built into government safety net and development systems. Bringing these two together will be key in building lowland resilience.

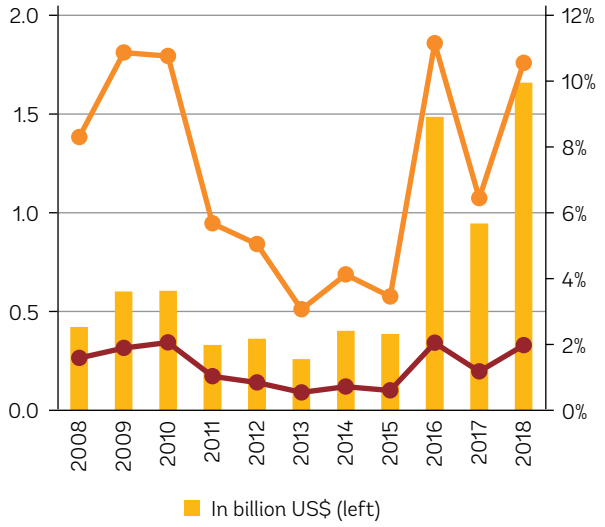
Introduction

To date the government has been using two main financing instruments to respond to emergency and chronic food needs. The first mechanism is the Humanitarian Requirement Document (HRD) in which the government appeals for humanitarian assistance from international donors to respond to emergency needs that arise mainly from drought and other weather-related events, such as flooding.[88] The second mechanism is the Productive

[87] Humanitarian Food Assistance refers to food or cash distributed to beneficiaries to meet their emergency food needs.

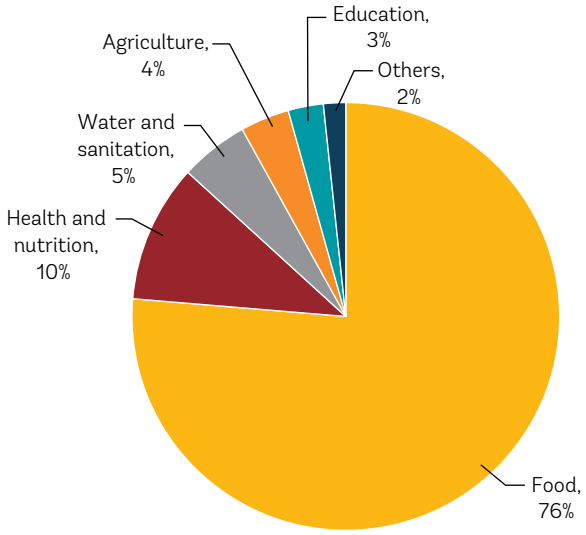
[88] On average food assistance has accounted for 76 percent of the appeal. In 2019 the complex needs of 3 million IDPs and returnees have changed the profile of the HRP, with 50 percent allocated for food.

Figure 8.1: Humanitarian requirements, 2008–18



Source: HRD, various issues, and MoFEC.

Figure 8.2: Humanitarian requirement by type of need, 2008–18



Source: HRD, various issues, and MoFEC.

Safety Net Program (PSNP), which is a government-led, mainly donor-financed program, that supports people that are chronically food insecure.

Humanitarian Intervention

The HRD is a biannual appeals process corresponding to the two main harvest seasons, *meher* and *belg*. HRD *meher* appeal numbers are typically released in January or February, reflecting the number of people in need of food assistance as a result of the performance of the *meher* harvest. Updated appeal numbers, corresponding to the *belg* harvest, are typically released in July or August, reflecting the number of people in need of assistance either because of the performance of the *belg* harvest, or because of the extent of need from the failure of the *meher* harvest. The start time of the assessments is frequently delayed (by two or three weeks) in the lowlands until the end of the lowland rains (*gu/ganna* and *deyr/hageya*) to ensure their impact can be included.

Humanitarian requirements requested through the HRD process over the past 10 years on average amounted to nearly US$700 million a year. The amount of appeal saw a significant increase in the past three years as emergency needs increased significantly, mainly due to the El Niño–induced drought in 2015/16 and La Niña in 2016/17. The humanitarian requirements were $1.6 billion and $1.4 billion for 2016 and 2017 respectively (Figure 8.1).[89] On average the humanitarian appeal has been equivalent to 1.4 percent of GDP over the last six years or on average equivalent to 8.9 percent of government revenue,[90] whereas spending on safety nets (rural and urban PSNP) has cost the equivalent of less than 0.5 percent of GDP.[91] More than 75 percent of the total amount appealed through the HRD process constituted food aid (Figure 8.2). From the nonfood components, the main needs came from health and nutrition, WaSH, and education. In 2019 the complex needs of IDPs has changed the profile of the response, with only 50 percent of the 2019 HRD appeal being for food.

The number of people requiring food assistance over the past decade averaged about 4.8 million people a year, ranging between 2.5 and 10.0 million people (Figure 8.3). On average, the number of beneficiaries constituted about 6 percent of the entire population. The number of people impacted varied across the regional states. The lowland regions, including Somali, Gambella, and Afar, had a relatively large proportion of their population requiring food assistance over the past 10 years (Figure 8.4).

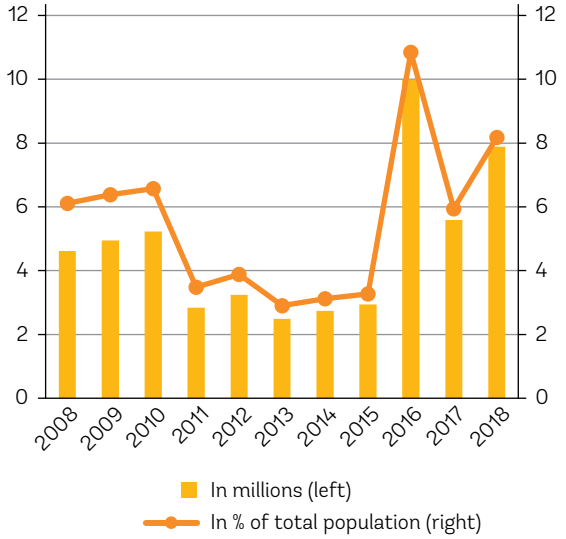
Based on the hot spot classifications (hot spots are *woredas* in need of emergency support), the drought-prone lowlands have been consistently targeted for humanitarian assistance in Somali, Afar, and the Borana zones of Oromia region (Map 8.1).

[89] Omzigt, Dirk-Jan, A Study on Lowland Resilience in Ethiopia—Building a More Developmental Approach to Responding to Shocks, May 2018, UNDP.

[90] Ibid.

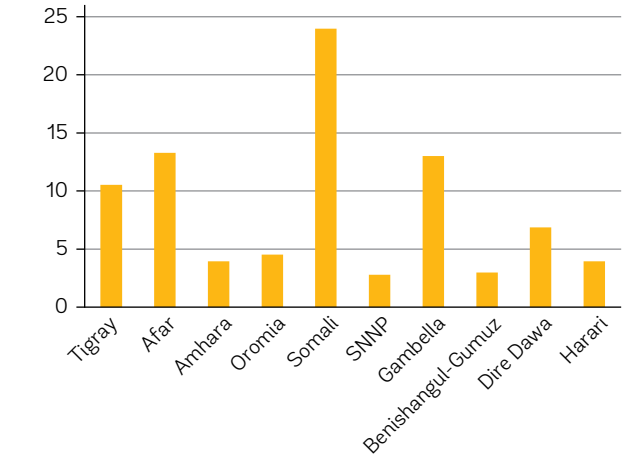
[91] Endale, et al. Financing Social Protection in Ethiopia: A long-term perspective, OECD Development Policy Papers, February 2019, No. 15, p. 32.

Figure 8.3: Number of people requiring food aid, 2008–18



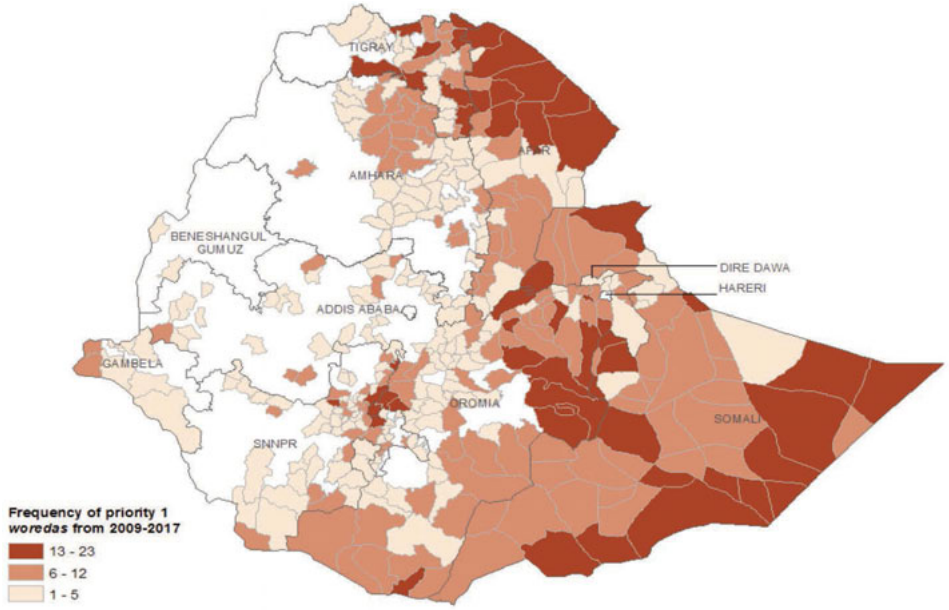
Source: HRD, various issues, and CSA.

Figure 8.4: Regional distribution of people requiring food aid (2008–18), as a proportion of total population



Source: HRD, various issues, and CSA.

Map 8.1: Frequency of hot spot *woredas* 2008–2017

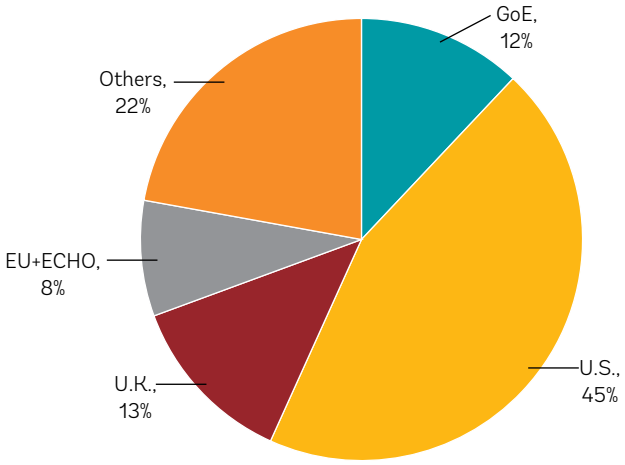


In response to the appeals through the HRD process, resources worth a total of about US$4 billion are estimated to have been mobilized to cover food aid only over the past decade. The U.S. government has been the major donor, covering nearly half of the total resources mobilized. Other major donors included the United Kingdom and EU (Figure 8.5). The Government of Ethiopia covered a little more than 10 percent of the total resources. Regional spending on droughts and other emergencies is not included in the figures; this rose significantly in 2015/16 reaching nearly 5 billion ETB (~US$175 million). Average annual spending on emergencies by the regions between 2013/14 and 2016/17 (Ethiopian fiscal years) by Oromia was highest at 120 million ETB (~US$4.2 million), followed by Somali and Amhara.[92]

The critical question is whether responding to weather-related events in this way is the most

[92] Endale, et al. Financing Social Protection in Ethiopia: A long-term perspective, OECD Development Policy Papers, February 2019, No. 15, p. 31.

Figure 8.5: Food aid contributions, 2009–17



Source: HRD, various issues.

effective use of donor resources.[93] Drought is a predictable occurrence in the lowlands and responses to it should be built into government systems; swift action through government systems can reduce both human suffering and the macroeconomic effects of humanitarian crisis.[94] Going forward there is a need to gradually shift to more predictable and relatively less costly ways of responding to droughts, while preserving emergency humanitarian interventions for relatively less predictable rapid onset disasters, such as displacement because of conflict. In this regard, there may be a variety of ways of smoothing out the consumption peaks and troughs of lowland environments, from the use of contingency budgets and risk transfer (insurance) instruments, to an adapted social protection system like PSNP, that can scale up assistance to those that need it when required.

Reimagining PSNP for the lowlands

This section focuses on the critical policy elements needed to create one government-led system that effectively and efficiently addresses poverty and vulnerability in the lowlands through the provision of social transfers. Due to data constraints, the discussion focuses primarily on Afar and Somali Regions but includes SNNP and Oromia regional data where available. Unless otherwise stated, data sources are from the PSNP's independent Impact and Performance Evaluations completed every two years (2008, 2010, 2012, 2014, 2016).

We make a series of policy recommendations regarding the design of an appropriate safety net system in the lowlands that supports resilience building. The discussion raises fundamental strategic and design recommendations which need policy direction before any detailed program design work can begin. These recommendations relate *inter alia* to policy issues of allocative efficiency, horizontal equity, governance and accountability, financial planning, and capacity.

Social assistance should continue to be a first-order priority for building resilience in the lowlands—although alone it is insufficient. The first critical step toward building resilience in the lowlands is to redesign the government-led safety net system, ensuring it is appropriate for lowland contexts and can flexibly respond to local conditions (drought, for example) through one financial framework and one implementation rule book for multiple implementing partners. By recommitting to this system as a foundational platform, social assistance programs (or safety nets) can then be complemented by livelihood and other more development-based interventions to build the resilience of poor and vulnerable households in the lowlands.

There are multiple systems and service providers that support poor and vulnerable households in the lowlands. The two largest vehicles for responding to needs in the lowlands are the Productive Safety Net Program (PSNP) and Humanitarian Food Assistance (HFA). Box 8.1 has more details relating to these systems. Importantly, both systems are implemented through government agencies and multiple nongovernmental organizations. In addition, there are several government and nongovernment livelihood support programs,[95] aimed at strengthening households' livelihoods through

[93] A large proportion of humanitarian aid beneficiaries receive support consistently; more than half of HFA clients received HFA assistance for three consecutive years. This figure is over 80 percent in Somali and over 50 percent in Afar. Hirvonnen et al., Humanitarian Food Assistance 2019: Process Evaluation Report, DRAFT January 2019.

[94] IMF Article 4 discussion on the 2015/16 drought noted, 'Ethiopia's macroeconomic outturn . . . [had] . . . been adversely affected by a severe drought and the weak global environment. As a result, output growth is estimated to have slowed down in 2015/16 to 6.5 percent. The slowdown was mitigated by effective and timely policy responses to the drought, and buoyant industrial and services sectors.

[95] Such as the Government's Pastoral Community Development Program (PCDP) and bilateral development partner funded programs such as USAID's Pastoral Areas Resilience Improvement and Markets Expansion (PRIME) program.

Box 8.1: The Productive Safety Net Program (PSNP) and Humanitarian Food Assistance (HFA) in the lowland areas

The Productive Safety Net Program (PSNP) in lowland areas. The design of the national PSNP is based on livelihoods and food security analysis in the highland areas of Ethiopia. The PSNP aims to address the symptoms and causes of food insecurity by providing predictable transfers in cash or food each month to poor households during the six-month lean season, in exchange for a labor contribution from the household to build community assets. A smaller number of households benefit from 'direct support', which is offered for 12 months to those with no able-bodied adults. The focus of the community asset building is on restoring natural resources within watersheds. The PSNP has benefited from multiple impact evaluations and assessments in multiple disciplines, assessing progress toward development goals over time.

Humanitarian Food Assistance (HFA) in the lowland areas. HFA is a complex network of agencies providing food or cash to meet emergency food needs using a common analytical framework on livelihoods and food security. HFA attempts to address the symptoms of food insecurity by providing food (and increasingly cash) transfers to transitory food insecure households to meet immediate food needs. While there are data on the outputs of agencies, there are limited data to measure impact on the lives of food assistance recipients.

community resilience initiatives, social service provision, and market access.

HFA and the vertical or horizontal scale-up of PSNP use food need assessments as the primary means of determining coverage, meaning that beneficiaries of HFA and the transitory (or extended) PSNP beneficiaries are not (necessarily) the poorest. National food needs assessments are completed every six months to determine future numbers of people 'in need'. While technical in nature, the assessments are also informed by political considerations. The assessment results are used by the government as the basis for issuing emergency appeals. In recent years the response was implemented through both HFA and PSNP scale-ups. Together, the HFA and the PSNP footprints mirror the size of historic food assistance need assessments, rather than poverty data. As a result, HFA and PSNP caseloads reflect *vulnerability* to drought and self-reported consumption—and while they could be used as a proxy for poverty, they may not reflect poverty incidence or trends more broadly.

The PSNP aims to address both symptoms and causes of food insecurity with regular assessments of impact and performance. Data are monitored regularly, and data on inputs, outputs, and outcomes are independently evaluated with increasing efforts since 2010 to ensure that the lowland regions are held accountable in the same way as the highland regions. The PSNP's evidence-based approach allows the identification of constraints and opportunities to address poverty and vulnerability. The HFA aims to address the symptoms of food insecurity (vulnerability), although empirical evidence of the impact is scarce. While evidence on the impacts of HFA across the country is limited, in the lowlands the challenge is exacerbated by the harsh operating environments, poor reporting lines, and a lack of demand for evidence (from donors and government), as well as access issues. Data on the HFA tend to be expressed in terms of the number of people in need of support of food assistance or the amounts of support provided. There is little regular or comparable reporting on the timeliness, number, and size of monthly transfers received by households across operators and over time on the targeting accuracy of HFA,[96] on accountability to beneficiaries, or on a host of other aspects of program delivery. There is no regular information on or assessment of how the HFA and PSNP together support poor and vulnerable households. While there is reasonable information from the HFA donors and operators on program inputs and outputs, there is no empirical evidence on impact although there are impacts that can be inferred—for example, it can be argued that as a result of both HFA and PSNP, there were no famines declared in 2011, 2012, 2015, or 2016. Data on how HFA contributes to building resilience are scant.

The number of households enrolled in the lowland PSNP is significant and they receive support through accountable government delivery systems. Between 2008 and 2017, the number of the PSNP beneficiaries in Afar Regional State remained fairly constant, fluctuating slightly between 470,00 and 560,000. In Somali Regional State the number

[96] Hirvonnen et al., Humanitarian Food Assistance 2019: Process Evaluation Report, DRAFT January 2019 is a first step in assessing targeting of humanitarian assistance and in particular shows the importance of PSNP and HFA working together as a combined system.

Figure 8.6: PSNP caseloads in Afar and Somali regional states (2008–2017)

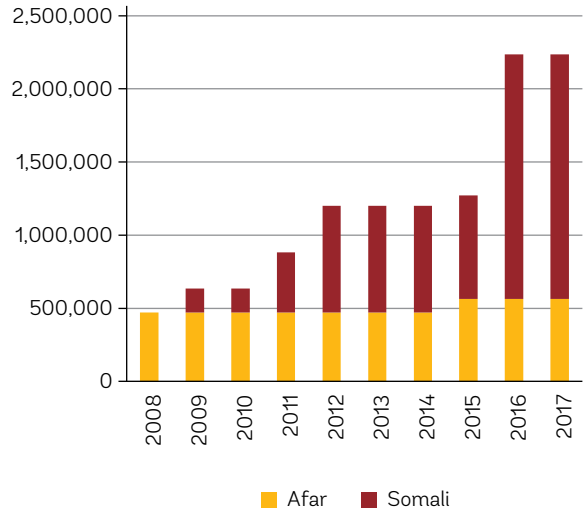
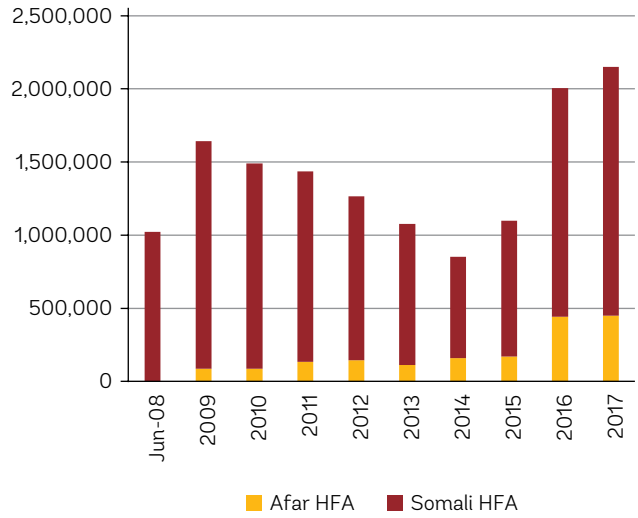


Figure 8.7: HFA needs in Afar and Somali regional states (2008–2017)

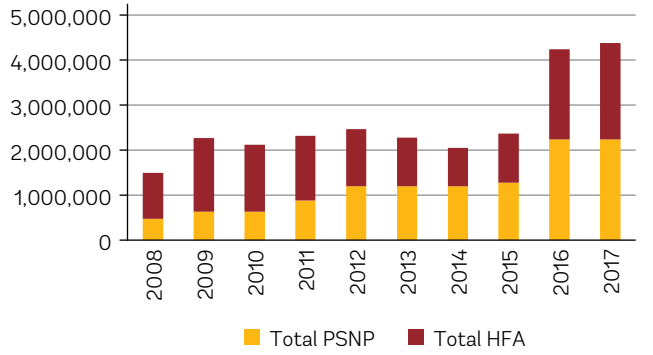


of PSNP beneficiaries increased steadily over the same period, responding to the periodic reviews of needs assessments. Figure 8.6 clarifies the size of the PSNP caseloads in the lowland regions. Implementation of the PSNP across the lowlands is managed through a common set of procedures, rules, and accountability structures, with clear reporting lines. The PSNP is 'on budget', has regular reporting, and a variety of feedback loops to beneficiaries, the various government structures, and donors.

The number of households identified as 'in need' of HFA is large, yet they are supported through weak delivery systems. The number of households 'in need' of emergency food support through the HFA have fluctuated significantly over the last decade in both Afar (as low as 86,000 people) and Somali regions (as high as 1.6 million people), as shown in Figure 8.7. While the delivery of HFA in Afar is mostly through a government system, in Somali Region the delivery is through international organizations and NGOs, with government agencies only nominally involved due to limited capacity to effectively manage the operation. In both regions, the HFA is, however, off budget, with no reporting using standard government systems, and with significant weaknesses in the reporting and accountability systems. Further, HFA continues to be unpredictable (it is almost exclusively funded through international donors), late, and expensive.

Together, the number of households that are addressed through either the PSNP or HFA in the lowlands is increasing. Figure 8.8 shows the combined annual PSNP and HFA caseloads in Somali and Afar regions since 2008. The numbers have

Figure 8.8: Total needs in Afar and Somali regions (2008–2017)



increased over time, with 2016 and 2017 representing the highest figures, following a recalculation of those in need of PSNP transfers and the major droughts demanding additional support through HFA. The overall increase is reflective of the national trend of an increase in the number of people in need of social transfers (cash or food).

Responding to poverty and vulnerability inter alia through a well-designed safety net remains an effective approach in the lowlands of Ethiopia. As detailed in the following section, there is an increasing body of evidence to justify investments in safety nets as a policy contribution for addressing poverty and vulnerability, and for building resilient households. The PSNPs documented effectiveness in the highlands, as well as programs in other lowland areas of East Africa (e.g., Kenya's Hunger Safety Net Program), show the significant effects that safety net approaches can have on long-term development outcomes and building

resilience.[97] Safety net approaches are also typically more cost-effective than alternatives such as HFA approaches—by as much as 30 percent more efficient—saving between $2.3 and $3.3 for every $1 spent on safety nets.[98] In the case of Ethiopia, such a cost-effective approach would be built on the significant investments already made in systems and capacity.

Impact and Performance of the PSNP

While the PSNP in the highlands made important gains in addressing chronic poverty, progress in the lowlands was slower. Over the course of a decade, the PSNP in highland areas was able to increase food security by 1.48 month for public works participants, and by 1.93 months for nonpublic works participants, increase nonfood expenditures by 43.7 birr per month, increase the number of food groups consumed by participants by –0.5, limit households' distress sales, and protect them against the impact of drought. In the lowlands, the impact of the PSNP was more muted, achieving a reduction of households' food gap by a maximum of 0.5 months, a (maximum) 21 percent increase in income levels, and the stabilization of household assets. Progress in the highlands PSNP was in part a result of an appropriately designed program that responded to local poverty and vulnerability dynamics. Different climate, production systems, social services, and degree of market integration mean that the ratio of poverty to vulnerability in the highlands is half the ratio experienced in the lowlands. Regrettably however, the lowland PSNP design simply replicated the highland PSNP design, despite these differences. A reluctance to ensure the lowlands program responded to local dynamics was inter alia born out of concerns regarding regional allocations and equity.

The design of the PSNP in the lowlands meant that it could not respond adequately to transitory food insecurity, or vulnerability, in particular. Pastoral households' needs fluctuate in line with the 'sawtooth curve' of economic ups and downs that reflect expansion and contraction of herd sizes and milk production. Accordingly, the numbers of vulnerable households 'in need' varied considerably each year, as rainfall fluctuated and cumulatively affected livelihoods. Inflexible financing instruments and rigid administrative 'quotas' between the numbers of chronic food insecure households and transient food insecure households meant that the PSNP could not provide temporary support to all those in need. A tightly controlled financial envelope, with a lack of flexible financial instruments and capacity constraints, resulted in a continued reliance on the HFA to address transient needs. The PSNP's contingency budgets held at the federal and *woreda* levels were inadequate in size and inadequately used to accommodate all transitory needs.

The effective targeting of beneficiaries in the lowlands was compromised with a lack of adherence to related program rules. The effectiveness of poverty targeting in the highlands increased steadily over time with additional support, capacity, and training so that by 2012 targeting was considered good by international standards. Despite similar, significant investments in targeting in the lowlands, challenges continued throughout. There was significant 'rotation' of beneficiaries within the PSNP, with many registered beneficiaries only receiving four months of transfers. This may have been an administrative solution to the rigid quotas of PSNP beneficiary numbers. Some larger households only received as little as 27 percent of their entitlement, which may have been a way of providing transfer sizes tailored to individual households. There is also evidence that some PSNP households circumvented the rigid quotas of program beneficiaries in place at a local level by sharing their transfers with non-PSNP households—some 38 percent of PSNP households confirmed this was a regular practice. Local notions of 'fairness' in the lowland areas are that everyone should benefit regardless of wealth and that targeting a minority of community members (albeit poor ones) can engender tensions.[99] Concerns around elite capture of targeting and enrollment are legitimate, with evidence from Somali region indicating that having a household head in an official position increases the likelihood that the household (and kin) are selected into the PSNP by 22 percent. These examples show that program rules regarding the poverty-targeting approach of the program were not always strictly adhered to—and go some way toward explaining

[97] PSNP achieves both social and productive goals by raising income in beneficiary households while stimulating local and national production (IFPRI, 2016) and improves health and school attendance (Berhane et al., 2015) (Shigute et al., 2017), achieves higher rates of insurance uptake, and improves cognitive skills in children (Berhane et al., 2016).
[98] Cabot Venton (2018). Case studies: Ethiopia, Kenya, and Somalia.

[99] Lind, J., et al., Targeting social transfers in pastoralist societies: Ethiopia's productive safety net program revisited, ESSP Working Paper, IFPRI, 2018.

reduced impacts of the program compared to its highland implementation.

The delivery of PSNP transfers to households remained erratic, unpredictable, and irregular. From the highlands, there is strong evidence that the extent to which transfers are predictable, regular, and timely affects the intended PSNP outcome of household food security. Beneficiaries are able to plan household consumption and investments better, and they are seen as more creditworthy. In the lowlands, little progress was made against program targets on timeliness and predictability of food transfers (the vast majority of transfers in the lowlands): food transfers to beneficiaries were up to 60 days late, with a two (sometimes three) months' payment often being paid together, typically with only one day's notice, requiring an overnight stay outside of the local community, and only 60 percent of PSNP households indicated they could plan ahead based on the predictability of the PSNP transfers with the amounts received often less than expected. The shift to cash and e-payments through the PSNP is currently seeking to address some of these challenges and, based on a range of international experiences, will also increase transparency through a robust audit trail of receipts.

Capacity constraints in the lowlands affected the progress of the PSNP toward its objectives. Capacity constraints across the lowlands have materially affected PSNP performance with, for example, only 50 percent of key financial PSNP staff in place in Somali Region and only 66 percent of staff having received training or having access to vehicles to perform their work tasks. Importantly, accountability mechanisms need to be further strengthened when compared with performance in the highlands. For example, by 2016 no *kebeles* had made program identity cards available to new PSNP beneficiaries in Somali region, the use of Kebele Appeals Committees was limited, and only 25 percent of households understood the roles of key PSNP structures or were aware of key decision-making meetings.

The PSNP has clear accountability mechanisms, which are not mirrored by the HFA. While the PSNP and HFA are delivered to the same (and neighboring) communities using the same frontline staff at *kebele* and district levels, the same targeting criteria, and delivering the same type of transfers, they have different accountability mechanisms. The PSNP has several administrative, financial, and quasi-judicial checks and balances that allow community members to appeal their exclusion from the program, allow local administrations to resource solutions for exclusions, and require various levels of government to monitor and report on resources and processes. While these systems could be replicated by the HFA, they were not, and there was little reporting or monitoring from HFA to government and weak auditing of HFA commodities. The lack of a harmonized accountability mechanism stretches (already weak) local implementation capacity, could lead to perverse incentives for regions and households to prefer one program over the other, and confuses district/*kebele* staff responsible for delivery of transfers.

Investments through the safety net have had positive spillover effects for HFA in accountability and targeting. In *woredas* that have both PSNP and HFA, targeting is progressive, and communities that have HFA but no PSNP have significantly poorer targeting.[100] Kebele Appeals Committees are 'relatively rare' in areas that receive HFA but do not receive PSNP, but common where PSNP is present.[101] Fifty-five percent of people in non-PSNP *woredas* think that local leaders who help with program implementation should benefit from HFA, compared to just 16 percent of people in PSNP *woredas*.[102] The better performances of HFA in PSNP *woredas* is likely due to system strengthening investments under the program, which includes community awareness of the program rules.

The use of a highland design for public works hampers the PSNP'S ability to contribute to addressing the causes of chronic food insecurity in the lowlands. The PSNP, informed by analysis and practice in highland areas, uses a community participatory watershed planning system to identify public works which contribute to tackling root causes of food insecurity. While a planning approach using the watershed model in the highlands has proven to be highly successful, the wide geographic spaces, low gradients, sparse populations, and labor-based natural resource conservation in the lowlands mean that a watershed model cannot be expected to contribute strongly to local livelihoods. Despite several attempts to moderate the public work planning methodology, practice on the ground still fails to take into account more

[100] Hirvonnen et al., Humanitarian Food Assistance 2019: Process Evaluation Report, DRAFT, January 2019.
[101] Ibid.
[102] Ibid.

considered approaches, such as rangeland management, drought cycle management, or a focus on social infrastructure.

Impact and Performance of the HFA

Impact data on the HFA is scarce. There is no consistent process to review the targeting or outcomes of HFA. Though there is limited detailed empirical evidence on impact of the HFA, there are impacts that can be *inferred*. For example, the droughts of 2011, 2012, 2015, or 2016 can be compared in severity and numbers affected to the droughts of 2002, where multiple deaths occurred and famine was declared. As a result of both HFA and PSNP, there no deaths and no famines were declared in 2011, 2012, 2015, or 2016. There are no data however on the impact of HFA on human capital (e.g., nutrition) or household economy (e.g., productive assets) or wider development outcomes. As set out in Chapter 4, a recent analysis of Household Income, Consumption and Expenditure Surveys (HICES) data shows that humanitarian aid has been poverty reducing but significantly less so in Somali region[103] than Afar. There are no data on whether HFA prevented the sale of distress sales during droughts. Data on whether HFA contributes to building resilience more generally are equally limited.

The number of HFA transfers delivered are often not the same as the number of planned transfers—and transfers that are not delivered are 'lost' to the beneficiary. There is little regular or comparable reporting on the timeliness, number, and size of monthly HFA transfers received by households over time; on the targeting accuracy of HFA; nor on accountability to beneficiaries. From data that are available, while HFA implementers may plan to deliver a fixed number of monthly transfers to households (so-called 'rounds' of transfer), scarce and delayed resources result in 'breaks' in the delivery. Over the last decade, for example, despite the HFA needs assessments indicating that 12 months of food assistance may be necessary in some zones, it has been unusual for more than seven rounds of transfers to be delivered. When these 'breaks' occur, households do not receive their expected transfer and are not retrospectively compensated. A country evaluation of operations in Somali noted the importance of actors mitigating governance and accountability risks in the delivery of food and nutrition assistance in Ethiopia, with particular focus on Somali region.[104] Persistently high levels of food aid accompanied by persistently high levels of malnutrition in Somali region merits further research.

Necessary and Essential Measures to Transform the Current Approach

There are three policy changes that are necessary to transition the current PSNP in the lowlands into a more effective system. While the PSNP has proven to be a powerful instrument for tackling poverty and vulnerability, further improvements in design and implementation are needed to deliver on this promise in the lowlands:

- redesign one government-led safety net, appropriate for lowland contexts,
- prioritize the timely delivery of social transfers to intended households, and
- strengthen governance and accountability and address capacity bottlenecks.

A. Redesign the government-led safety net system, appropriate for lowland contexts

Develop one common policy framework for initiatives to address poverty and vulnerability in the lowlands. There is currently an unenforced agreement of 'continuity' between the HFA and PSNP. A new policy framework for the lowlands should be established that provides overall direction for how the PSNP and HFA should be brought under one system, outlines operational efficiencies to make use of scarce implementation capacity, clarifies one institutional structure required to deliver support, and ensures that the PSNP and HFA are delivered with the same levels of accountability and transparency. The key elements of this framework are set out below.

Ensure that the program design and financing responds to the relative size of poor and vulnerable caseloads in the lowlands, which are different from the highlands. In practice, the PSNP has a fixed

[103] The less significant poverty reducing impact in Somali region could have been because the drought in the HICES reference year 2016 was less severe in Somali (noting that malnutrition indicators remained at emergency levels in seven zones) but also may indicate targeting challenges or elite capture, or that resources are not reaching those targeted to receive them or are not reaching them in the appropriate quantity.

[104] WFP Country Evaluation, 2018.

national ratio between a 'core' caseload of chronically food insecure beneficiaries and a 'transitory' caseload, which it can modestly respond to as vulnerability conditions change and available financing allows. The HFA augments the PSNP's response to the 'transitory' caseload.[105] The ratio between a 'core' caseload of PSNP beneficiaries and a 'transitory' caseload in the lowlands should better reflect local conditions (it currently reflects highland dynamics) and will need to change on an annual (possibly seasonal) basis, as rainfall and vegetation changes. According to poverty data, a 'core' regular caseload in the lowlands may need to be smaller than some regions' current caseload (i.e., in Somali region) and the annual allocation to a 'transitory' caseload larger than currently programmed. Within regional boundaries, beneficiaries are likely to differ in proportions, according to the incidence of poverty in pastoral, agropastoral, and farming areas.

Ensure there are appropriate, scalable instruments that can deliver support to those who are poor and those who are vulnerable to poverty. With the numbers of vulnerable households approximately two times the number of poor households in lowland areas, it follows that appropriate instruments able to rapidly respond to their needs are required (i.e., a transfer program with flexible delivery mechanisms that can reach those who may not be poor today but who are likely to become poor if impacted by a 'shock'). Being vulnerable to poverty and risk does not mean that households are 'in need' all the time—rather, that vulnerable households may need rapid support as livelihood conditions change. When assistance is needed, a temporary and rapid scale-up to a larger caseload must happen *before* the 'alarm' sounds for the drought—multiple research shows that early interventions are more cost effective[106]—and with a 'no regrets' approach. This means that there should be prepositioned funds, and/or an annual allocation, to enable an annual response to transitory needs among the lowland regions.

Make critical and essential investments in the Government's Early Warning System. A scalable instrument requires credible data against which decisions can be made to scale up in certain areas to certain households when certain predefined conditions have been met. The current system does not allow for this: there are limited credible data inputs; triggers for action are not well-established; and systems are not well-embedded within government or linked to national, regional, zonal, and *woreda* level capacities. The current system can also be influenced by political factors. An agreement on the use of objective 'thresholds' to "trigger" a response of differing magnitudes implemented under the government-led system is required, supported by the necessary investments that allow for the technical measurement of the thresholds. This should be considered central to an ex ante approach that addresses poverty and vulnerability.

Introduce one financial framework with appropriate financial instruments for a scalable system. The multiple systems and actors in the lowlands currently leverage multiple sources of financing through government systems, as well as parallel to government. Adopting one framework will lead to humanitarian financing flowing through PSNP systems and will clarify the limits for what government will accept financial responsibility for when responding to vulnerability. This will then enable a realistic assessment of the related costs in addressing responsibilities, leading in turn to a more effective deployment of resources, and ensuring complementarity between government and nongovernment resources.

Ensure one rule book for all implementers in the lowlands. While all PSNP actors work to a common 'rule book' of processes and procedures, others—including the HFA—do not. Standardizing information sets and ways of working across actors are needed to strengthen transparency and accountability and make better use of implementation capacity. Adopting a common administration system for all implementers would accelerate the shift from fragmented projects to common systems. Developing an operational system that can respond to poverty *and* vulnerability requires flexible administration and strong capacity at local levels.

B. Prioritize the delivery of social transfers to intended households

Prioritize the timeliness of transfers for all implementers. Despite progress across the highlands, PSNP transfers in the lowlands remain erratic, late, unpredictable, and irregular. While comparable data

[105] While the PSNP can support a transitory caseload in all *woredas* within a PSNP region, in practice the HFA is directed to *woredas* without a PSNP core caseload and to *woredas* where the "need" surpasses the ability of the PSNP to respond.

[106] See Cabot-Venton et al. (2012) The Economics of Early Response and Disaster Resilience: Lessons from Kenya and Ethiopia, DFID; USAID, Economics of Resilience to Drought in Ethiopia, Kenya and Somalia, (2018), among others.

on the HFA are not available, monitoring of 'rounds' of food assistance show that these are often delivered late, with some rounds 'skipped' due to shortfalls in resources.[107] Remembering that 'a safety net delayed is a safety net denied', the PSNP's primacy of transfers principle needs to 'have teeth.' There needs to be an inviolable rule regarding the delivery of transfers, with local incentives for strong performance and accountability measures to encourage staff to meet targets.

Regular transfers must be delivered to the poor. The national program is a poverty-targeted program, but the record of effective targeting in the lowlands is particularly concerning. Despite multiple technocratic attempts to resolve this for over a decade, there remains friction with local notions of 'fairness' and 'equity', with communities indicating that everyone should benefit regardless of wealth, and that targeting a minority of community members can engender tensions.[108] Senior leadership discussions with customary institutions and other structures are needed to ensure that the safety net system can reach the poor in line with agreed rules. While universal approaches are aspirational (and an achievable policy goal in the long term), they are currently unaffordable, and in the meantime poverty targeting should be strictly enforced.

C. Strengthen governance and accountability and address capacity bottlenecks

Introduce one institutional structure for oversight of initiatives to address poverty and vulnerability in the lowlands. Introducing one clear structure to govern implementation of the system minimizes the ability of stakeholders to avoid accountability at local levels relating to performance, particularly by "projectizing" responses. The structures need to be easy so they can follow a trail of accountability from community to *kebele* to district to zone to region to federal levels and be representative of key stakeholders, including customary institutions.

Strengthen local accountability through increased transparency. When local decision makers and officials in the lowlands are transparent, the governance and performance of the PSNP improves.[109] Importantly, transparency can neutralize the 'capture' of resources at the local level. PSNP and HFA actors in the lowlands should adopt the same oversight, reporting, monitoring, and auditing standards. The execution of accountability functions should be managed as part of the system-based approach; in particular, food management requires stronger accountability measures that mirror those in place for cash transfers.

Increase human and physical capacity to improve performance. The numbers of local government staff in the lowlands are currently inadequate and, more than in highland areas, key staff are often not in place, are heavily and frequently rotated, and essential training is erratic. More than in highland areas, to deliver support and monitor effectively, local authorities require reliable and frequent access to quality transport services, which are currently missing. Addressing these issues through policy change will be critical to the success of a government-led system.

Additional Measures to Respond to the Causes of Poverty and Vulnerability

While social assistance is necessary for poor and vulnerable households, it cannot respond to the range of causes of poverty and vulnerability alone. Economic diversification and investments in human capital are needed to provide sustainable options for populations in the lowlands to strengthen their resilience. These require dedicated strategies, with safety net professionals and technicians from other relevant sectors (livestock, agriculture, labor, etc.) engaged in identifying how they can tailor support to safety net beneficiaries and work together to facilitate households' exit from poverty.

To complement safety net initiatives, poor and vulnerable households should be exposed to a range of diversification strategies, including: livestock-based activities, non–livestock-based activities, and facilitation to allow the uptake of employment opportunities (including migration). Poor and vulnerable households require additional support to diversify activities away from traditional livelihoods. The government is well positioned to

[107] As the HFA is not an entitlement, if the plan is to provide monthly support from January to June, for example, and the allocation for January is severely delayed, it is common for this 'round' to be renamed support for February and for only five months of support to be provided rather than six as originally intended.

[108] Lind et al. Targeting Social Transfers in Pastoralist Societies—Ethiopia's Productive Safety Net Programme Revisited, 2018, IFPRI.

[109] For example, the association between being a *kebele* official and being a PSNP beneficiary in Somali is higher when the beneficiary list is *not* publicly posted; in *kebeles* where the list is posted, widows are 30 percentage points more likely to be selected; and where lists are publicly posted, rich households are 11.3 percentage points *less* likely to be selected for the PSNP than are destitute households.

lead the development of relevant strategies that would facilitate households' diversification (even exit) from unviable, unsustainable livelihoods. Global experience indicates that these strategies need to be tailored to poor and vulnerable households' capacities and capabilities (they should not be generic strategies). Options exist for households with livestock to diversify into added value products (dairy production, hides and skins, etc.), in addition to strengthening existing primary livelihood activities, noting that local markets are often too thin to ensure viability without integration into larger value chains. While returns to rain-fed cropping have continued to be low and uncertain, the numbers of pastoral households now turning to cropping has increased, partly from a lack of alternatives. The supply and quality of skills and training however remain low. Facilitation of employment opportunities and migration should also be considered for poor and vulnerable households. While entrepreneurial activities may be appropriate for some poor and vulnerable households, a significant proportion will not wish to risk their resources on entrepreneurial activities and prefer to gain food security through employment. In most developed countries at least 80 percent of all people are of this mindset, and poor and vulnerable households are unlikely to be different. Government could therefore consider best practices in the areas of employment facilitation as part of the system to build resilience. This may also be associated with internal and international labor migration, which should be further considered as part of the government system.

There is a special need to address education and skills development in lowland regions to better support individuals to identify and secure adequate incomes through wage-based employment. While wage-based diversification is increasing, 89 percent of the households who left the pastoral system in 2013 were unskilled and 82 percent were illiterate. Urban employment is generally informal and low-skilled, and dominated by women, with the entry barriers to remunerative diversification being skills, contacts, and capital. As part of the government-led system, human capital (education and skill development, particularly for women) should be considered as critical building blocks toward diversification away from unsustainable livelihoods. A strategy for strengthening human capital around the life cycle should be prioritized once the supply of relevant social services has evolved adequately (see Chapter 3).

> "[E]ducation investments should be the central pillar of diversification and transformation strategies in ASAL regions, with irrigation schemes and other attempts to promote diversification into sedentary farming a distant second. The latter have some potential to promote economic growth and create jobs, but that potential is limited by basic agroecological and agronomic factors, and by institutional factors that appear to exclude ASAL populations from substantially benefitting from these schemes. Education, in contrast, is a direct investment in the very young populations found in ASAL areas, and one likely to generate assets and income sources (such as remittances) that are far less vulnerable to covariate shocks, and even more mobile than pastoralist livestock. Advances in female education will also reduce population growth (with a lag) and improve health and nutrition outcomes for children. . . . Hence if the right delivery modalities can be developed, we expect that education investments will be a high return investment, albeit one that will require a decade or so to truly bear fruit." (Headey et al. 2014)

In the next chapter we examine opportunities for long-term sustainable development in the lowlands through increased opportunities for economic diversification.

Chapter 9: Economic Development

Summary

Economic development in the lowlands lags the highlands. To fully participate in inclusive national and regional growth the lowlands will need considerable investment. At the forefront of any strategy is the need to take a long-term perspective that addresses service provision, connectivity, and human capital. At the same time support and investment are needed to ensure that the economic opportunities available can be maximized. Livestock will remain the main source of livelihood for the pastoralist community, and there are potentially good returns from both the domestic and export livestock markets. But this will require support to all aspects of market infrastructure, including veterinary services, cold chain logistics, border posts, and roads. The extractive sector will feature in many of the lowland regions over the next 10 years, and the sector could comprise up to 10 percent of Ethiopia's GDP within 20 years. But this will mainly benefit the country through national foreign exchange earnings and royalties, with limited employment opportunity and direct benefit to the lowlands. Increasing urbanization will lead to the growth in the service sector in the lowlands, and with lower levels of poverty and vulnerability in urban areas, rural to urban migration provides a better opportunity than rural to rural migration for poverty reduction and supporting growth.

The most important action for the government will be to strengthen the overall human capital of the lowland population, with priorities given to education and access to improved services. Such support to human capital would increase the ability of lowlanders to take new jobs and is part of a long-term transformational approach to address entrenched gender barriers and social norms.

Agriculture Overview

Agriculture plays a key role in the economy of Ethiopia and, including the related value and supply chains, accounts for over 84 percent of employment and 53 percent of GDP.[110] (See Table 9.1.) In the lowlands, agriculture is characterized by an increasing scarcity of grazing land and driven by the expansion of land used for irrigated commercial agriculture, as well as the settlement of rangeland communities.

Table 9.1: Structure of agriculture—GDP and employment 2011

	GDP (%)	Employment (%)
Agriculture	42.1	79.1
Agroprocessing	2.0	0.7
Input production	1.3	0.4
Trade & transport	7.5	4.2
TOTAL Agri food system	**52.9**	**84.4**

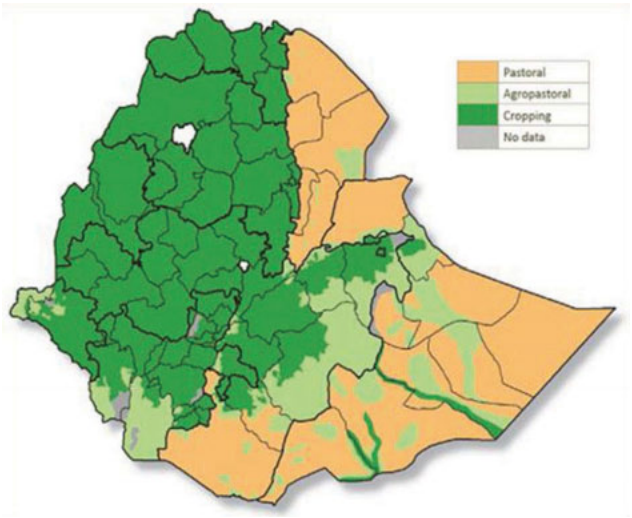
Source: IFPRI.

While the lowland areas are overwhelmingly dependent on primary production, the balance between livestock and cropping varies across regions. Livestock is a key source of income in the lowlands for most rural households (see Chapter 1 of this report).

Maps 9.1 and 9.2 demonstrate the importance and distribution of different types of livestock for the lowlands—particularly for the arid drought-prone lowlands.

[110] IFPRI (2018) Diagnostic Resilience Building for Ethiopia.

Map 9.1: Models of agricultural production[111]



Map 9.2: Spatial distribution of livestock

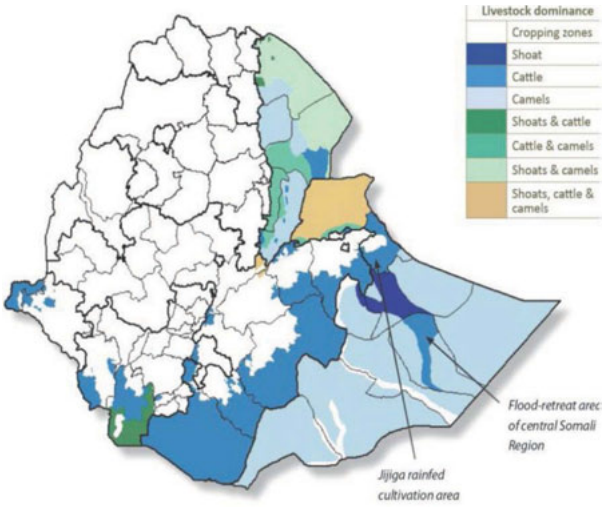
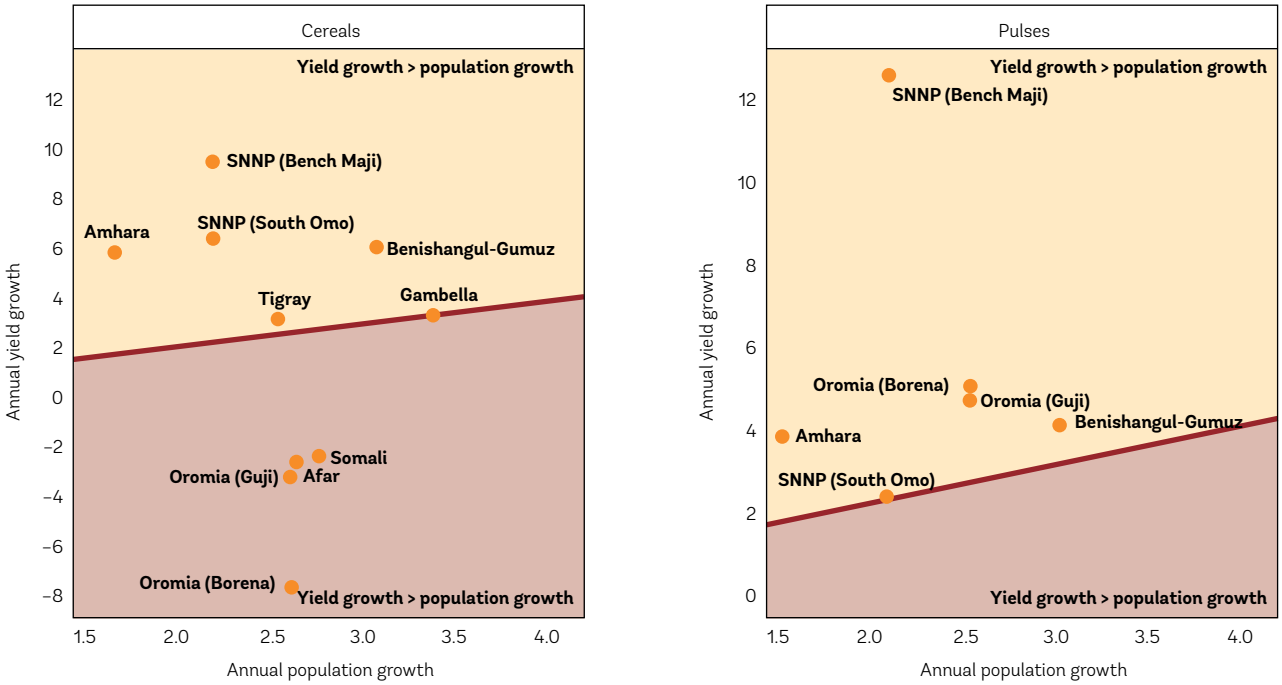


Figure 9.1: Growth in crop yields and population across highland and lowland regions



Source: CSA Agricultural Sample Surveys, 2004–2010 Ethiopian Calendar, CSA Population Projection of Ethiopia for all regions at *woreda* level from 2014–2017.

A notable feature of lowland agriculture is the slowing growth in crop yields, most likely due to the adverse climatic conditions and the lasting impact of extreme weather events on soil fertility and water retention. Despite the fact that agricultural productivity in the lowlands continues to increase over time, the rate of the increase is **insufficient to compensate** for population growth.

Figure 9.1 demonstrates this: for cereals, most of the lowland regions and zones are below the yield/population growth parity line, meaning that in the no-change scenario, the food security situation is likely to gradually worsen over time. For pulses the outlook is better but only for those areas where production is possible—production volumes in Afar, the Somali region, and Gambella are negligible.

In terms of livestock productivity, the analysis in the Livestock Master Plan sets out a continued growth in feed requirements in the lowlands, which is forecast to rise to a total of 56 M tons of dry

[111] MOARD. (2010) Ministry of Agriculture and Rural Development, United States Agency for International Development; Government of Ethiopia. *An atlas of Ethiopian livelihoods.*

matter by 2030. The existing pastureland will not be able to support this level of feed demand under any climatic conditions.[112]

Pastoralism and Livestock

Despite the adverse climatic conditions for intensive fodder production, extensive livestock herding is still a high-potential sector for lowlands pastoralists. Ethiopia is the 5th largest livestock producer in the world and thus has potential to claim a share of the market opportunity created by an estimated 7 percent projected deficit in global beef supply by 2024. Domestic demand for beef is also expected to grow strongly in line with urbanization and increasing incomes. Already, the price differential between domestic and export market prices (c. ETB 150/kg and ETB 74/kg, respectively) is an indication of domestic supply shortages. The Ethiopian Government's Livestock Master Plan (2015) estimates a deficit of 1.33 million tons of meat by 2028 in the absence of productivity improvements.

Taking advantage of these opportunities will require substantial investment to improve carcass quality and feed efficiency, and to strengthen market linkages. Out of a total national cattle population of 60 million head, approximately 30–40 percent are owned by lowland pastoralists and agropastoralists practicing extensive, low input production systems. Smallholders and pastoralists (with <200 cows) are the dominant livestock producers, contributing to almost the entirety of the 0.39 million metric tons of beef.[113] Chapter 1 in this study highlights the increasing concentration of livestock ownership in the population.

Lowland pastoralist cattle producers capture a relatively low share of the overall value of their produce. They supply most of their live animals to small traders earning margins ranging from ETB 7,300 to ETB 13,600 per head of cattle. Only 35–40 percent of the terminal value of the beef sold in consumer markets is captured by the producers (compared to about 50 percent in Kenya). There is scope for increased income for producers, but this will require improvements to market linkages and improved transportation links.[114]

Export earnings from live cattle are significant in the lowlands, which are responsible for approximately 90 percent of Ethiopia's meat and animal exports, though the trade is largely informal. Prices have remained low due to quality concerns, and government attempts to impose a live animal export price floor have been circumvented by a booming informal and/or illegal cross-border trade, estimated to be *almost twice* the value of formal exports (up to US$400 million per year). Taking advantage of export opportunities requires meeting challenging export quality requirements. Processed exports are minimal (~1 percent of total export revenue), with only 14 export-oriented abattoirs across the whole country.

Considering the mismatch between domestic demand and supply (current higher domestic prices for cattle) and challenges in meeting export quality, the incentive for many lowlanders is to produce for the domestic market that offers a greater opportunity. Nevertheless, the export opportunity should not be ignored. Substantial government investment in livestock infrastructure will help increase productivity and earning potential. Only 45 percent[115] of the country is served by public and private animal health delivery systems, with pastoralists relying on vaccination and treatment at reconditioning/feedlots which serve as pre-quarantine stations for exports. Investment in disease management to contain the prevalence of transboundary diseases will help reduce Ethiopia's vulnerability to trade bans, predominantly from Middle East countries.

For lowland producers to benefit, substantial government investment is required in livestock infrastructure, including **investment in disease management** to contain the prevalence of transboundary diseases, including but not limited to Foot-And-Mouth and Rift Valley Fever. Ethiopia is vulnerable to trade bans, predominantly from MENA countries, and sanitary and phytosanitary (SPS) and the World Organization for Animal Health requirements are becoming more stringent.

Only 45 percent of the country is served by public and private animal health delivery systems, with pastoralists in particular relying on vaccination and treatment at reconditioning/feedlots which serve as pre-quarantine stations for exports.[116] **There is an overreliance on Djibouti as the intermediary marketing channel for the Middle East.** However, Djibouti does not recognize Ethiopia's quarantine procedures and thus

[112] Livestock Master Plan 2015, p. 70.
[113] Agricultural Transformation Agency (2018) *Beef and Dairy Cluster Strategies.*
[114] USAID (2009) *Agricultural Value Chain Financing in Kenya—Assessment of Potential Opportunities for Growth.*
[115] Livestock Master Plan (2015) Roadmaps for Growth and Transformation.
[116] Ibid.

requires an additional 21-day quarantine prior to re-export, adding time and cost.[117] China, Hong Kong, Vietnam, and Malaysia have been identified as additional strategic priorities by the Ethiopian government, based on existing trade relations and market size, although improvement in disease management will be equally crucial.[118]

Camels

Camels will become an increasingly important source of meat, milk, and transport given the camel's versatility and resilience to drought. In terms of marketing potential, it has been estimated[119] that the northern Ethiopia camel trade alone has a sales volume of between US$18.5 million and $24.5 million per year, surpassing the sales volume of the reported formal meat exports. The contributions of camel to the national livestock GDP in terms of meat production is estimated to be ETB 3.6 billion and is projected to grow. Camel milk production, prevalent in the eastern lowlands, presents an underexplored opportunity. Even in conditions of fodder scarcity, camels can produce enough nutrient-rich milk to sustain pastoralist households for several months.

Dairy

Dairy production is a significant and growing market in the lowlands, however its growth is hampered by market inefficiencies. The average consumption of milk in Ethiopia is 19 liters per person per year, compared to the African average of 40 liters. Dairy demand is strongly income and urban related: the top 10 percent of earners in the Addis Ababa market consume 38 percent of the milk, thus with increasing urbanization, demand is expected to increase.

Over 60 percent of Ethiopia's annual production of 3.1 million metric tons of milk are produced in the lowland areas.[120] Milk yields are low at 1.5–1.9 liters of milk per day due to a range of challenges, most notably the availability of quality feed[121] and the preference for low-input pastureland grazing. Additional challenges include the inherent low productivity of local breeds, with little progress in improving the genetic stock, and poor access to extension and animal health services.

Support to all aspects of the value chain is needed, including breeding, veterinary services, and access to markets. The western and eastern lowlands are particularly disadvantaged, and approximately 70–90 percent of dairy production in Ethiopia is marketed through informal channels. Consequently, Ethiopia is a net dairy importer, with imports reaching US$14.6 million in 2015 to supply the wealthier, quality-orientated urban markets.

Within the formal value chain, producers capture approximately 50–60 percent[122] of the final retail price. The informal chain may allow for a higher value capture due to the lower costs of unlicensed marketing intermediaries, although the absence of rules and regulations creates its own problems regarding the reliability of marketing opportunities. Given the perishable nature of the product (c. 20–35 percent wastage rate),[123] increased availability of cold storage or cold chain transportation is needed so that processing facilities do not necessarily need to be near urban centers.

New private investment and/or public support is needed. Due to the climatic advantage and proximity to urban markets, the most likely contenders to capture this opportunity are the large-scale formalized dairy processing operations located in the highlands.

Agroforestry

BG[124] is a leading region in the country in terms of the area of land under private investment.[125] In addition to commonly grown cash crops such as sesame, maize, and oil seeds, which represent most of the commercial farming activity, bamboo presents a high potential commercial opportunity.

Investor interest has been registered for processed bamboo products, such as pulp, paper, fibers, plywood, and wood pellets, driven by: (i) plentiful availability of natural resource with over 750,000 ha of bamboo in the region; (ii) physical

[117] USAID Feed the Future (2017) Value Chain Analysis: Live Animals and Meat.
[118] Agricultural Transformation Agency (2017) Ethiopian National FMD Control Strategy and Program Design—Final Design Document.
[119] Aklilu Y. (2009). *Livestock and Animal Product Trade and Their Importance for Pastoral Economic Growth in Ethiopia.*
[120] Agricultural Transformation Agency (2018) *Beef and Dairy Cluster Strategies.*
[121] Livestock Master Plan, Roadmaps for Growth and Transformation (2015); USAID AGP-Livestock Market Development Project (2013), *Value Chain Analysis for Ethiopia: Meat and Live Animals, Hides, Skins and Leather, Dairy.*
[122] Agricultural Transformation Agency (2018) *Beef and Dairy Cluster Strategies.*
[123] SNV Ethiopia and Target Business Consultants Plc (2017), *Inventory of Dairy Policy, Ethiopia.*
[124] See Regional Report Annex on BG.
[125] The Federal Ministry of Agriculture (MOARD) (2013). Agricultural Investment Land Handed to Investors, Excel File (Data Set); MoA: Addis Ababa, Ethiopia.

attributes of lowland bamboo that make crushing it both technically simpler and commercially viable; and (iii) potentially attractive markets with rising prices for pulp, e.g., due to the closure of paper mills in China following tighter environmental regulations.

The benefits to the local population can include the sale of bamboo to investors/processing factories. According to initial estimates, 40–50 percent of bamboo would have to be sourced among smallholders outside of the investor-owned plantations,[126] and there would be employment for harvesting and post-harvest treatment as well. The cost calculations for transporting the product to the nearest port create a strong argument for investing in bamboo pulp processing facilities close to the source of the raw material to reduce transport costs. This would also create more jobs and capture more value for the country.

Spices

Spices are a historically significant commodity in Ethiopia, with the lowlands playing an important role in their cultivation (smallholders make up 98 percent of total production). The domestic market is reliably strong since spices play an important role in Ethiopian cooking and over 90 percent of spices are consumed domestically.

There is considerable potential for the lowlands (especially in SNNP, Oromia, and Afar) to play an increasing role in the US$16 billion world spice market. For example, SNNP is the leading region for ginger (~80 percent of national production) and turmeric (~75 percent of national production), both of which are exportable commodities, as well as black cardamom.[127] Ethiopian turmeric is of particularly high quality.

Supply chains tend to be long (with up to six intermediaries between the farmer and the end consumer), and the correspondingly high transaction costs serve to push up prices. Emerging exporting companies offer the potential of outgrow models, such as those operated by export companies.[128] The advantage of an outgrow model is that the processor/exporter provides the key role of aggregation and can address the lack of access to finance by smallholders by advancing inputs and/or credit.

Investment in market infrastructure is required in all aspects of the marketing chain but especially post-harvest handling, as 25 percent of output is lost in the "first mile,"[129] and quality is undermined as a result.

Extractive Sector

The extractive sector will become a significant feature of the Ethiopian economy within the next 20 years, and most of the resources[130] are in the lowlands. The sector's contribution will increase to 10 percent of GDP from its current level of 5.6 percent. Given the capital intensity of the sector, the benefits to the lowland regions will probably mainly come from higher overall government revenues and the increased scope for regional fiscal transfers rather than direct employment. Good governance is a critical precondition to maximize the economic and social benefits of extractives. Unquestionably, this will bring demands for the sharing of benefits to the region in terms of employment, services, and livelihood opportunities.

Most of the resources are in the lowlands, including gold (Guji and West Wellega zones in Oromia), tantalum (Guji zone, Oromia), gemstones (Oromia and Amhara), oil, natural gas (Somali), potash (Afar), and salt (Somali and Afar) as set out in Table 9.2. A key constraint is the ability of firms to prospect for minerals and the willingness of firms to invest.

Given the 15–20 years that will be needed for the mineral sector in Ethiopia to generate critical mass, the economic potential from the sector is clearly difficult to predict. However, based on the Strategic Assessment of the Ethiopian Mining Sector in 2014, three economic scenarios (conservative, probable, and possible) have been developed to present the potential based on exploitation of gold, potash, tantalum, and copper reserves. In a probable scenario, the mineral sector could generate export revenues of up to US$1.5 billion by 2024 from the sale of gold, copper, tantalum, and potash.

Figure 9.2 shows the potential revenues from the projects listed above. The sharp rise in revenue in 2023 is mainly linked to start-up production of

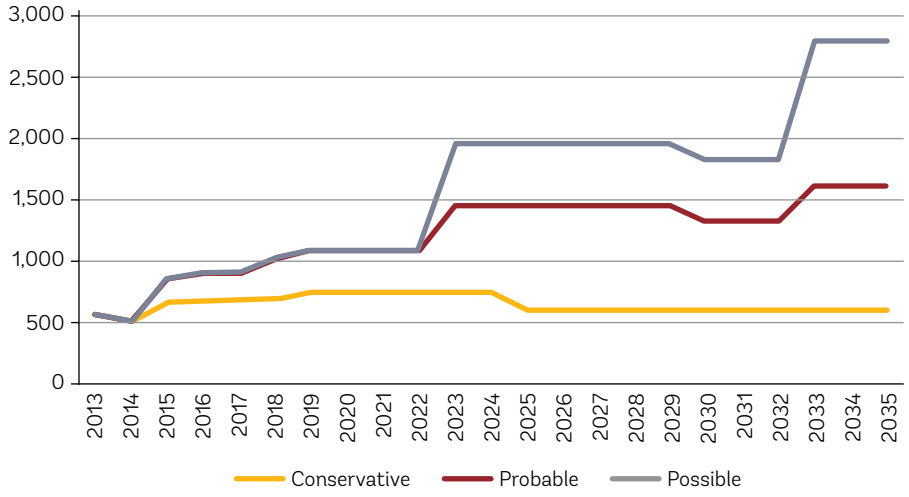
[126] Interview with McKinsey, DFID consultancy under EIAF on Industrial parks, January 2019.
[127] Herms S. (2015) Investment Opportunities in the Ethiopian Spices Sub-Sector, Advance Consulting.
[128] YSO (Yahia Sayed Omar) YSO Import-Export and ESEF (Ethiopian Spice Extraction Factory).
[129] Ibid.
[130] Minerals found in Ethiopia include gold, platinum, niobium, tantalum, nickel, copper, chrome, manganese, limestone, sandstone, gypsum, clay, lignite, opal, oil shale, laterite iron ore, bentonite, clay, perlite, diatomite, potash, halite, and oil and gas.

Table 9.2: Major exploration projects in lowland areas of Ethiopia

Type of mineral	Region	Locality and zone
Precious, base, and rare metals	BG	Baruda-Bulen, Ablarus, Bahu-Anjakoya, Yabanja and West Tangoy localities; Metekel zone
Gold and base metals	BG	Shungu and Nazali
Gold and base metals	BG	Sherkole locality; Asossa zone
Gold and base metals	BG	Oda Godere locality; Mengi and Oda Godere *woredas*; Asossa and Kamashi zones
Gold and base metals	BG	Asossa and Kurmuk
Gold and associated minerals	SNNP	Dizi, Sheka, and Surma *woredas*
Gold and associated minerals	Oromia	Haramfama and GenaleKorcha, Meda Welabu, Adolana, Oddo Shakiso *woredas*, Bale and Guji zones
Gold and base metals	Oromia	Okote, Borena, and Guji zones
Gold	Somali	Haramsam and Hasamite localities; Liben zone
Gold, silver, and base metals	Afar	Tendaho
Precious and base metals	Afar	Gabala and Gira localities
Potash	Afar	Musley and Crescent localities
Potash	Afar	Bada
Potash	Afar	Dallol
Natural gas	Somali	Ogaden

Source: Ministry of Mines.

Figure 9.2: Contribution of extractive sector exports 2013–35 (ETB M) scenarios



Source: Ministry of Mines.

new gold projects, while the fall in revenue in 2030 is linked to depletion of resources at the Midroc LegeDembi Mine. As new production comes on line for gold in 2033, revenue picks up again.

Tourism

Tourism makes substantial contributions by creating considerable employment and creating demand from micro, small-scale, and medium-scale enterprises for the production of goods and services. In line with the projections of GTP II, the government has set a high growth target of 5 million international visitors in 2025 with revenues of ETB 180 billion in 2025.[131]

The scale of the potential opportunity for the lowlands is not significant (including the Danakil Depression, Great Rift Valley Lakes, protected

[131] Ministry of Culture and Tourism (2015). Sustainable Tourism Master Plan 2015–2025.

wildlife areas, etc.). Attracting tourists will require investment in tourist infrastructure, marketing, and stability, as well as stronger local engagement, legal boundaries, and management plans to ensure that people in the lowlands benefit.

Further research is needed on tourist-linked employment potential for the lowlands. The evidence from Afar confirms that a significant amount of tourism development in Ethiopia is conducted with little engagement by or for local people; this is likely to link to low levels of human capital.

Key Drivers of Growth

The framework in Figure 9.3 shows the key economic growth sectors that are of significance to the lowlands. The four key drivers of economic growth[132] described below were identified as the key determinants of growth for the lowland peripheries. This growth will be critically dependent on the underlying political and economic conditions and requires specific policies to enable the growth generated by the markets to be inclusive and benefit the lowland population and pastoralists.

Government policies strengthening the enabling environment will be a precondition for successful engagement of the growth sectors with the economic growth drivers.

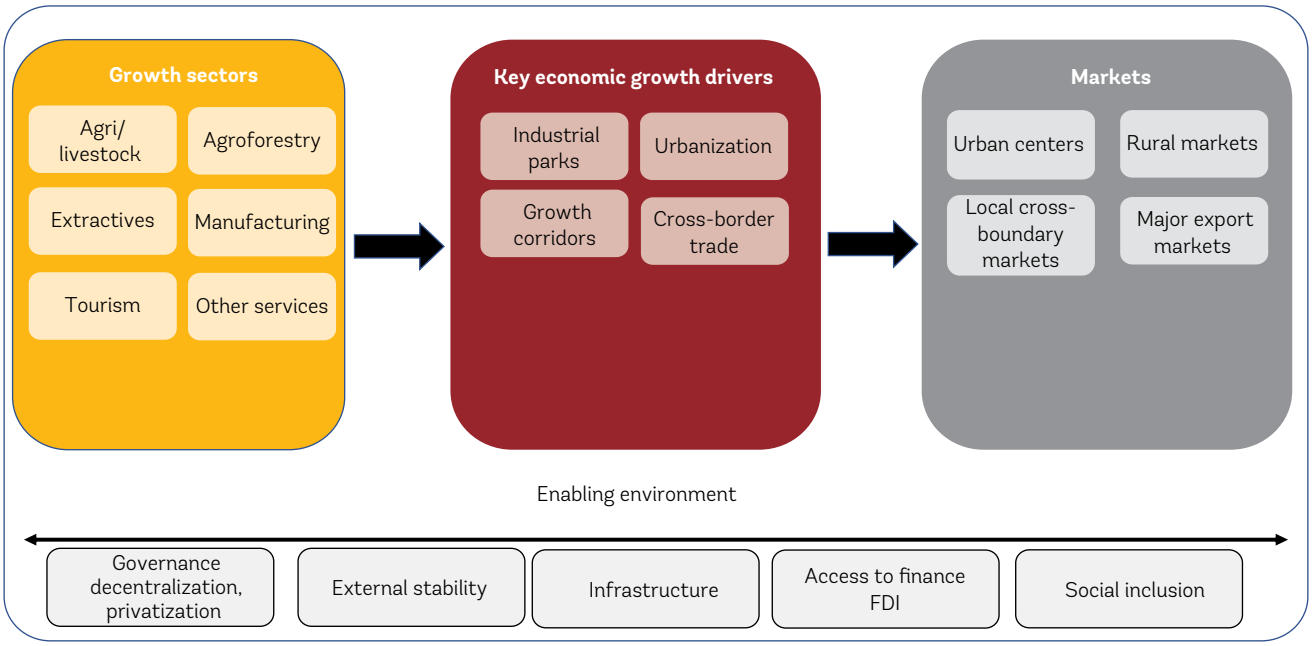
Governance and Stability

For the growth in these sectors to materialize and markets to be reached, the key economic growth drivers need to work for the benefit of the lowland population. This growth will be critically dependent on good governance and stability. The Growth and Transfromation Plan II (GTP II) of the Ethiopian Government highlights the importance of improving capacity at all levels of government administration and addresses: "*malpractices and governance problems are still prevalent in land use and administration, justice service, and public service deliveries in Government institutions.*" Weak governance is a deterrent to investors; investors will choose areas with a capable, engaged local administration.

Infrastructure

Improving connectivity through improved infrastructure and access to markets is critical. The lowland population has low levels of access to all-weather paved roads. Excluding Oromia and SNNP where the regional-level picture is likely to be skewed by better-developed highland areas, the lowlands are at a clear disadvantage: per 1,000 km, road density in Afar (12 km), BG (17 km), Gambella (16 km), and Somali (9 km) is significantly lower than in Amhara (35 km) or Tigray (32 km).[133]

Figure 9.3: Sectors and drivers for economic growth in the lowlands



[132] Figure 9.3 is a schematic representation. The identification and selection of the key drivers were discussed with MOFEC and DFID in December 2018.

[133] Ethiopian Road Authority estimates in "Existing Situation and Diagnostic Final Report, 2015" FDRE Ministry of Urban Development, Housing and Construction.

Crucially, most of the existing road network is unpaved—in higher rainfall regions of BG and Gambella this means that entire communities can be cut off during the rainy seasons.

Beyond roads, arguably one of the most significant infrastructure gaps is the shortage of border posts that would allow formalized cross-border trade, especially in Somali and Afar regions. Only seven posts have been set up across the entire length of the Somali region border with Somalia/Kenya, namely at Awbere, Tug Wajale, Hartishek, Gashamo, Ferfer, Dollo Ado, and Moyale. Currently, the only open posts are Moyale and Tug Wajale.

Market Development

Proactive government engagement is needed to support the development of market infrastructure and improvements in productivity in some key value chains, notably livestock, but also to facilitate the aggregation and development of the market for other value chains, notably spices.

Privatization will play a key role in market efficiency

There is a long legacy of state ownership in Ethiopia. State firms usually operate in a monopolistic environment, limiting the incentive to innovate and resulting in higher prices in some sectors (e.g., telecoms and logistics) but lower prices in others (e.g., energy). Nevertheless, the government has shown a commitment to private investment by attracting Foreign Direct Investment (FDI), particularly in manufacturing businesses in textiles, apparel, pharmaceuticals, and tanneries. Outside of the industrial parks and apart from petty trading, the concept of private-led commercialization is still underdeveloped, and the state is seen as the main actor for economic development.

Privatization and increased competition, along with continued foreign investment, could be major game changers for the lowlands. In particular, opening up the telecoms (especially if accompanied by financial sector reforms) and transport logistics sectors could have a major impact on lowland areas in addressing the critical constraints of access to finance and high transport costs. But this privatization process will need to ensure that: (i) the regulatory framework is transparent and encourages competition on a level playing field; (ii) investors have some form of political risk insurance; (iii) local communities are engaged; (iv) there is an emphasis on local job creation through backward linkages or value addition through processing; and (v) corporate and environmentally responsible policies and incentives are in place.

Access to Finance

Limited access to finance is a key barrier to economic growth, limiting start-up capital and business expansion. There are 35 Micro Finance Institutions (MFIs) of which the five largest are state owned. The state-owned MFIs are largely restricted to their own regional base, and competition in the industry is very limited. They are also especially influenced by their respective regional governments, which virtually own the MFI and provide below market-rate funds. There are major regional variations with stronger coverage in Somali than in Afar.

Overall, financial inclusion is low in Ethiopia compared to the rest of East Africa, particularly in the lowland areas. Figure 9.4 shows the skewed regional distribution of access to commercial or MFI bank accounts (and, inversely, of the unbanked population) between the highlands and the lowlands (the latter highlighted in bold). The share of population with access to a bank account is over 20 percent for women and 30 percent for men in Addis Ababa, Tigray, and Amhara. By contrast, in Somali, Oromia, SNNP, Benishangul-Gumuz (BG), and Afar, it is below 10 percent for women, and 20 percent for men.[134] Although gender disparities exist throughout the country, the relative disadvantages for women are even more marked in some of the lowland areas, notably BG, Afar, and Gambella.

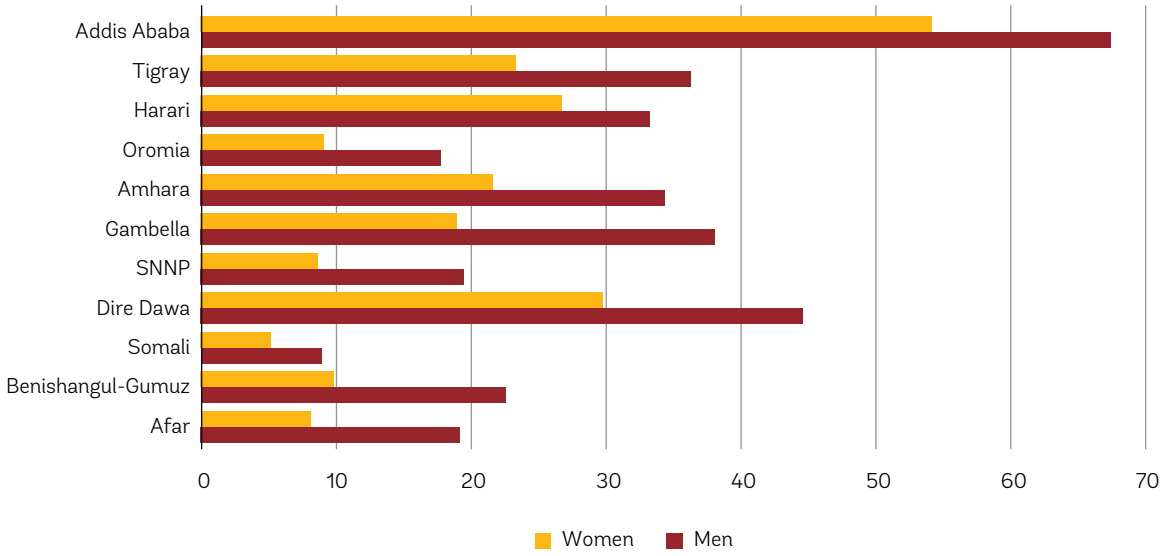
A significant portion of the population in the lowlands use *Iqub*, a rotating saving and credit association where each member agrees to regularly pay a small sum into a common pool so that each person, in rotation, can receive one large payout. These are often formed by people sharing the same employer, trade association, or business, or members of a community. These 'clubs' are unregulated, and the leader is in control of any net surplus of savings over loan disbursements, which is rarely placed in a dedicated account when it *is* banked.

A recent study[135] by the Association of Ethiopian Micro Finance Institutions (AEMFI) indicates that substantial cash holdings can be captured by Financial Institutions (FIs) with the correct

[134] DHS (2016).

[135] AEMFI Occasional Paper by Storrow/Gobezie/Figge (2015) '*Overview of Practical Challenges in Local Saving Mobilization by Ethiopian Microfinance Institutions*'.

Figure 9.4: Access to a bank account 2016



Source: DHS.

marketing techniques. This is important because the culture of holding cash savings at home, or buried outside for security, is reducing Ethiopia's liquidity. This cash is currently 'dead' in terms of potential for investment.

The National Financial Inclusion Strategy (NFIS)[136] seeking, inter alia, to develop strategies to capture these 'lost' savings notes that there are few financial services access points in Afar, BG, Somali, and Gambella regions, with only around 80 bank branches to serve a population of 8 million. It also notes that there is no detailed information about the location of financial service access points, and this hinders the outreach planning of financial institutions.

Access to financing for pastoralists is complicated by a general preference for and trust in holding savings in livestock, which is thought to be more advantageous than savings in banks. However, even if this barrier could be overcome, banks in Ethiopia have no legal framework to provide loans for pastoralists as they do not accept livestock as collateral. As far as pastoralists are concerned, livestock is their main asset; therefore, banks need to come up with innovative loan procedures to accommodate pastoralists.

The lowlands in general are in need of an increased financial services footprint. Completion of Geographic Information Systems (GIS) access points mapping would facilitate planning for improvement. In general, there is a direct correlation between economic advancement and the provision of new bank branches or increased mobile financial services that follow the intermediary principle of leveraging local savings to support local lending.

Unless there is a concerted effort to ensure financial institutions expand their networks, increase their footprint in the lowlands, and develop new instruments to cope with pastoralists' mobility, access to finance will remain a key constraint to smallholders expanding their herds.

Any support to financial inclusion will also require support to financial literacy and entrepreneurship. The evidence from NGO and government initiatives are that the most successful interventions are those that combine economic measures (e.g., access to finance, market information, and linkages) with social measures (e.g., training, education, and work to address discriminatory attitudes).

Some models of mobile money have potential, particularly for pastoralists who struggle to reach static banking facilities. Restrictions within the financial sector are preventing wider uptake, and so initiatives on agent-based mobile banking such as BelCash and HelloCash cannot operate at scale until the licensing of service providers is relaxed and/or the telecom sector liberalized. New creative instruments to support access to working capital financing for pastoralists need to be piloted.

Urbanization

Ethiopia is urbanizing very rapidly from a low base, and the pace of urbanization is estimated to have

[136] National Financial Inclusion Strategy (2017).

been rapidly increasing in recent years. Urbanization is particularly low, however, in the lowlands but is beginning to pick up pace. By 2025 the urban population in Ethiopia is expected to reach 27–30 percent of the total population, and by 2050 to rise to 38 percent of the population (86 million out of total projected national population of 226 million), or over three times the current level. In the lowlands the population is projected to rise to 35 million by 2050 of which 11 million will live in urban areas.[137]

Urban centers and the largest cities are concentrated in the highlands. The only city of any size in the lowlands is Dire Dawa (269,000). Any substantial urban population growth is likely to be associated with those centers located on the main transport, economic corridors, and trade routes, e.g., transport connections to the ports of Djibouti and Berbera linking Dire Dawa to the highland cities of Harar and Jijiga. Other 'oasis city' growth centers are projected for Gode in the Somali Region and Semera in Afar.

There is a strong correlation between the level of urbanization and economic value added. Effective, long-term economic development will involve (i) movement of labor from low productivity agricultural jobs to high productivity manufacturing jobs and services mainly in urban areas, and (ii) broader urban economic agglomeration benefits, which boost incomes and grow investment capital. Manufacturing is unlikely to play a significant role in the lowlands in the short to medium term, but backward linkages and opportunities for labor migration will be important.

Improved road infrastructure, rural-to-urban migration, and secondary city and market town development will all assist in the intensification of urban development. Urbanization, in turn, will assist with a reduction in poverty in both urban and rural areas.

The way that cities interact with their hinterlands is critical in driving more inclusive growth. Cities act as a stimulus to nearby agricultural development, providing ready access to local and wider markets. Processing industries that draw on and promote local agricultural outputs often follow. Efficient farming that feeds the growing urban population and responds to changing tastes for higher value produce can stimulate improved agricultural productivity. Hence, while the opportunity for urban manufacturing at scale in many lowland urban centers may be limited, there is significant scope for greater backward linkages from lowland areas to urban manufacturing hubs from improved transport connectivity.

Growth Corridors

The development of transport corridors that link the key centers of economic activity in the country to major ports is an important goal in the government's GTP II strategy. The economic development corridor (EDC) framework approach views transport corridors not only as a means of transporting goods, services, and people, but also as a tool for stimulating social and economic transformation in the wider region. They do this by: (i) concentrating transport and industrial infrastructure investment in a defined geographic area; (ii) removing non-physical barriers to the flow of goods, services, and people; (iii) promoting integrated governance and management of trans-boundary resources; and (iv) using the corridor as a concept to 'crowd-in' private sector investment'.

The transformation of a transport corridor to an economic development corridor follows four stages, given careful planning, political commitment, and stakeholder involvement:

Stage 1: Basic transport corridor: characterized by infrastructure (e.g., a road, rail, or waterway) physically linking two points of economic importance across a national border.

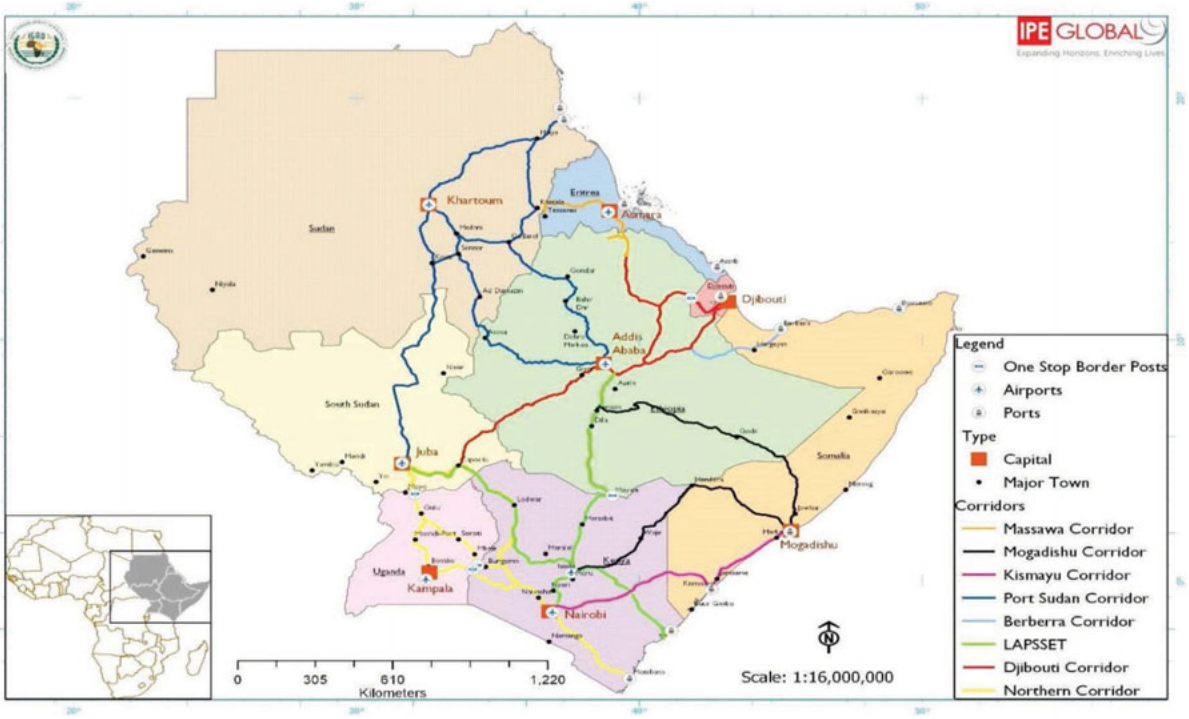
Stage 2: Multimodal transport corridor: characterized by the integration of modes of transport (e.g., combined road and rail) and the limited provision of logistics facilities, such as dry ports or warehousing along the route designed to facilitate the movement of traded goods.

Stage 3: Functional logistics corridor: characterized by a clearly defined institutional arrangement, such as a committee of the elected representatives of cities along the corridor or a special purpose vehicle which oversees and/or implements the corridor's regulations and cross-border trade agreements; and plans for the establishment and operation of related services, such as storage, warehousing, trucking, insurance, and freight management.

Stage 4: Economic development corridor (EDC): characterized by multimodal transportation infrastructure, the attraction of domestic

[137] Project based on Central Statistical Agency Population Projection of Ethiopia for All Regions at *Woreda* Level from 2014–2017.

Map 9.3: Transport corridors for the Ethiopian lowlands in the IGAD region



Source: IGAD Regional Infrastructure Master Plan, 2018.

investment and FDI, and the generation of economic activity and benefits in surrounding regions through a clearly defined spatial development initiative (SDI) focused on proactive urbanization and economic growth.

The right enabling environment is essential for a transport corridor to become an EDC. At present, more than 90 percent of Ethiopia's trade flows through the port of Djibouti, and the Djibouti Corridor has benefited from the most significant investment. The government has ambitious plans to develop transport corridors to reduce reliance on the port of Djibouti, including the Berbera Corridor, LAPSSET Corridor, Port Sudan Corridor, Massawa/Assab Corridor, and Mogadishu Corridor. These corridors are illustrated in Map 9.3.

Potential development corridors will traverse the lowland regions facilitated by transport connections and have the potential for a positive impact on lowland economies if two conditions are met. Firstly, intervention in 'last-mile' connectivity and warehousing and logistics are necessary to connect remote areas to the primary corridor infrastructure and to enable linkages between agrarian producers in peripheral areas to market their produce in the highlands and internationally. Secondly, management of some unintended negative consequences is required. As cargo shifts from the road to the Addis-Djibouti railway line, the transport corridor may no longer require the same level of supplementary services, and the lowland "truck stop" economy suffers.[138] A balance is needed between reducing transit time and costs through these corridors to promote overall trade and growth and create local economic opportunities.

The Djibouti Corridor has the highest potential, as it reaches the greatest number of lowland residents, includes the emerging urban cluster of Dire Dawa-Harar-Jijiga, and will continue to be the primary corridor for Ethiopian trade. There is significant untapped potential to increase trade between the western lowlands and South Sudan.

The Berbera Corridor has been given high priority by the government, given its 19 percent stake in the port, and as such is likely to receive future investments. New access to Eritrea's ports in Massawa and Assab could lead to greater opportunities along that corridor, though large freight volumes are only likely once the ports have been upgraded; short-term opportunities exist in burgeoning cross-border trade in items scarce in Eritrea. The LAPSSET

[138] Centre for Rural Development (SLE) Berlin (2017), Ethiopia's Arid and Semi-Arid Lowlands: Towards Inclusive and Sustainable Rural Transformation, SLE DISCUSSION PAPER 03/2017–E.

Corridor has significantly reduced travel time between Addis and Nairobi, providing new opportunities for bilateral trade. This route passes through the emerging urban cluster around Awassa, which will boost the prospects for an economic development corridor in this region with potential knock-on benefits for the SNNP lowlands. The long-term impact of the corridor will be reliant on the success of the planned port in Lamu and the ability of the Kenyan government to secure investment for its development, as well as associated infrastructure.

Cross-Border Trade

Cross-border trade has existed for centuries and plays a crucial economic, political, and social role for pastoralists in the Horn of Africa. This is largely an unrecorded activity but is a key driver of potential growth for the lowland regions. Informal trade is more important than formal trade along the Somaliland border with Ethiopia, with an estimated value between US$200–300 million, which is four to five times the formal trade.[139] Livestock is a significant element of cross-border trade with Somaliland.

The income from cross-border trade can be an important source of savings and capital for start-ups and can strengthen alternative livelihood activities.[140] Cross-border trade creates employment and business opportunities in related areas, e.g., pharmaceuticals for livestock, restaurants and bars, commodity sellers, *chat* traders, and holding ground and loading ramp facility providers.[141]

The prospect of formalizing cross-border trade should be pro-poor but faces a number of challenges. Currently, the benefits from informal trade are captured by elites, and although there has been an increased volume of recorded exports from the region (e.g., Somaliland, Djibouti, and Ethiopia), no substantial improvement is evident in the livelihoods of poorer pastoralists. The current policy favors formalizing larger scale livestock exports to international markets, a process from which poorer pastoralists are largely excluded.

Trade facilitation is limited, largely due to uncoordinated border management practices. COMESA has introduced the Simplified Trade Regime, i.e., a simplified customs clearance procedure for its member states for goods originating from the COMESA region. Small-scale cross-border traders benefit from completing simplified customs documents and simplified COMESA certificates of origin. IGAD[142] member states adopted a policy framework on informal cross-border trade that is aimed at improving cross-border security governance and seeks to achieve a common understanding and attitudinal shift regarding informal cross-border trade, as well as the standardization of IGAD member state's definitions of informal cross-border trade. This is yet to be implemented.

More border crossing points would generally open the opportunity for many areas of the lowlands, and of critical importance is the adoption of an integrated border management strategy. The absence of formal and regulated border crossing infrastructure has worked to the detriment of pro-poor growth in the lowlands, especially in relation to the livestock sector, whereby a buoyant illegal and informal trade in the South and East has enabled rents to be captured by a minority of powerful traders. Formalizing cross-border trade with improved transport and border infrastructure could generate more revenue at the federal level and may open up opportunities for many lowland areas, including widening the opportunity to livestock producers in particular.

Industrial Parks (IP)

The development of industrial parks is central to the government's policy of transitioning from an agro-based economy to an industrial one. Ethiopia's industrialization strategy recognizes that state intervention is necessary to support the development of new value chains for both export and import substitution. Neither the cement sector (import substitution) nor floriculture (export) would have grown without strong state support.

The IP policy will stimulate the demand for women employees who comprise the majority of employees in the textile, leather, and agroprocessing sectors. GTP II envisages creating 750,000 jobs in the medium- and large-scale manufacturing industries by 2020, with 60 percent of the low and medium skilled, and 30 percent of the high skilled jobs expected to be held by women. Low levels of human

[139] Ethiopia Ministry of Agriculture (2012): *Ethiopia Country Programming Paper to End Drought Emergencies in the Horn of Africa*, Ethiopia; Catley, et al., 2011 cited in MoA 2012.

[140] The Little study (2010) found about 25 percent of livestock traders in the Ethiopia/Somalia/Kenya cross-border trade were involved in selling staple foods, most of which were unofficially imported from Somalia and purchased with revenues from the livestock trade.

[141] Yacob A., and Catley A. (2010): *Pastoral Livestock Commercialization in Ethiopia: Driving economic growth or driving destitution?*

[142] IGAD (2018) *Policy Framework on the Informal Cross-Border Trade & Cross-Border Security Governance Nexus; Enhancing Cross-Border Cooperation and Cross-Border Economic Exchanges in the IGAD Region*, V. 17, January 2018.

capital are a constraint to labor mobility and full participation in the labor market for lowlanders. The low penetration of Technical and Vocational Education Training (TVET) in the lowlands could be considered to be a challenge, but quality of TVET education remains persistently low, and thus few factories see TVET education as a condition for employment.

It is unlikely that industrial parks will be a silver bullet for the lowlands. Apart from Dire Dawa, industrial parks are not generally being developed in lowland areas. Investors will invest where they have suitable labor supply, water, electricity, connectivity, conducive climatic conditions (to save cost on air conditioning), and good governance. The lowlands are sparsely populated and often poorly connected. Huge investment would be required, and geographic isolation and climate may deter investors in any case. There is an initiative by the government to promote integrated agro-industrial parks (IAIPs) in Semera (Afar), and the opportunity around the bamboo sector in BG has been highlighted.

Improving general connectivity without building industrial parks would be a more cost-effective way of encouraging investors. Two other key features apply to the lowlands: (i) the need for detailed research on the market opportunity of different value chains, and (ii) to apply a process of adaptation and learning based on the successful experience of the cement and flower industries. The key message here is that the needs of the potential investor should be the focus of government support and facilitation.

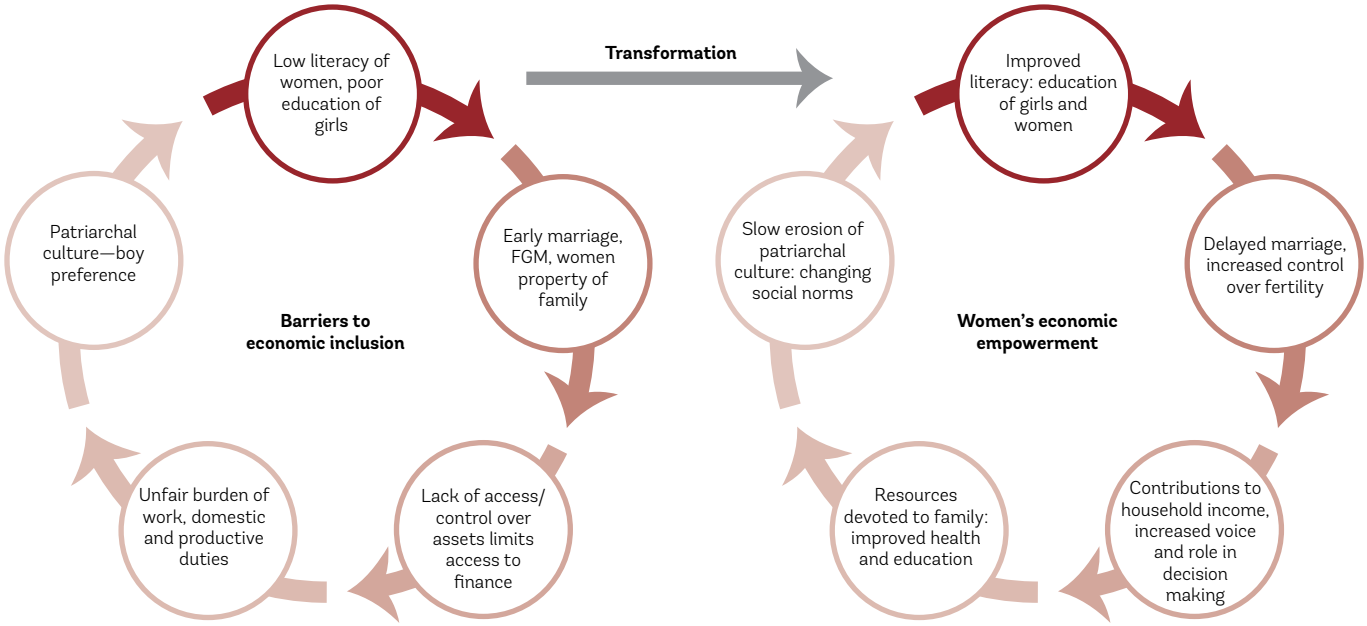
Focusing on addressing constraints to integrating lowland resources into manufacturing and agro-processing would create jobs and raise incomes, as well as boost productivity through exposure to export markets. Key to this is continuing to improve human capital that would empower more people to take advantage of new job opportunities being created throughout the country and in the lowlands, and to improve connectivity to urban centers and export markets. Other policy changes may incentivize FDIs to source more inputs from local inputs in a way that does not undermine their global competitiveness.

Enabling Social Inclusion

Ethiopia's recent growth trajectory has been rapid, but unless the next phase of growth adopts a transformative approach to addressing gender and social inclusion, there is a risk of leaving a large proportion of the population in the lowlands behind. There is also an economic imperative, since inequalities and social norms may hinder the ability of parts of the population to engage in formal economic activities. Recent IMF analysis suggests that eliminating gender gaps in both educational attainment and the rate of formal employment could increase Ethiopian GDP over time by over 24 percent.

A transformative approach is required that seeks to change gender norms, attitudes toward disability, and the imbalance of power between men and women and combines social interventions alongside economic interventions (Figure 9.5). This

Figure 9.5: Human capital and empowerment



is a long-term process to break the social norms underpinning the barriers to inclusion. In the long term the most fundamental routes to economic and social inclusion are to address geographic and gender inequalities in education and provide access to training.

Affirmative action to target girls, women, and people with disabilities is a necessary component in education, training, access to agricultural and livestock inputs, and finance to support small businesses. Similarly, cooperative approaches have been shown to be successful in both supporting small business and providing access to finance and building the stepping-stone from participation in Village Savings and Loans Associations (VSLA) through rural SACCOs to MFIs. Women are often unable to approach an MFI because of a lack of property or land to offer as collateral, the short time frame within which they may be required to repay a loan, or for cultural reasons. Therefore, this gradual step of combining social measures with economic ones is needed.

Conclusions

Historically, the lowlands have been peripheral[143] to the Ethiopian state: geographically, politically, and increasingly economically isolated from markets, finance, and industrialization opportunities. The government needs to take a strategy forward for the lowlands of Ethiopia, which has a long-term perspective and recognizes the diversity of opportunity and challenges in the area. At the forefront of any strategy should be the need to build the resilience of the lowland population.

Pastoralism is not a residual livelihood system that needs to be phased out, which, at times, is the tone of the GTP II.[144] Instead, it needs to be seen as a key feature of the lowland economy with enormous economic potential, as well as the livelihood of choice for a large proportion of the population. Mobility is part of this livelihood and not just a short-term coping strategy. Pastoralism will continue to be the main livelihood for large parts of the lowlands for the foreseeable future. It follows that a range of policies to support the pastoralist community are needed rather than policies to settle them, including access to markets for livestock, access to veterinary services, access to irrigation, relevant finance and insurance instruments, and health and education services.

While highland areas have experienced faster and more diverse growth, this study has shown that there is considerable growth potential in the lowlands, building on the comparative advantage of the area, in terms of livestock and niche agricultural products like spices, bamboo, and extractives, as well as exploiting the location of these areas along important trade and logistical routes to neighboring countries. Much of the economic disadvantage of the lowlands is related to poor infrastructure, poor transport access to the region, and high transport costs. Improving connectivity through improved infrastructure and access to markets is critical, and introducing greater competition in the freight and logistics sector is central to lowering costs. Understanding and reducing barriers to economic migration to take new jobs (e.g., in industrial parks) and develop the financial system to facilitate cheap, efficient remittance flows would also improve integration with the rest of Ethiopia.

There are some new critical sources of growth in the lowlands. The clearest growth opportunity is extractives, though local employment opportunities are likely to be limited and there are well-known risks to the broader tradeable sector from the effects of *Dutch disease*.[145] The main benefit from extractives to lowland areas would therefore be how revenues are redistributed to lowland areas. Other investment opportunities similarly would exploit lowland resources (e.g., bamboo). The simple message on financial inclusion is that all financial institutions need a greater footprint in the lowlands to address the very low levels of financial inclusion and the increasing gender gap between men and women. Poor access to financing and low levels of financial literacy were common themes from this study's regional consultation.

Proactive government engagement will be critical to support the development of market infrastructure and improvements in productivity in some key value chains, notably livestock, but also to facilitate the aggregation and development of the market for other value chains, notably spices. On livestock a first step would include range management, the development of cold chain storage, additional border posts, and veterinary and phytosanitary services.

[143] Markakis (2011) *Ethiopia The Last Two Frontiers.*

[144] Looking forward, further emphasis will be given to ensure the benefits to the pastoralists building on the achievements gained so far and through enhancing voluntary sedentary farming (crop farming) practices.

[145] The negative impact on an economy of sharp inflows of foreign currency.

There are considerable opportunities identified from the development of growth corridors. The absence of a formal and regulated border-crossing infrastructure has worked to the detriment of pro-poor growth in the lowlands, especially in relation to the livestock sector whereby a buoyant illegal and informal trade in the South and East has enabled rents to be captured by a minority of powerful traders. Formalizing cross-border trade with improved transport and border infrastructure opens up opportunities for many lowland areas and could widen the opportunities for livestock producers.

Underpinning the economic potential of the lowlands is the need to develop its human capital. Improved access to social services, particularly education and health, would empower more of the population to take advantage of economic opportunities in the lowlands but also elsewhere in the country. In addition, the cultural change of moving from a rural nomadic experience to an urbanized, industrialized lifestyle and work pattern will require long-term support. Addressing inclusion and gender equality is a slow process and will require time to change social norms. A transformative approach, cognizant of the cultural differences on the ground, is required to surmount the barriers to economic inclusion in the lowlands. This will require significant investment and long-term planning.

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Annex 1: Environment and Land Use Tables

Table A.1: Area by region, lowland/highland and lowland AEZ (km^2)

				Lowland AEZ			
	Lowland	**Highland**	**Total**	**Dry Berha**	**Dry Kolla**	**Moist Berha**	**Moist Kolla**
Addis Ababa	—	539	539				
Afar	94,384	773	95,157	41,568	52,817	—	—
Amhara	40,092	115,284	155,376	—	18,255	—	21,837
Benishangul-Gumuz	46,233	3,797	50,030	—	21,131	—	25,102
Dire Dawa	705	349	1,054	—	705	—	—
Gambella	29,579	1,129	30,708	—	2,128	17,238	10,213
Hareri	120	250	371	—	120	—	—
Oromia	141,970	180,877	322,848	992	107,495	96	33,387
SNNPR	61,100	47,445	108,545	8,619	25,881	—	26,600
Somali	304,952	7,861	312,814	92,337	212,615	—	—
Tigray	24,472	27,366	51,838	65	23,762	—	644
Total	**743,607**	**385,672**	**1,129,280**	**143,581**	**464,909**	**17,335**	**117,783**

Source: WB calculations based on Hurni (1982) and WLRC.

Table A.2: Average annual rainfall by region, lowland/highland, and lowland AEZ (mm/year)

				Lowland AEZ			
	Lowland	Highland	Total	Dry Berha	Dry Kolla	Moist Berha	Moist Kolla
Mean annual precipitation 1982–2017							
Afar	348.6	548.4	350.2	227.5	444.0		
Amhara	1,042.8	1,091.7	1,079.1		888.4		1,172.0
Benishangul-Gumuz	1,220.1	1,448.8	1,237.5		1,074.3		1,342.9
Gambella	1,135.3	1,810.2	1,160.1		1,297.8	985.0	1,355.1
Oromia	749.5	1,207.3	1,006.0	397.5	628.4	974.7	1,149.3
SNNPR	1,161.7	1,389.3	1,261.2	742.3	997.5		1,457.3
Somali	330.8	473.7	334.4	267.4	358.3		
Tigray	937.8	716.6	821.0	412.2	928.4		1,337.6
Total	**627.2**	**1,148.0**	**804.9**	**285.3**	**553.2**	**984.9**	**1,283.2**
Mean annual precipitation 1982–1999							
Afar	349.0	544.0	350.6	225.0	446.6		
Amhara	1,026.4	1,083.3	1,068.6		875.2		1,152.8
Benishangul-Gumuz	1,194.2	1,423.4	1,211.6		1,042.4		1,322.0
Gambella	1,116.4	1,795.3	1,141.3		1,266.1	967.7	1,336.1
Oromia	757.1	1,206.2	1,008.7	395.3	634.4	965.6	1,162.2
SNNPR	1,120.3	1,372.8	1,230.7	702.5	954.7		1,416.7
Somali	336.9	477.3	340.5	270.6	365.8		
Tigray	921.7	709.3	809.6	435.9	912.5		1,309.8
Total	**624.1**	**1,142.2**	**800.8**	**284.3**	**553.0**	**967.7**	**1,267.9**
Mean annual precipitation 2000–2017							
Afar	348.3	552.6	349.9	230.0	441.3		
Amhara	1,059.3	1,100.1	1,089.6		901.5		1,191.2
Benishangul-Gumuz	1,246.0	1,474.2	1,263.4		1,106.1		1,363.8
Gambella	1,154.2	1,825.2	1,178.8		1,329.4	1,002.2	1,374.1
Oromia	742.0	1,208.4	1,003.3	399.7	622.4	984.0	1,136.5
SNNPR	1,203.1	1,405.8	1,291.7	782.1	1,040.2		1,497.9
Somali	324.6	470.2	328.2	264.3	350.8		
Tigray	953.8	724.0	832.5	389.1	944.2		1,365.3
Total	**630.4**	**1,153.8**	**808.9**	**286.4**	**553.4**	**1,002.1**	**1,298.6**

Source: WB calculations and WLRC using CHIRPS. Excludes Addis Ababa, Dire Dawa, and Hareri.

Table A.3: Rainfall trend by region, lowland/highland, and lowland AEZ (mm/year)

				Lowland AEZ			
	Lowland	Highland	Total	Dry Berha	Dry Kolla	Moist Berha	Moist Kolla
Precipitation trend 1982–2017							
Afar	0.657	1.217	0.661	0.716	0.610		
Amhara	3.003	2.285	2.470		2.442		3.471
Benishangul-Gumuz	4.227	4.207	4.226		4.772		3.768
Gambella	2.987	3.035	2.989		4.823	2.708	3.077
Oromia	−0.590	0.989	0.295	0.615	−0.596	1.314	−0.610
SNNPR	5.432	3.142	4.431	5.176	5.310		5.633
Somali	−0.264	0.055	−0.256	0.114	−0.429		
Tigray	2.476	1.551	1.988	−1.859	2.442		4.180
Total	**0.935**	**1.702**	**1.197**	**0.595**	**0.492**	**2.700**	**2.836**
Precipitation trend 1982–1999							
Afar	5.456	10.842	5.500	3.148	7.273		
Amhara	11.279	11.283	11.282		11.477		11.113
Benishangul-Gumuz	8.392	7.789	8.346		10.761		6.398
Gambella	6.725	8.406	6.787		8.077	6.428	6.946
Oromia	−2.194	3.688	1.101	0.325	−2.874	4.107	−0.097
SNNPR	8.739	7.481	8.189	7.350	7.883		10.022
Somali	0.525	1.964	0.562	1.394	0.148		
Tigray	9.225	9.504	9.372	6.949	9.162		11.770
Total	**2.911**	**6.880**	**4.265**	**2.254**	**2.117**	**6.415**	**6.326**
Precipitation trend 2000–2017							
Afar	0.055	−3.994	0.022	0.923	−0.628		
Amhara	1.791	1.407	1.507		−0.679		3.856
Benishangul-Gumuz	8.178	8.975	8.239		6.201		9.843
Gambella	4.591	5.933	4.641		9.424	3.753	5.000
Oromia	2.517	3.517	3.077	3.157	2.110	0.327	3.814
SNNPR	7.131	6.692	6.939	7.555	6.096		8.002
Somali	1.492	0.836	1.476	1.641	1.428		
Tigray	−0.118	−1.994	−1.109	−6.244	−0.190		3.157
Total	**2.472**	**2.875**	**2.610**	**1.795**	**1.701**	**3.734**	**6.152**

Source: WB calculations and WLRC using CHIRPS. Annual trends are obtained by regressing annual total rainfall as a function of year on a pixel-by-pixel basis. The reported values are an average of the estimated slope coefficient for a given classification (weighted by area). Excludes Addis Ababa, Dire Dawa, and Hareri.

Table A.4: Key short-term agro-meteorological trends by seed location

Location cluster ID	Region	Elevation	AEZ	Rainfall (mm/year)	Max temp. (degrees/year)	Drought stress days (# days/year)
1	Afar	329	Dry <500 m (Dry Berha)	6.4	−0.3	−1.8
2	Afar	821	Dry 500–1,500 m (Dry Kola)	17.6	−0.3	−1.1
3	Afar	912	Dry 500–1,500 m (Dry Kola)	4.0	−0.4	−1.3
4	Somali	1,007	Dry 500–1,500 m (Dry Kola)	9.9	0.1	−0.9
5	Somali	384	Dry <500 m (Dry Berha)	3.7	−0.2	1.0
6	Somali	906	Dry 500–1,500 m (Dry Kola)	−12.7	−0.4	1.6
7	Oromia	1,430	Dry 500–1,500 m (Dry Kola)	−7.4	−0.3	−0.4
8	SNNP	594	Dry <500 m (Dry Berha)	3.6	−0.1	−0.7
9	Gambella	451	Moist <500 m (Moist Berha)	9.5	−0.7	−0.8
10	Benishangul-Gumuz	1,366	Moist 500–1,500 m (Moist Kola)	−3.1	−0.8	−1.5
11	Amhara	673	Dry 500–1,500 m (Dry Kola)	−15.0	−0.8	−0.1
12	Tigray	906	Dry 500–1 500 m (Dry Kola)	−13.5	−0.8	−0.2

Source: Trend estimates based on analysis by aWhere.

Table A.5: Average NDVI by region, lowland AEZ, and lowland/highland (index)

				Lowland AEZ			
	Lowland	Highland	Total	Dry Berha	Dry Kolla	Moist Berha	Moist Kolla
Mean NDVI 2000–2017							
Afar	0.152	0.278	0.153	0.113	0.182		
Amhara	0.395	0.357	0.366		0.347		0.435
Benishangul-Gumuz	0.512	0.545	0.515		0.483		0.537
Gambella	0.635	0.835	0.642		0.600	0.592	0.714
Oromia	0.402	0.511	0.463	0.136	0.378	0.561	0.487
SNNPR	0.525	0.587	0.552	0.397	0.479		0.610
Somali	0.235	0.259	0.235	0.208	0.246		
Tigray	0.317	0.284	0.299	0.099	0.314		0.433
Total	**0.324**	**0.454**	**0.369**	**0.191**	**0.302**	**0.592**	**0.535**
Mean NDVI 2000–2009							
Afar	0.153	0.281	0.154	0.113	0.185		
Amhara	0.403	0.359	0.371		0.353		0.445
Benishangul-Gumuz	0.517	0.550	0.519		0.486		0.543
Gambella	0.622	0.835	0.630		0.594	0.575	0.708
Oromia	0.404	0.518	0.468	0.136	0.379	0.550	0.493
SNNPR	0.526	0.594	0.556	0.389	0.477		0.617
Somali	0.233	0.260	0.234	0.209	0.244		
Tigray	0.324	0.283	0.302	0.101	0.321		0.439
Total	**0.325**	**0.459**	**0.371**	**0.191**	**0.302**	**0.575**	**0.541**
Mean NDVI 2010–2017							
Afar	0.150	0.273	0.151	0.114	0.178		
Amhara	0.384	0.353	0.361		0.338		0.422
Benishangul-Gumuz	0.506	0.539	0.509		0.479		0.529
Gambella	0.654	0.836	0.661		0.609	0.618	0.724
Oromia	0.399	0.502	0.457	0.137	0.376	0.578	0.480
SNNPR	0.523	0.577	0.547	0.407	0.481		0.601
Somali	0.237	0.258	0.237	0.208	0.249		
Tigray	0.307	0.284	0.295	0.096	0.305		0.425
Total	**0.324**	**0.447**	**0.366**	**0.192**	**0.302**	**0.618**	**0.528**

Source: WB calculations and WLRC using MODIS 250 m, 16-day composite (MOD13Q1). The dataset used to generate these estimates and for subsequent trend/regression analysis has been cleaned using a filtering routine to remove contaminated or low-quality pixels (i.e., cloud, shadow, etc.) was implemented along with a water mask to remove outlier observations and pixels which might skew results. Excludes Addis Ababa, Dire Dawa, and Hareri.

Table A.6: NDVI trend by region, lowland/highland, and lowland AEZ (%)

				Lowland AEZ			
	Lowland	Highland	Total	Dry Berha	Dry Kolla	Moist Berha	Moist Kolla
NDVI trend 2000–2017							
Afar	−0.11%	−0.16%	−0.11%	0.01%	−0.20%		
Amhara	−0.15%	−0.03%	−0.06%		−0.16%		−0.14%
Benishangul-Gumuz	0.02%	0.02%	0.02%		0.04%		0.01%
Gambella	0.30%	0.02%	0.29%		0.13%	0.39%	0.18%
Oromia	0.02%	−0.07%	−0.03%	0.13%	0.03%	0.29%	−0.01%
SNNPR	0.02%	−0.09%	−0.03%	0.19%	0.06%		−0.08%
Somali	0.07%	−0.03%	0.07%	−0.01%	0.10%		
Tigray	−0.16%	0.01%	−0.07%	−0.25%	−0.17%		−0.06%
Total	**0.02%**	**−0.05%**	**0.00%**	**0.01%**	**0.02%**	**0.39%**	**−0.03%**
NDVI trend 2000–2009							
Afar	−0.34%	−0.66%	−0.34%	−0.13%	−0.50%		
Amhara	−0.14%	−0.07%	−0.09%		−0.21%		−0.08%
Benishangul-Gumuz	0.00%	−0.02%	0.00%		0.00%		0.01%
Gambella	0.18%	0.05%	0.18%		0.09%	0.21%	0.16%
Oromia	0.22%	0.08%	0.14%	0.39%	0.22%	0.10%	0.20%
SNNPR	0.22%	0.01%	0.13%	0.49%	0.29%		0.07%
Somali	0.04%	−0.03%	0.04%	0.05%	0.04%		
Tigray	−0.18%	−0.21%	−0.20%	−0.10%	−0.18%		−0.06%
Total	**0.03%**	**0.00%**	**0.02%**	**0.03%**	**0.01%**	**0.21%**	**0.08%**
NDVI trend 2010–2017							
Afar	0.40%	1.00%	0.41%	0.43%	0.38%		
Amhara	0.61%	0.63%	0.63%		0.40%		0.78%
Benishangul-Gumuz	1.38%	1.27%	1.37%		1.49%		1.29%
Gambella	1.27%	0.15%	1.23%		0.33%	1.62%	0.87%
Oromia	0.15%	0.34%	0.26%	−0.18%	0.04%	1.53%	0.50%
SNNPR	−0.26%	0.17%	−0.07%	−0.88%	−0.36%		0.04%
Somali	0.22%	−0.15%	0.21%	0.05%	0.29%		
Tigray	0.55%	0.61%	0.58%	−0.47%	0.54%		0.80%
Total	**0.33%**	**0.43%**	**0.37%**	**0.10%**	**0.28%**	**1.62%**	**0.65%**

Source: WB calculations and WLRC using MODIS 250 m, 16-day composite (MOD13Q1). Values in the table represent trends as percentage change for a given study period (weighted by area). These values are computed by regressing on a pixel-by-pixel the full collection of NDVI observations against time to estimate the slope coefficient and expressed as an elasticity. Excludes Addis Ababa, Dire Dawa, and Hareri.

Table A.7: Average EVI by region, lowland AEZ, and lowland/highland (index)

				Lowland AEZ			
	Lowland	Highland	Total	Dry Berha	Dry Kolla	Moist Berha	Moist Kolla
Mean EVI 2000–2017							
Afar	0.088	0.161	0.089	0.065	0.106		
Amhara	0.224	0.195	0.203		0.193		0.250
Benishangul-Gumuz	0.287	0.303	0.288		0.269		0.301
Gambella	0.380	0.487	0.384		0.350	0.349	0.439
Oromia	0.219	0.297	0.263	0.089	0.203	0.334	0.273
SNNPR	0.309	0.357	0.330	0.234	0.274		0.367
Somali	0.140	0.157	0.140	0.132	0.143		
Tigray	0.184	0.166	0.175	0.066	0.183		0.242
Total	**0.187**	**0.262**	**0.213**	**0.119**	**0.171**	**0.349**	**0.310**
Mean EVI 2000–2009							
Afar	0.089	0.163	0.089	0.065	0.107		
Amhara	0.228	0.197	0.205		0.196		0.255
Benishangul-Gumuz	0.291	0.307	0.292		0.273		0.306
Gambella	0.370	0.488	0.375		0.345	0.335	0.435
Oromia	0.219	0.301	0.265	0.088	0.203	0.327	0.276
SNNPR	0.309	0.363	0.333	0.226	0.272		0.373
Somali	0.138	0.157	0.139	0.132	0.141		
Tigray	0.188	0.166	0.176	0.067	0.186		0.247
Total	**0.187**	**0.265**	**0.214**	**0.118**	**0.170**	**0.335**	**0.314**
Mean EVI 2010–2017							
Afar	0.087	0.159	0.088	0.066	0.104		
Amhara	0.218	0.193	0.199		0.189		0.242
Benishangul-Gumuz	0.281	0.298	0.282		0.264		0.295
Gambella	0.396	0.485	0.399		0.357	0.371	0.446
Oromia	0.218	0.292	0.260	0.089	0.204	0.348	0.269
SNNPR	0.309	0.350	0.326	0.244	0.278		0.359
Somali	0.141	0.156	0.142	0.132	0.145		
Tigray	0.179	0.166	0.172	0.064	0.177		0.235
Total	**0.187**	**0.258**	**0.211**	**0.119**	**0.171**	**0.371**	**0.305**

Source: WB calculations and WLRC using MODIS 250 m, 16-day composite (MOD13Q1). The dataset used to generate these estimates and for subsequent trend/regression analysis has been cleaned using a filtering routine to remove contaminated or low-quality pixels (i.e., cloud, shadow, etc.) and was implemented along with a water mask to remove outlier observations and pixels which might skew results. Excludes Addis Ababa, Dire Dawa, and Hareri.

Table A.8: EVI trend by region, lowland/highland, and lowland AEZ (%)

				Lowland AEZ			
	Lowland	Highland	Total	Dry Berha	Dry Kolla	Moist Berha	Moist Kolla
EVI trend 2000–2017							
Afar	−0.14%	−0.15%	−0.14%	−0.02%	−0.23%		
Amhara	−0.17%	−0.05%	−0.08%		−0.17%		−0.16%
Benishangul-Gumuz	−0.06%	−0.03%	−0.06%		−0.05%		−0.07%
Gambella	0.37%	−0.03%	0.36%		0.15%	0.52%	0.17%
Oromia	0.05%	−0.06%	−0.01%	0.11%	0.07%	0.33%	−0.02%
SNNPR	0.02%	−0.12%	−0.04%	0.23%	0.09%		−0.11%
Somali	0.08%	−0.04%	0.08%	−0.01%	0.12%		
Tigray	−0.17%	−0.01%	−0.08%	−0.25%	−0.17%		−0.14%
Total	**0.02%**	**−0.06%**	**−0.01%**	**0.00%**	**0.03%**	**0.52%**	**−0.06%**
EVI trend 2000–2009							
Afar	−0.42%	−0.71%	−0.42%	−0.17%	−0.61%		
Amhara	−0.22%	−0.13%	−0.15%		−0.32%		−0.14%
Benishangul-Gumuz	−0.14%	−0.11%	−0.14%		−0.16%		−0.13%
Gambella	0.16%	−0.18%	0.15%		0.14%	0.21%	0.07%
Oromia	0.21%	0.04%	0.12%	0.35%	0.23%	0.14%	0.13%
SNNPR	0.17%	−0.08%	0.07%	0.45%	0.25%		0.01%
Somali	0.05%	−0.04%	0.05%	0.03%	0.06%		
Tigray	−0.21%	−0.26%	−0.23%	−0.14%	−0.21%		−0.13%
Total	**0.00%**	**−0.05%**	**−0.02%**	**0.00%**	**−0.01%**	**0.21%**	**−0.01%**
EVI trend 2010–2017							
Afar	0.12%	0.83%	0.13%	0.10%	0.14%		
Amhara	0.43%	0.63%	0.58%		0.27%		0.56%
Benishangul-Gumuz	1.29%	1.22%	1.29%		1.35%		1.25%
Gambella	1.42%	0.21%	1.38%		0.24%	1.78%	1.06%
Oromia	0.10%	0.35%	0.24%	−0.14%	−0.03%	1.37%	0.53%
SNNPR	−0.33%	0.18%	−0.10%	−1.12%	−0.47%		0.07%
Somali	0.12%	−0.26%	0.11%	−0.06%	0.19%		
Tigray	0.40%	0.53%	0.47%	−0.65%	0.40%		0.58%
Total	**0.23%**	**0.43%**	**0.30%**	**−0.08%**	**0.17%**	**1.78%**	**0.63%**

Source: WB calculations and WLRC using MODIS 250 m, 16-day composite (MOD13Q1). Values in the table represent trends as percentage change for a given study period (weighted by area). These values are computed by regressing on a pixel-by-pixel the full collection of NDVI observations against time to estimate the slope coefficient and expressed as an elasticity. Excludes Addis Ababa, Dire Dawa, and Hareri.

Table A.9: Land use and land cover (LULC) classes and definitions

LULC class	Description
Forest	An area covered with natural and plantation tree species with more than 30% crown cover, 5 meters height at maturity, and greater than 0.5 ha in area.
Woodland	The land occupied by woody species with open crown cover.
Shrub and bush	Shrubs and bushes.
Cropland	A land cover with different crops and physical conservation structures on it.
Grassland	A land used for pasture and occupied by grass species. Physical and biological measures done on grassland categorize it as grassland.
Bare land	A land without any vegetation. It includes rocky surfaces, sandy surfaces, roads, etc.
Swamp and marsh area	An area occupied with a water body and having aquatic grass and herb species for more than nine months in the year.
Water body	Water body includes lakes, big ponds and dam areas.
Settlement	Small and big towns with dense houses. It does not include rural settlements.

Source: WLRC.

Table A.10: Summary of LULC by highland/lowland (1986 and 2016)

	Highland			Lowland			National		
	Area (1,000 ha)		Change	Area (1,000 ha)		Change	Area (1,000 ha)		Change
Land use category	1986	2016	%	1986	2016	%	1986	2016	%
Forest	5,915	5,478	–7%	5,064	3,318	–34%	10,979	8,795	–20%
Woodland	5,666	3,692	–35%	30,688	22,919	–25%	36,355	26,611	–27%
Shrub/bush	5,534	4,464	–19%	19,436	23,355	20%	24,970	27,819	11%
Cropland	13,847	17,962	30%	2,234	4,691	110%	16,081	22,653	41%
Grassland	5,278	3,798	–28%	7,106	9,392	32%	12,385	13,189	6%
Bare land	1,416	2,154	52%	9,102	10,007	10%	10,518	12,161	16%
Wetland	133	60	–55%	478	298	–38%	611	359	–41%
Water body	471	497	5%	241	349	45%	711	846	19%
Settlements	57	239	321%	11	32	179%	68	270	297%

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.11: Lowland LULC (1986, 2000, and 2016)

	Area (1,000 ha)			Change (%)		
Land use category	1986	2000	2016	1986–2000	2000–2016	1986–2016
Forest	5,064	3,954	3,318	–22%	–16%	–34%
Woodland	30,688	29,635	22,919	–3%	–23%	–25%
Shrub/bush	19,436	20,164	23,355	4%	16%	20%
Cropland	2,234	3,232	4,691	45%	45%	110%
Grassland	7,106	8,638	9,392	22%	9%	32%
Bare land	9,102	8,002	10,007	–12%	25%	10%
Wetland	478	407	298	–15%	–27%	–38%
Water body	241	268	349	11%	30%	45%
Settlements	11	—	32	—	—	179%

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.12: Lowland forest (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	124.3	119.8	–4%
Amhara	142.9	125.2	–12%
Benishangul-Gumuz	555.9	542.4	–2%
Dire Dawa	2.6	0.7	–74%
Gambella	535.8	511.4	–5%
Hareri	2.1	0.3	–87%
Oromia	1,177.6	695.1	–41%
SNNPR	1,564.9	866.6	–45%
Somali	898.3	423.8	–53%
Tigray	59.3	32.4	–45%
Total	**5,063.6**	**3,317.7**	**–34%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.13: Lowland cropland (1986, 2000, and 2016)

Region	Area (1,000 ha)			Change (%)		
	1986	2000	2016	1986–2000	2000–2016	1986–2016
Afar	27.7	45.7	147.1	65%	222%	431%
Amhara	463.1	615.7	716.2	33%	16%	55%
Benishangul-Gumuz	205.9	370.2	519.3	80%	40%	152%
Dire Dawa	10.8	9.9	11.6	–8%	17%	7%
Gambella	27.3	39.0	106.8	43%	174%	292%
Hareri	6.2	6.0	7.0	–3%	16%	12%
Oromia	588.9	947.1	1,378.5	61%	46%	134%
SNNPR	414.5	446.7	853.8	8%	91%	106%
Somali	147.1	250.7	410.7	70%	64%	179%
Tigray	342.7	500.8	540.4	46%	8%	58%
Total	**2,234.1**	**3,231.9**	**4,691.3**	**45%**	**45%**	**110%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.14: Lowland grazing and forage* (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	3,006.6	2,786.8	–7%
Amhara	3,204.6	2,826.6	–12%
Benishangul-Gumuz	3,844.9	3,545.5	–8%
Dire Dawa	49.3	47.2	–4%
Gambella	2,185.2	2,139.0	–2%
Hareri	3.6	3.9	7%
Oromia	12,053.4	11,631.5	–4%
SNNPR	3,939.6	4,136.5	5%
Somali	27,015.8	26,872.4	–1%
Tigray	1,928.2	1,676.1	–13%
Total	**57,231.3**	**55,665.4**	**–3%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

*Grazing and forage land combines three LULC categories: woodland, shrub and bush, and grassland.

Table A.15: Lowland woodland (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	571.1	342.7	–40%
Amhara	1,503.5	1,082.0	–28%
Benishangul-Gumuz	2,801.7	1,767.7	–37%
Dire Dawa	17.4	14.1	–19%
Gambella	667.3	665.6	0%
Hareri	2.1	1.0	–54%
Oromia	7,679.1	5,225.2	–32%
SNNPR	2,035.6	1,935.7	–5%
Somali	14,554.3	11,487.5	–21%
Tigray	856.2	397.7	–54%
Total	**30,688.3**	**22,918.9**	**–25%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.16: Lowland shrub and bush (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	1,471.7	1,476.4	0%
Amhara	1,237.3	1,299.0	5%
Benishangul-Gumuz	767.3	1,241.2	62%
Dire Dawa	15.7	17.1	9%
Gambella	847.2	789.7	–7%
Hareri	1.1	2.0	93%
Oromia	3,242.7	4,883.3	51%
SNNPR	1,451.5	1,527.5	5%
Somali	9,467.4	11,300.5	19%
Tigray	934.7	818.4	–12%
Total	**19,436.5**	**23,355.0**	**20%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.17: Lowland grassland (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	963.8	967.7	0%
Amhara	463.9	445.7	–4%
Benishangul-Gumuz	275.9	536.6	94%
Dire Dawa	16.2	16.1	0%
Gambella	670.7	683.7	2%
Hareri	0.5	0.9	91%
Oromia	1,131.7	1,523.1	35%
SNNPR	452.5	673.3	49%
Somali	2,994.1	4,084.5	36%
Tigray	137.3	460.1	235%
Total	**7,106.4**	**9,391.5**	**32%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.18: Lowland bare land (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	6,125.7	6,284.0	3%
Amhara	190.4	322.7	70%
Benishangul-Gumuz	15.8	13.1	–17%
Dire Dawa	7.1	8.2	16%
Gambella	4.8	14.9	211%
Hareri	0.0	0.9	343.5%
Oromia	225.6	313.6	39%
SNNPR	78.6	104.3	33%
Somali	2,337.3	2,750.8	18%
Tigray	116.5	194.4	67%
Total	**9,101.7**	**10,006.9**	**10%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.19: Lowland swamp and marsh (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	81.0	19.9	–75%
Amhara	5.5	0.3	–94%
Benishangul-Gumuz	0.1	0.9	643%
Dire Dawa	—	—	—
Gambella	202.7	182.0	–10%
Hareri	—	—	—
Oromia	78.9	20.6	–74%
SNNPR	27.1	45.6	68%
Somali	82.6	28.9	–65%
Tigray	0.0	0.0	–3%
Total	**478.0**	**298.2**	**–38%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.20: Lowland waterbody (1986 and 2016)

Region	Area (1,000 ha)		Change (%)
	1986	2016	1986–2016
Afar	72.9	78.3	7%
Amhara	0.7	12.8	1,614%
Benishangul-Gumuz	0.0	0.4	3,145%
Dire Dawa	—	—	—
Gambella	1.1	2.4	119%
Hareri	—	—	—
Oromia	69.3	152.9	121%
SNNPR	84.9	98.6	16%
Somali	11.7	3.1	–74%
Tigray	0.1	1.1	1,618%
Total	**240.7**	**349.5**	**45%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.21: Lowland settlement (1986 and 2016)

Region	Area (ha)		Change (%)
	1986	2016	1986–2016
Afar	235.0	2,482.0	956%
Amhara	2,029.0	5,490.0	171%
Benishangul-Gumuz	739.0	1,614.0	118%
Dire Dawa	717.0	2,769.0	286%
Gambella	937.0	1,348.0	44%
Hareri	32.0	20.0	–38%
Oromia	3,415.0	5,000.0	46%
SNNPR	466.0	4,765.0	923%
Somali	2,449.0	5,583.0	128%
Tigray	374.0	2,671.0	614%
Total	**11,393.0**	**31,742.0**	**179%**

Source: WB calculations based on data from WLRC, ESA, and DevSeed.

Table A.22: EHAIA land concession details

Region	Number of leases	Average area (ha)	Total area (ha)	Median (ha)	Standard deviation (ha)	Maximum (ha)
Benishangul-Gumuz	446	549	244,930	325	1,112	20,029
Gambella	520	800	416,252	528	865	9,990
SNNPR	20	3,485	69,694	1,001	4,648	18,516
Total	986	741	730,876	501	1,242	20,029

Source: Ethiopian Horticulture and Agriculture Investment Agency (EHAIA). Figures reflect all types of concession and cover the majority of land concessions issued between 2015 and 2017 in these three regions. Information on land concessions from other regions was not provided.

Table A.23: Large farms and concessions by region

Region	Area (ha)	% of lowland area
Afar	84,889	0.90%
Amhara	16,998	0.42%
Benishangul-Gumuz	254,448	5.50%
Gambella	437,932	14.81%
Oromia	24,595	0.17%
SNNPR	134,369	2.20%
Somali	12,542	0.04%
Tigray	44,060	1.80%
Total	**1,009,833**	**1.36%**

Source: WB calculations using information on land concessions from Ethiopian Horticulture and Agriculture Investment Agency (EHAIA) plus DevSeed. Areas reflect areas identified as land concessions (from EHAIA data), DevSeed, or where these datasets overlap.

Table A.24: *Prosopis* expansion in Afar 2000–2016/17

	2000		2016/17		% Change 2000–2016/17	
	Prosopis present	High infestation	*Prosopis* present	High infestation	*Prosopis* present	High infestation
Area (ha)	828,411	41,529	1,173,300	306,409	42%	638%
% of lowland area	8.8%	0.4%	12.4%	3.2%		

Source: WLRC.

Annex 2: Methodology for Measuring Household Vulnerability

The method used to estimate vulnerability to poverty is based on Gunther and Hartgen (2009) who integrated a two-level hierarchical model (e.g., Hox, 2010) into Chaudhuri's (2002, 2003) method to estimate vulnerability from cross-sectional or short panel data resolving the problem of missing lengthy panel data (see, e.g., Chaudhuri, Jalan, & Suryahadi, 2002, for applications). The two key features of the model are (i) the error term in the consumption regression or the unexplained variance in the consumption of otherwise identical households is decomposed into household-specific and community (*woreda*)-specific shocks to household consumption; and (ii) the variance of these two types of shocks is then modelled as a function of observable household and community (*woreda*) characteristics.

Specifically, let $i = 1, \ldots, N$ denote household at level one and $j = 1, \ldots, J$ denote communities *(woredas)* at level two, with households being nested within communities *(woredas)*. Consumption of household i in community j is specified as

$$lnc_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + e_{ij} \quad (1)$$

The coefficients (both constant term and slopes) of each community are assumed to be affected by community observed (Z) and community unobserved factors denoted by u_{0j} and u_{1j}

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + u_{0j} \quad (2)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + u_{1j} \quad (3)$$

Substituting (2) and (3) into (1) yields the regression equation

$$lnc_{ij} = \gamma_{00} + \gamma_{01}Z_j + (\gamma_{10} + \gamma_{11}Z_j)X_{ij} + u_{0j} + u_{1j}X_{ij} + e_{ij} \quad (4)$$

Or

$$lnc_{ij} = \gamma_{00} + \gamma_{01}Z_j + (\gamma_{10} + u_{1j})X_{ij} + \gamma_{11}Z_jX_{ij} + u_{0j} + e_{ij} \quad (4a)$$

Equation (4a) implies that the hierarchical model as specified amounts to a random coefficient (or random slopes) model. Thus, there are three errors terms to be estimated u_{0j}, u_{1j}, and e_{ij}, whereby captures the idiosyncratic shocks u_{0j} and $u_{1j}X_{ij}$ capture the community covariate shocks. Specifically, u_{0j} captures the *direct* effect of covariate shocks affecting the intercept of each community and thus all households in the same community in the same manner, $u_{1j}X_{ij}$ and captures the *indirect* effect of covariate shocks. In practice, a likelihood ratio test may be used to test whether a random coefficient model is more appropriate than a simple random effects model, where only the direct effect of the community covariate shocks is taken into account.

Step 1: Equation (4a) above is estimated using Stata's command for mixed-effects maximum likelihood regression.

Step 2: Regress squared residuals e_{ij}^2 and u_{0j}^2 of Equation (4a) from step 1 above on X_{ij} and Z_j

- $\sigma_{e_{ij}}^2 = e_{ij}^2 = \theta_0 + \theta_1 Z_j + \theta_3 X_{ij} Z_j$
- $\sigma_{u_{0j}}^2 = u_{0j}^2 = \tau_0 + \tau_1 Z_j$
- $\sigma_{u_{0j}+e_{ij}}^2 = (u_{0j} + e_{ij})^2 + \pi_0 + \pi_1 Z_j + \pi_3 X_{ij} Z_j$

Assuming consumption is log-normally distributed, one can estimate the probability of consumption falling below the poverty line z and using a threshold for this probability (e.g., 50%) to define who is vulnerable to poverty (i.e., a household is vulnerable if $\widehat{v_{ij}} \geq 0.5$). The poverty threshold is set at 20 percent, which is equivalent to having a 50 percent probability of falling below the poverty line in any given year.

$$\widehat{v_{ij}} = P(lnc_{ij} < lnz \mid X, Z) = \phi\left(\frac{lnz - \widehat{lnc_{ij}}}{\sqrt{\widehat{\sigma_{u_{0j}+e_{ij}}^2}}}\right)$$

If instead of $\widehat{\sigma_{u_{0j}+e_{ij}}^2}$, in the denominator, we use

- $\widehat{\sigma_{u_{0j}}^2} \rightarrow$ vulnerability to poverty from covariate or *woreda* level shocks
- $\widehat{\sigma_{e_{ij}}^2} \rightarrow$ vulnerability to poverty from idiosyncratic shocks

There are two main caveats associated with the method that are important to bear in mind:

- The cross-sectional variance is assumed to estimate future intertemporal variance in consumption. This implicitly assumes that the variance in consumption of a particular household is constant over time.
- There is no measurement error in consumption and/or no time invariant of unobserved fixed effects. If there is measurement error, this can lead to an overestimate of the variance of consumption, especially to an overestimation of the impact of idiosyncratic shocks on consumption. In principle, this can be addressed by checking the robustness of the vulnerability estimates under alternative assumptions about the proportion of the estimated variance of consumption that is due to measurement error.


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