



Migration and Conservation in the Bale Mountains Ecosystem

International Institute for Sustainable Development

The International Institute for Sustainable Development (IISD) is one of the world's leading centres of research and innovation. The Institute provides practical solutions to the growing challenges and opportunities of integrating environmental and social priorities with economic development. We report on international negotiations and share knowledge gained through collaborative projects, resulting in more rigorous research, stronger global networks, and better engagement among researchers, citizens, businesses and policy-makers.

IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the International Development Research Centre (IDRC) and from the Province of Manitoba. The Institute receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations, the private sector, and individuals.

Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700

Fax: +1 (204) 958-7710

Website: www.iisd.org

Twitter: @IISD_news

Geneva Office

International Environment House 2
9 chemin de Balaxert
1219 Châtelaine
Geneva, Switzerland

Tel: +41 22 917-8683

Fax: +41 22 917-8054

Cover photo credit: Alec Crawford

Migration and Conservation in the Bale Mountains Ecosystem

August 2015

Written by Dereje Tadesse Wakjira, Frankfurt Zoological Society;
Floris D'Udine, Conservation Development Centre; and Alec
Crawford, International Institute for Sustainable Development

The authors would like to thank our field coordinator, Abdulkadir Ibrahim; our field assistants, Hussien Abdulahi, Abdulahi Hasen, Teyib Abdulmenan and Nibras Ibrahim; our GIS specialist, Merga Deyas; as well as the residents of the study kebeles, for their invaluable help in conducting the research for this report.



Executive Summary

Bale Mountains ecosystem is located in southeast Ethiopia. It is made up of Bale Mountains National Park (BMNP), a globally important centre of endemism, in the north, and Harennna Forest, the largest remaining stand of moist tropical forest in Ethiopia, in the south. Harennna Forest has experienced a major influx of migrants since the 1990s, largely driven by local political factors relating to the area's administrative subdivisions. This threatens the forest's critical conservation values and ecosystem services.

In order to better understand what is driving this migration, how it is impacting the ecosystem, and how these impacts can be addressed, the project team conducted desk and field-based research on two sections of the forest that have been affected by very different migration scenarios: the *woredas* (districts) of Harennna Buluk and Delo Mena. Harennna Buluk is located in the southwest portion of the forest, and has experienced large-scale migration over the past 20 years. By contrast, Delo Mena, which is in the southeast of the forest, has seen minimal levels of migration.

The influx of migrants into Harennna Buluk has been driven by a combination of pull factors relating to local politics and the perceived availability of land, and push factors relating to limited economic opportunities and access to suitable agricultural land in the migrants' areas of origin. The most significant pull factor has been the desire of political elites to rapidly increase the district's population by actively promoting migration. Delo Mena has a similar terrain and climate to Harennna Buluk, but lacks the same political forces; migration to the area has been limited.

Livelihoods in the region have traditionally revolved around pastoralism. However, the migrant population in Harennna Buluk has introduced new and more profit-oriented livelihoods centred on crop farming, and local residents have rapidly adopted the farming methods of their migrant neighbours. Cultural similarities between the local and migrant communities have facilitated the rapid adoption of new, economically advantageous livelihoods introduced by the migrants. By contrast, Delo Mena residents have had less contact with migrants and have to a greater extent retained their traditional livelihoods. That said, across both case study areas local residents are increasingly engaging in the management and harvesting of forest coffee, which has become increasingly profitable as the value of Harennna Forest coffee increases and market access improves.

Across both sites, livelihood diversification and the intensification of previously sustainable, traditional forest resource management systems are having negative repercussions on the forest: deforestation, forest degradation, and habitat loss and fragmentation. Satellite images and anecdotal observations from stakeholders indicate that forest cover has decreased in both *woredas*, while agricultural land continues to expand. The ultimate impact at both sites is biodiversity loss. These negative changes are happening regardless of migration pressures, but they are happening at a faster rate in Harennna Buluk. In a context of rapid national transformation and escalating internal population pressures, migration is accelerating and intensifying existing land conversion processes, and amplifying biodiversity impacts.

A number of key themes emerge in terms of the involvement of migrants and non-migrants in forest-dependent livelihoods. Non-migrants in Harennna Buluk have increasingly adopted migrant livelihoods, while migrants themselves are minimally involved in pastoralist livelihoods. Similarly, migrants have only a limited involvement in forest coffee production. With regards to farmland, plots are generally the same across the two groups, though migrants use land more efficiently than local residents. Migrants have introduced new crops, particularly *khat*, which local residents have begun to cultivate.

There are solutions to these problems. Authorities can address migration in Harennna Buluk. This would require regulating the informal land market and introducing new regulations to curb the expansion of unsustainable settlements and the land conversion processes that are threatening the forest's key conservation values. In Ethiopia, *kebele* (ward) administrations have the right to pass bylaws; it would be possible to formally regulate and restrict settlement expansion in critical areas through this mechanism, given the political will. But for this strategy to be effective, existing financial incentives that motivate many *kebele* leaders to allow migrants to informally settle in the area in large numbers (i.e., the informal "land use tax") should also be revised.

There is also a need to strengthen the protection of Harennna Forest. Many of the ecosystem's species could be put forward as flagship species. As umbrella species, the conservation of their habitat in the Harennna Forest would also ensure the protection of numerous other key plant and animal species. This will require significant additional funding, not just to implement potential

habitat and species-specific management strategies, but also to achieve the objectives of the ecosystem's general management plan.

At the local, state and national levels, Harenna Forest conservation programs can also be promoted through the lens of water conservation. The forest's key role in local and regional water supply and security is threatened by deforestation and forest degradation; by extension, Harenna Forest plays a key role in local economic development and food security, particularly in a context of climate change. Conservationists can use this message to strengthen the case for preservation among local communities and authorities, to raise funds, and to press for the increased enforcement of local laws governing resource access and use.

Conservationists should also focus on rebuilding those conflictual relationships that are blocking constructive and sustainable forest resource management and use. This will require identifying shared interests and needs, as well as neutral mediators who can bring the parties together and establish dialogue between them. The role of mediator should of course be approached with caution; there is always the risk that an attempt to resolve tensions between opposing groups could backfire and lead to further broken connections between other stakeholders.

It is essential to further enhance and tighten recently introduced forest management bylaws to improve the long-term sustainability of local forest-dependent livelihoods. While the current participatory forest management regulations in Harenna Buluk and Delo Mena include penalties for infractions, these penalties consist of minor fines that are largely symbolic and are unlikely to act as effective deterrents in their current form. Further measures are also needed to build enforcement capacities and to clarify boundaries between *kebeles*.

Finally, the provision of sustainable, viable livelihoods to forest-adjacent communities is of prime concern, both with regards to community well-being and to the well-being of the forest. These livelihood options will have to be developed in concert with local communities, to ensure that they meet their needs and interests, and they must be provided in a conflict-sensitive way to ensure that they are not inequitably distributed to just a few well-connected individuals or communities. Benefits should also extend only to those already in the area; organizers would have to avoid a situation in which the alternative livelihoods simply attract more migrants to the region in search of jobs. Tourism may be one viable option that both provides both jobs to locals and migrants and increases awareness among both communities as to the importance of forest conservation.

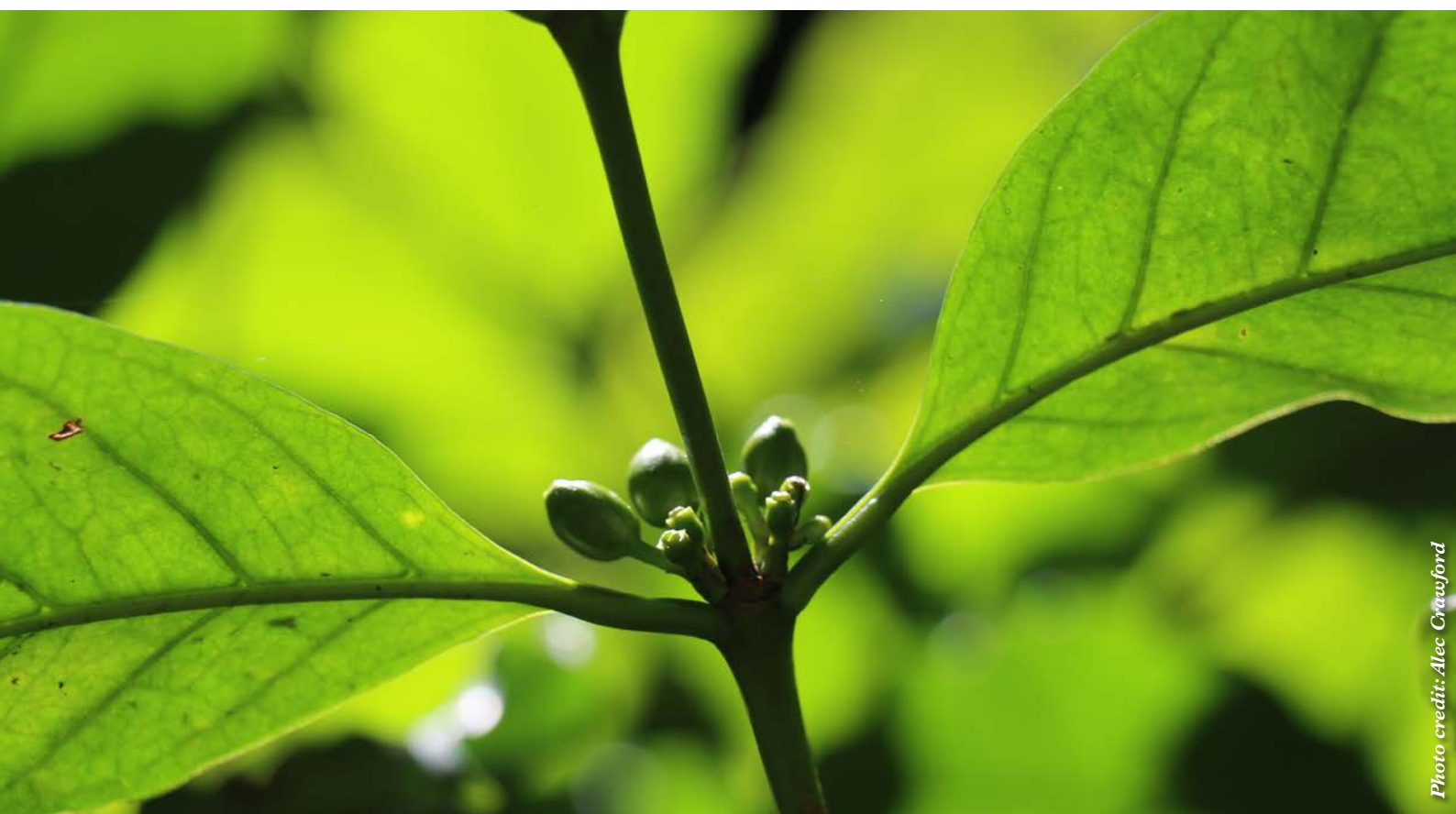


Photo credit: Alec Crawford

Table of Contents

1.0 Introduction.....	1
2.0 Bale Mountains and Hareenna Forest	2
3.0 Key Livelihoods and Natural Resource Use	8
4.0 Migration in Hareenna Buluk and Delo Mena.....	9
5.0 Ecosystems Impacts of Migration	13
6.0 Conclusions and Recommendations	18
References	24
Annex 1: Case study methodology.....	25
Annex 2: Summary of household questionnaire results.....	27

List of figures

Figure 1. Map of southern part of the Bale ecosystem, including the BMNP boundary, Hareenna Forest and woreda boundaries	2
Figure 2. Hareenna Buluk and Delo Mena Woredas	3
Figure 3. Hareenna Buluk and Delo Mena population trends	9
Figure 4. Population trends in case study focus kebeles	9
Figure 5. Hareenna Buluk Woreda land cover change 1995–2011.....	13
Figure 6. Hareenna Buluk land cover in 1995, 2000 and 2011	14
Figure 7. Delo Mena land cover change 1995–2011.....	15
Figure 8. Delo Mena land cover in 1995.....	16
Figure 9. Hareenna Buluk stakeholder map.....	19
Figure 10. Delo Mena stakeholder map	20

List of Tables

Table 1. Case study focus areas.....	12
Table 2. Hareenna Buluk land cover types	15
Table 3. Hareenna Buluk land cover change 1995–2011	15
Table 4. Delo Mena Woreda land cover types	17
Table 5. Stakeholder profiles.....	21
Table A1. Satellite imagery used for land-cover change analysis	25
Table A2. Case study data collection focus areas	25
Table A3. Proportion of total households in the target kebeles and villages surveyed.....	26
Table A4. Semi-structured interviews conducted.....	26
Table A5. Focus group discussions held	26



Acronyms

BERSMP	Bale Eco-Region Sustainable Management Programme
BMCP	Bale Mountains Conservation Project
BFE	Bale Forest Enterprise (BFE)
BMNP	Bale Mountains National Park
CA	Conservation Area
CBO	Community-Based Organization
CDC	Conservation Development Centre
CSA	Central Statistical Agency
CSC	Conflict-Sensitive Conservation
CZ	Conservation Zone
C&SNRMZ	Conservation & Sustainable Natural Resource Management Zone
ENVI	Environment for Visualizing Images
ETM	Enhanced Thematic Mapper
EWCA	Ethiopian Wildlife Conservation Authority
FMA	Forest Management Agreement
FZS	Frankfurt Zoological Society
GIS	Geographic Information Systems
GMP	General Management Plan
GNI	Gross National Income
GPS	Global Positioning System
HWC	Human-Wildlife Conflict
IISD	International Institute for Sustainable Development
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
NGO	Non-Governmental Organization
NP	National Park
NR	Natural Resource
NRM	Natural Resource Management
OARDB	Oromia Agriculture and Rural Development Bureau
OFWE	Oromia Forest and Wildlife Enterprise
PA	Protected Area
PFM	Participatory Forest Management
REDD	Reducing Emissions from Deforestation and Forest Degradation
SNNP	Southern Nations Nationalities and Peoples' Regional State
SSI	Semi-Structured interview
TEK	Traditional Ecological Knowledge
TLU	Tropical Livestock Unit
TM	Thematic Mapper
USGS	United States Geological Survey
USD	United States Dollar
UTM	Universal Transverse Mercator

1.0 Introduction

Migration has been used for centuries as a means of adapting to and coping with change, both in Ethiopia and in the Great Lakes region more broadly. It is driven by a number of oftentimes mutually reinforcing factors, including: livelihood strategies, such as mobile pastoralism; the pursuit of economic opportunities; population pressures; environmental and climate stresses; development policies; and political persecution and conflict. The livelihood and natural resource management strategies that are adopted throughout the migration process can have a range of impacts on ecosystems and the livelihoods they support. For example, habitat and species loss can undermine ecotourism opportunities, pollution can increase health risks, and land degradation and deforestation can undermine agricultural productivity. As traditional migration systems break down and the push-pull factors increase both in scale and complexity, the migration story in many countries is becoming increasingly complicated. For the Great Lakes region—a region already experiencing myriad forms of natural resource and climate stress—the growing socio-environmental impacts of migration could incubate or reinforce existing social tensions and institutional failures, further threatening the critical ecosystems and the livelihoods they support.

Policy-makers and practitioners are not fully aware of these threats, nor are they fully prepared to manage them through appropriate interventions. The Migration and Conservation in the Great Lakes Region project attempts to address this gap by: (a) developing a methodology to better understand the drivers and impacts of migration on critical natural resources, ecosystems and livelihoods in the Great Lakes region; (b) identifying effective responses for policy-makers and practitioners working on these issues; and (c) catalyzing further research and policy engagement on the topic in the region. To achieve these objectives, the project is carrying out research at three case study sites: Buliisa District in northwest Uganda, the Misotshi-Kabobo ecosystem in the eastern Democratic Republic of

Congo, and the Bale Mountains ecosystem in southern Ethiopia. The research was carried out through a mix of desk research, site visits and on-the-ground surveys (for the full methodology, see Annex 1). This report will present an assessment of the migration context in the Bale Mountains ecosystem, as well as suggested response strategies. The research was conducted by the International Institute for Sustainable Development, the Conservation Development Centre and the Frankfurt Zoological Society, with the generous support of the MacArthur Foundation.

Migration is playing a significant role in driving land conversion and sustaining the overexploitation of key natural resources in the Bale Mountains ecosystem, to the detriment of conservation and traditional livelihoods. A similar process of land conversion is gradually taking place in the absence of an influx of migrants, albeit at a much slower pace, and the ecosystem is under threat from a variety of factors, including population growth, changing climate conditions, and changing livelihood strategies and socioeconomic expectations of the resident population. But in a context of rapid socioeconomic change and escalating internal population pressures, migration accelerates and intensifies the livelihood changes and associated land conversion processes that are inevitable in the long term. This will continue, unless effective and sustainable resource management systems are put in place.

The next section of the report explores the conservation context, including the ecosystem's key species, its management structures and institutions, and key threats and challenges. Section 3 outlines key livelihoods and natural resource use in the case study area. Section 4 presents the migration context, describing the extent of the migration into the case study site, the history of migration over the past 20 years, and the profile of most migrants coming to the area. Section 5 looks at the ecological impacts of this migration in Harena Buluk and Delo Mena. Finally, Section 6 presents the project team's main conclusions and recommendations, including potential key intervention strategies.

2.0 Bale Mountains and Harena Forest

The Bale Mountains ecosystem is located in southern Ethiopia, approximately 400 kilometres (km) southeast of Addis Ababa (see Figure 1). The ecosystem is made up of two parts: Bale Mountains National Park (BMNP) in the north, and Harena Forest, which partly overlaps with the BMNP, in the south. Migration to the ecosystem has been concentrated in the southern Harena Forest, in particular the Harena Buluk *woreda*. This part of the forest will serve as the focal point for the case study; for

comparative purposes, the assessment will also look at the parts of the forest lying in the adjacent *woreda* of Delo Mena, which has not experienced the same level of migration but nonetheless holds important lessons for understanding migration impacts. Together, these areas take up approximately 1,800 km² of Harena Forest, and comprise a large part of the southern section of BMNP.

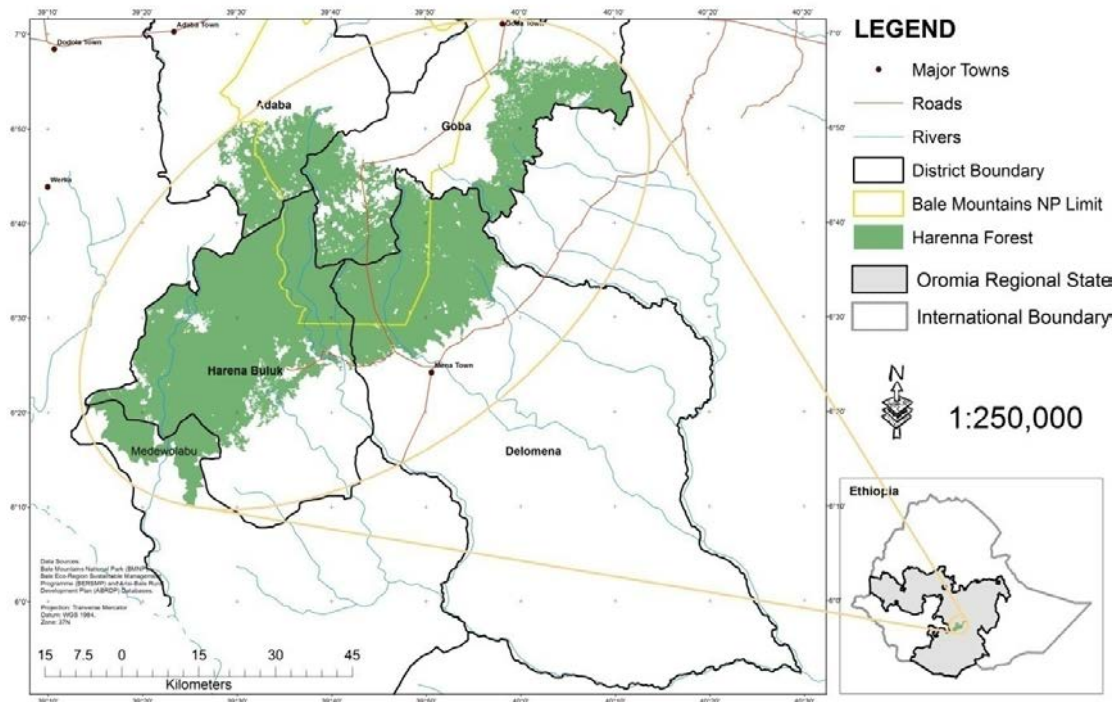


FIGURE 1. MAP OF SOUTHERN PART OF THE BALE ECOSYSTEM, INCLUDING THE BMNP BOUNDARY, HARENA FOREST AND WOREDA BOUNDARIES

Source: Wakjira, Fischer & Pinard, 2013.

Both *woredas* are relatively sparsely populated: with an area of 1,923 km² and a total population of 94,051, Harena Buluk has a population density of 49 people per km². Delo Mena has an area of 4,893 km² and a population of 103,928 (Central Statistical Agency, 2011), and a population density of approximately 21 people per km². They are both largely rural, with rural agro-pastoralists accounting for 94 per cent of the

population in Harena Buluk and 88 per cent in Delo Mena (Central Statistical Agency, 2007). The forest is significantly more fragmented in Harena Buluk than in Delo Mena; much of Harena Buluk resembles a mosaic of different landscapes, ranging from dense forest to grasslands and agricultural land, whereas in the northern part of Delo Mena, the forest remains largely intact (see Figure 2).

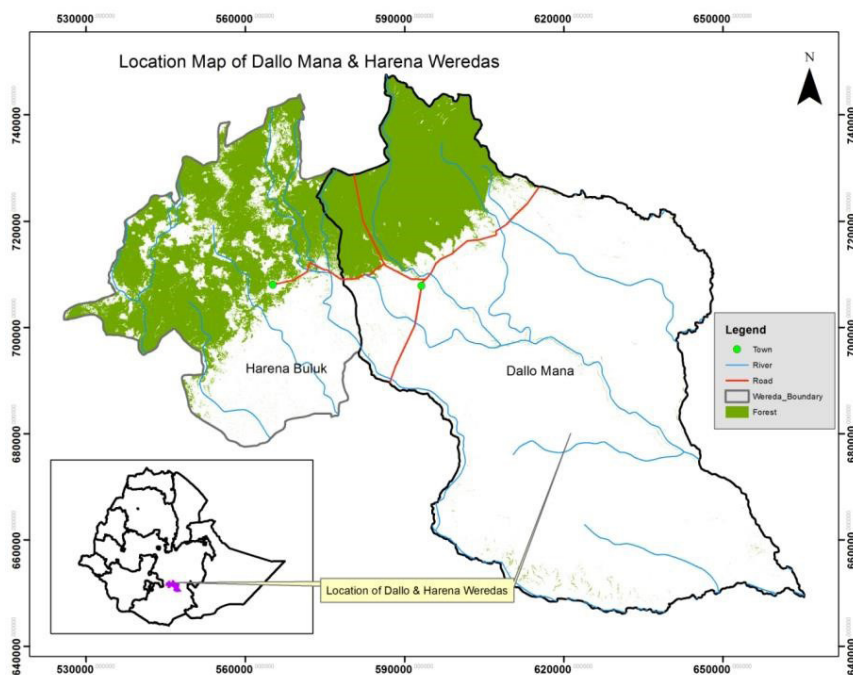


FIGURE 2. HARENNA BULUK AND DELO MENA WOREDAS

Ethiopia is categorized as a country of low human development, according to the UN's latest Human Development Report. Gross national income (GNI) per capita is USD470, approximately 30 per cent of the population live below the national poverty line, average life expectancy is just 63 years, and only 42 per cent of the rural population have access to improved water sources (World Bank Indicators, 2014). Oromia Regional State, in which the case study area is situated, is one of the less developed parts of the country, and the case study *woredas* are among the more marginalized and underdeveloped parts of Oromia. The population across the two districts is overwhelmingly young: more than a quarter of the population in both *woredas* is under 15 (Central Statistical Agency, 2007). Population pressures are expected to worsen moving forward. In the last census (2007), 77 per cent of people five years old and older across the case study area had never attended school (81 per cent in Harenna Buluk and 73 per cent in Delo Mena) (Central Statistical Agency, 2007). For the state as a whole, however, this figure drops to 45 per cent (Central Statistical Agency, 2007), indicating that access to education is significantly below the regional average in Harenna Buluk and Delo Mena.

The Conservation Context: Bale Mountains Ecosystem

The Bale ecosystem is regarded as one of the most important conservation areas in Ethiopia. It is divided

between the broad, flat Gaysay Valley in the north, a central plateau, and a steep escarpment on its southern slopes. The Gaysay Valley is flanked by a number of peaks above 3,500 metres (m), while the Sanetti Plateau, which dominates the central portion of the ecosystem, has an altitude of over 4,000 m and is the largest alpine habitat on the African continent. It also includes the second-highest peak in Ethiopia, Tullu Dimtuu, (4,377 m). From the plateau, an escarpment quickly drops down into the Harenna Forest, the second-largest stand of moist tropical forest in Ethiopia. This dramatic change in elevation is key to the area's unique and globally important conservation values, as it results in a rapid succession of distinctive vegetation zones. The ecosystem was formally protected in 1971 with the establishment of the national park, which covers an area of 2,200 km².

BMNP is increasingly recognized as a regionally important water tower for the crucial role it plays in climate control for the region. Rainfall in the ecosystem feeds four major regional rivers (the Web, Wabe, Dumel and Welmel), which in turn flow into two major Ethiopian rivers, the Genale and Wabe-Shebelle. The park also has significant dry season water-holding capacity in its swamps and lakes and in the moist, tropical Harenna Forest. This complex hydrological system is of critical importance to 12 million downstream water users in the arid and semi-arid lowlands of southeast Ethiopia and Somalia (Frankfurt Zoological Society, 2007).

Harena Forest is one of the largest and most biologically diverse moist tropical forests in Ethiopia. It covers the entire southern half of the BMNP (see Figure 2), and extends beyond the park boundaries to cover large portions of the Bale-Arsi Massif's southern escarpment. It encompasses a total area of around 3,000 km². The forest covers a wide range of alpine, sub-alpine, subtropical and tropical vegetation, including elfin forest, Erica forest, rain forest and subtropical savannah (Chiodi and Pinard, 2011). While its floral and faunal composition is still poorly documented, the forest is known to support high levels of biodiversity and endemism, including many threatened plant species; it also harbours the most important stocks of wild genetic material in Ethiopia, including wild coffee and a large number of medicinal plants (Wakjira, Gashaw & Pinard, 2011). At its southern edge, the forest blends into a mosaic of open woodland and rapidly expanding agricultural land (Wakjira Fischer & Pinard, 2013).

Limited quantitative data on the abundance and distribution of key vegetation and wildlife (endemic, locally threatened, and critical natural resource species) are available for the case study area, and no *woreda*-specific data are available to compare the status and trends in terms of key species between Harena Buluk and Delo Mena. Though Harena Buluk has been more affected by habitat loss and agricultural expansion than Delo Mena, the forest is effectively the same ecosystem in terms of key species composition across the two *woredas*.

BMNP is a globally important centre of endemism, harbouring 26 per cent of Ethiopia's endemic species, including more than half of the global population of the endangered Ethiopian wolf, two thirds of the global population of the endangered Mountain nyala (Frankfurt Zoological Society, 2007), and the entire global population of the giant mole-rat. The park is also home to the Bale monkey, several rare and endemic amphibian species, and over 160 endemic species of flowering plants (Teshome, Randall, & Kinahan, 2011). BMNP is part of Conservation International's Eastern Afromontane Biodiversity Hotspot Area and is one of Ethiopia's 69 Important Bird Areas, harbouring about 280 bird species, of which six are endemic and seven are globally threatened (Asefa, 2011).

Harena Forest supports a diverse range of wild animal species, including large carnivores such as lion, leopard and a small population of the endangered African wild dog. The forest's wild dog population should be a high conservation priority, as it is thought to be one of the last remaining packs in Ethiopia, and due to the atypical

habitat it occupies. In fact, both the lion and the wild dog populations found in the southern Harena Forest are unique, as these species typically prefer semi-arid open savannah environments (Dutson & Sillero-Zubiri, 2005). Some of the key herbivorous and omnivorous mammals found in the forest include ungulates such as reedbuck, bushbuck, lesser kudu, bushpig and warthog, as well as primates. The Bale monkey is of particular conservation interest, as it is listed as endangered and is considered by some to be an endemic species to Ethiopia, although its taxonomy remains disputed. Recent studies estimate the population to be over 1,400 individuals (Wakjira, Gashaw, & Pinard, 2011).

The forest is also home to the endemic Harena shrew, which is listed by the International Union for Conservation of Nature (IUCN) as Critically Endangered because the entire population is restricted to a small area of mixed montane evergreen tropical forest of just 4 km², and its habitat continues to decline in both extent and quality due to conversion of land to agricultural use, overgrazing by domestic livestock, collection of firewood and timber and fires (Lavrenchenko & Hutterer, 2014). Another critical conservation priority is the endemic Harena Forest grass frog, the population status of which is currently unknown. There is no information on whether or not its population is severely fragmented as a result of human encroachment (IUCN SSC Amphibian Specialist Group, 2013). It can be assumed that the wildlife in Harena Buluk is more likely to be affected by human encroachment than in Delo Mena.

Harena Forest also supports over 300 vascular plant species, including a significant number of endemics adapted to relatively high humidity and high altitude, and differs significantly from the rainforests found in southwest Ethiopia in terms of dominant canopy tree species. This makes it a unique conservation target. The forest has a clear vegetation zonation due to altitude, and the forest is drier at low altitudes than high altitudes.

The forest includes a large number of forest glades. These patches of grassland are scattered across the forest but concentrated primarily in its western part. The glades represent a critical component of the forest for wildlife and livelihoods, as they provide grazing space for wild herbivores and local livestock alike, as well as hunting grounds for predators such as lion, leopard, hyena and the endangered African wild dog (Chiodi & Pinard, 2011). They also provide habitat for a number of local endemic species, and play an important role in regulating the area's hydrology, as many small rivers that support downstream communities have their

headwaters in these forest glades (Wakjira Fischer & Pinard, 2013).

Park and Forest Management

All forestland in Ethiopia is government-owned. The Ethiopian Wildlife Conservation Authority (EWCA – part of the Ministry of Culture and Tourism) has lead responsibility for the conservation and sustainable utilization of wildlife in Ethiopia. Its mission is to conserve and manage the country's wildlife and its habitats in collaboration with local communities and stakeholders for the ecological, economic and social benefit of present and future generations. The Bale Mountains Conservation Project of the Frankfurt Zoological Society (FZS-BMCP) supports EWCA. FZS-BMCP was set up in 2005 to provide support to the BMNP in all aspects of park management, including ecotourism development, outreach, park operations and ecological management.

The Oromia Forest and Wildlife Enterprise (OFWE) manages the portion of Hareenna Forest that falls outside of the park's boundaries in partnership with local communities. OFWE strives to develop and implement multiple-use forestry systems that simultaneously provide biodiversity conservation, watershed protection and sustainable resource use, in order to contribute to regional and national socioeconomic development. OFWE has eight branch offices in the vicinity of key forest resources, including the Bale Forest Enterprise (BFE). Since taking over the management of sections of Hareenna Forest outside BMNP in 2009, the BFE has sought to implement sustainable forest management in partnership with impoverished forest-adjacent communities, with the support of the Bale Eco-Region Sustainable Management Programme (BERSMP), which is implemented by the two non-governmental organizations, FARM-Africa and SOS Sahel Ethiopia.

Together, BFE and BERSMP have started setting up local-level, community-based systems and structures for participatory forest management (PFM). They have sought to respond to the stated needs and desires of local community groups to manage their own livelihoods and resources, through their own institutions. To achieve this, PFM has been piloted in the area, with the aim of protecting the Hareenna Forest while enhancing the livelihoods of communities who use and benefit from forest resources in the process. PFM is based on defining legal rights in terms of access to forest resources, rights to forest products, and ways of sharing management responsibilities; bylaws have been developed and passed

at the *kebele* level, with technical backstopping and support from the BERSMP.

Since the establishment of *kebele*-level community-based organizations (CBOs) in 2010, communities have become partners in local development processes, and are beginning to plan and implement bottom-up forest resource management strategies. The BFE's approach to forest management does not distinguish between native residents and migrant settlers, but only between PFM CBO members and non-members. Capacity-building and awareness-raising activities by the BERSMP in partnership with the BFE have been instrumental in enabling PFM CBOs to develop forest, grassland and water management strategies with local communities, incorporating elements of traditional forest governance systems where appropriate.

The General Management Plan (GMP) of Bale Mountains National Park (2007–2017) provides EWCA and BMNP management with a critical tool for addressing settlement and encroachment issues by identifying the key management needs, setting priorities and defining conservation strategies over a 10-year period. While the conservation of biodiversity and ecosystem processes throughout the park is the primary management objective of the GMP, the plan also sets out a zonation scheme under which the Hareenna Forest is divided into a Conservation Zone (CZ) in the southeast of BMNP, and a Conservation & Sustainable Natural Resource Management Zone (C&SNRMZ) in the southwest of BMNP.



In the C&SNRMZ, the GMP proposes that traditional resource use at sustainable levels (e.g., harvesting of coffee, medicinal plants, grass, bamboo, herbs, spices and mushrooms; livestock grazing; use of horas and other livestock watering at designated points) be permitted, subject to Sustainable Natural Resource Management Agreements between park management and resource users.

A number of agreements between *kebele*-level CBOs and the BFE have been signed since 2008 to jointly manage natural resources in both Harenna Buluk and Delo Mena. These Forest Management Agreements (FMAs) are structured as business contracts, with each FMA stipulating the rights, responsibilities and revenues that the BFE and the community (represented by the PFM CBOs) hold. In this respect, *kebele*-level PFM bylaws regulating forest grazing, management and harvesting of forest coffee, forest beekeeping and the harvesting of timber have been approved by *kebele* executives and local elders. According to key stakeholders, this has already led to a significant decrease in unsustainable resource exploitation over the past years.

Incorporating elements of formal rules in informal traditional forest governance systems provided the basis on which the modern PFM CBO was built. To the extent that traditional forest resource management systems have been incorporated into the PFM bylaws, these local systems have effectively been extended to migrant settlers through the introduction of PFM. For example, traditional informal governance and dispute arbitration structures enforced by community elders on local native communities, which have been incorporated in the new PFM structures, also apply to migrant settlers.

Stakeholders highlight key differences between Harenna Buluk and Delo Mena. The traditional pastoralist system has largely broken down in Harenna Buluk as a result of in-migration, while it is still relevant in Delo Mena. Therefore, the aspects of traditional forest resource access systems applied through the new *kebele*-level PFM CBO bylaws vary to some extent from one *kebele* to the next depending on the current status of the key forest resource uses.

Key Conservation Threats

Harenna Forest's rich biodiversity is currently threatened by a number of human-induced pressures, all related to forest-dependent livelihoods. These include agricultural encroachment associated with settlement expansion and overgrazing within the forest, the gradual conversion of

previously undisturbed forest to intensively managed forest coffee plantations, and human-induced forest fires. Migration influences the each of these threats.

Population growth: Rapid population growth over the past two decades has led to a significant expansion of human settlements in the Bale ecosystem, both within and outside the park boundaries. Corresponding land conversion and agricultural encroachment threatens the area's conservation value as well as the sustainability of traditional livelihoods and resource-access mechanisms. While the observed population growth is largely a result of extremely high fertility rates and the adherence to traditional practices such as early marriages and polygamy among the local population, migration has also contributed to population growth since the mid-1990s.

Agricultural expansion: The conversion of forest to agricultural use is taking place in both woredas. However, agricultural encroachment within forest glades previously used for dry season grazing has remained largely restricted to Harenna Buluk, and appears to be a direct consequence of the increasing presence of migrant settlers. In Delo Mena, the few small forest settlements that have existed for decades have to date not led to large-scale conversion of forest pasture to agriculture.

Forest coffee expansion and intensification of management: The area of Harenna Forest in which coffee is grown has increased considerably over the past two decades, and previously wild coffee plants are increasingly being managed to maximize production. Coffee yield is closely correlated with the amount of sun reaching the lower strata of the plant (Gole & Senbeta, 2008), so forest coffee management increasingly involves cutting down some of the medium and large shade trees to open up the canopy, and removing the natural undergrowth vegetation that competes with coffee. This type of intensified forest coffee management is now widespread in both Harenna Buluk and Delo Mena, and causes biodiversity loss and forest degradation while displacing seasonal livestock grazing to previously pristine areas of the forest. It also reduces the viability of other forest-dependent livelihoods such as beekeeping. While the degradation and fragmentation of forest habitats is generally at a more advanced stage in Harenna Buluk, the role of forest settlements in Delo Mena in driving the expansion of forest coffee should not be overlooked, as these forest communities are involved in coffee production.

Overgrazing: Pastoralism is still widely practiced in Delo Mena, but is rapidly disappearing as a livelihood strategy in Harennu Buluk following the influx of migrants. Migrant settlers from eastern Ethiopia have introduced on-farm grazing to Harennu Buluk and have played a key role in the shift to more agriculture-based livelihoods and the decline of the traditional value of large herds of cattle as status symbols. In Delo Mena, the duration of the forest grazing season has gradually increased due to loss of pasture to agriculture in the lowlands south of the forest, increasing overgrazing within the Harennu Forest.

The area of the forest in which livestock are grazed during the dry season has also expanded, with grazing taking place at increasingly high altitudes within the forest. This is largely due to livestock being displaced from lower altitudes by the expansion of forest coffee over the past decades. This is a serious threat to local biodiversity, both in terms of the vegetation in previously pristine areas of the forest being increasingly overgrazed, and in terms of the decline in wild herbivores due to increasing competition with livestock. Human-wildlife conflict is also escalating as pastoralists increasingly come into contact with forest predators.

Forest fires: The entire Bale Mountains massif, in particular the high altitude belt but to a lesser extent also Harennu Forest, is affected by recurrent fires which often significantly threaten local biodiversity and key habitats. A fire that occurred between February and April 2000 was the most severe of the past hundred years, and destroyed approximately 20,000 hectares (ha) of moist evergreen forest in the case study area. The loss of biomass during the fire was estimated at 18 million tonnes, resulting in direct and indirect losses to the local and national economy of nearly USD20 million (Anteneh, Temesgen, & Worku, 2013). Nearly all recent fires in Harennu Forest have been of human origin, the key causes being accidents during traditional forest honey collection (in which smoke is used to protect the beekeepers), and uncontrolled campfires lit by pastoralists accessing the forest's mineral springs. The natural fire system no longer appears to be functioning in the massif due to the dramatic increase in human population and consequent habitat fragmentation, degradation, and loss (Anteneh, Temesgen, & Worku, 2013).

Weak governance, rights and enforcement: The effectiveness of the protection and management of BMNP decreased dramatically following the fall of the Derg military regime in 1991. Limited financial, human and technical resources hampered management

by both the Ethiopian Wildlife Conservation Organization (EWCO) (until 1997) and the Oromia regional government (1997–2009). Similarly, the Oromia Agriculture and Rural Development Bureau, responsible until 2009 for the sustainable management of the portion of Harennu Forest that lies outside of BMNP, also struggled to fulfill its mandate. As a result, the BMNP and the Harennu Forest became de facto open access resources for much of the 1990s and 2000s, and as a result the unique ecological and hydrological resources of Bale ecosystem are now seriously imperilled.

BMNP is still not formally gazetted, and its boundaries were re-demarcated in 2009 to accommodate a growing population. New park boundaries have not yet officially been recognized by the central government. This results in uncertainty about the exact jurisdiction of park management in the case study area, in particular with regard to the prohibition of farming and the proposed resettlement of residents in contested areas. In addition, BMNP management still lacks sufficient resources and staff for effective patrolling and implementation of the park's management plan, despite the substantial support provided by the FZS Bale Mountains Conservation Project.

Forest resource access rights granted to local communities under the recently introduced FMAs and approved by the *kebele* executives have thus far not been officially recognized by higher-level government institutions. In the case of forest coffee, this means there is still no formal market on which title deeds for forest coffee plots can be bought and sold, and the informal market continues to thrive. In addition, the penalties for forest resource users who fail to comply with the PFM bylaws remain largely symbolic, and in a context of mounting population pressures, may not be enough to deter unsustainable practices in the long-term. In forest villages in Delo Mena, further expansion of the settlements and associated small-scale farming can happen through encroachment into the Harennu Forest, despite the PFM regulations. In a context of rapid population growth, these Delo Mena forest communities risk undergoing a transformation in terms of land use and habitat integrity similar to that which has taken place in Harennu Buluk over the past two decades. The FMAs introduced under the BERSMP have provided a short window of opportunity to catalyze further action from the relevant government agencies to enhance the sustainability of the existing forest resource management systems, and to introduce additional measures to preserve the forest's integrity and biodiversity.

3.0 Key Livelihoods and Natural Resource Use

Livelihoods in both *woredas* are intimately tied to forest resources. Traditionally, livelihoods across the case study area largely depended on a pastoralist transhumance system known as *godantu*, which together with subsistence crop farming has been central to local Oromo customs (Wakjira Fischer & Pinard, 2013). The system revolves around seasonal forest grazing, with some members of pastoralist communities in the lowland areas south of Harenna Forest moving into the forest with their livestock—cattle in particular—during the dry season (January to March) in search of shade and livestock fodder. Pastoralists traditionally also use mineral springs in Harenna Forest to provide mineral nutrients to their livestock at particular times of the year.

Semi-wild forest coffee plays an increasingly important role in the local economy, both in Harenna Buluk and Delo Mena. Historically, coffee from the Harenna Forest was only traded locally for domestic consumption, keeping prices low. Officially, forest resource use was prohibited, and people put little effort into tending their coffee in the forest, partly because the price of coffee was too low to make more management effort worthwhile, and partly because forest coffee users did not want to attract the attention of the authorities (Wakjira Fischer & Pinard, 2013).

Revenues from Harenna Forest coffee have steadily increased since the mid-1990s, both as a result of improved access to the national market and the increasing international value of Ethiopian coffee. Local communities have responded by increasingly shifting away from traditional forms of subsistence agro-pastoralism to artisanal forest coffee production,

capitalizing on weakened law enforcement to occupy previously unclaimed forest coffee areas.¹ In a break from tradition, forest coffee is now increasingly managed to maximize production, and the areas under cultivation are spreading north to higher altitudes within the forest, effectively displacing forest grazing to even higher altitudes that were traditionally beyond the range of pastoralists.

Today, considerable amounts of semi-wild coffee are harvested in the Harenna Forest, providing a significant source of income for the local community. The amount of Harenna Buluk coffee sold at the central market in Addis Ababa has rapidly increased over the past decade: between the 2006/7 harvest and the 2013/14 harvest the amount of coffee sold at the central market has increased by over 6,350 per cent. Coffee production in Delo Mena has gradually picked up again after it had decreased by approximately a third between the 2006/7 and the 2008/9 harvests.

Both migrant and non-migrant residents depend on other forest resources, including water, fuel wood and non-timber forest products such as forest honey and medicinal plants. Stakeholders report that forest beekeeping has declined across the entire case study area during the same period. This is thought to be due to the progressive forest degradation and associated loss of pollen-rich smaller plants (climbers and shrubs), a consequence of overgrazing, increasingly intensive coffee management, and agricultural expansion. Decreasing honey production in turn leads to further expansion in forest coffee cultivation, as local residents seek to make up for the loss of honey revenue.

¹ In some cases local artisanal coffee tending and harvesting operations have even employed seasonal labourers from outside the region. However, few if any seasonal labourers have permanently settled in the area and they are beyond the focus of this case study.



Photo credit: Alec Crawford

4.0 Migration in Harena Buluk and Delo Mena

Prior to 1995, the forest and the natural resource-based livelihoods it supported were largely the same across the two *woredas*. However, over the past two decades land conversion and forest resource use in the two districts have developed along markedly different paths as a result of different rates of migration: in Harena Buluk, rapid large-scale migration has taken place, while in Delo Mena, migration has been marginal. Migration to the area has been driven by a combination of pull factors relating to local politics and the perceived availability of land, and push factors relating to limited economic

opportunities and access to suitable agricultural land in the migrants' areas of origin.

Significant population increases have taken place in both Harena Buluk and Delo Mena *woredas* over the past 20 years (see Figures 3 and 4). Population growth rates have been significantly higher in Harena Buluk than in Delo Mena. This suggests that high migration rates into Harena Buluk have contributed to the observed population increase, particularly in the 1990s and early 2000s.

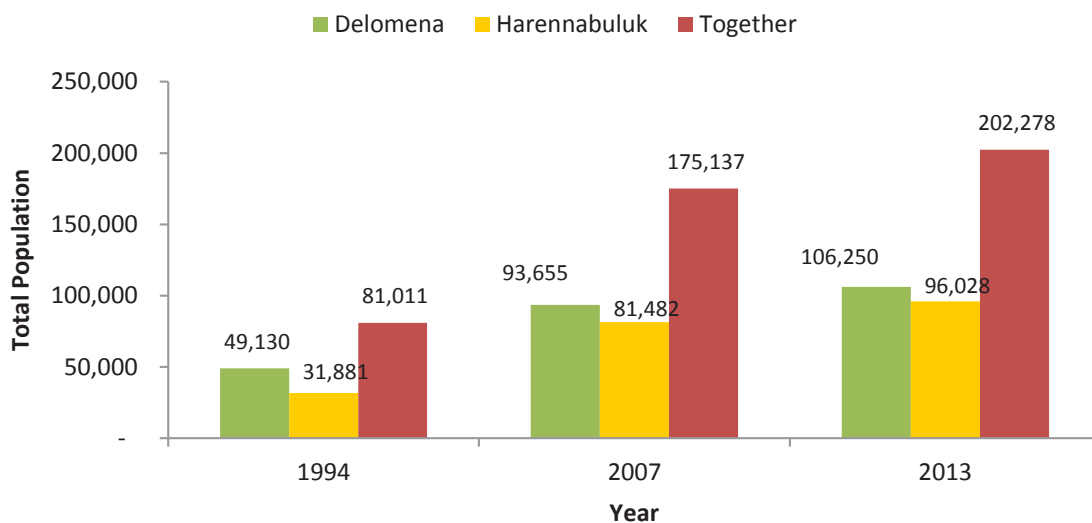


FIGURE 3. HARENNABULUK AND DELO MENA POPULATION TRENDS

Source: Authors' data.

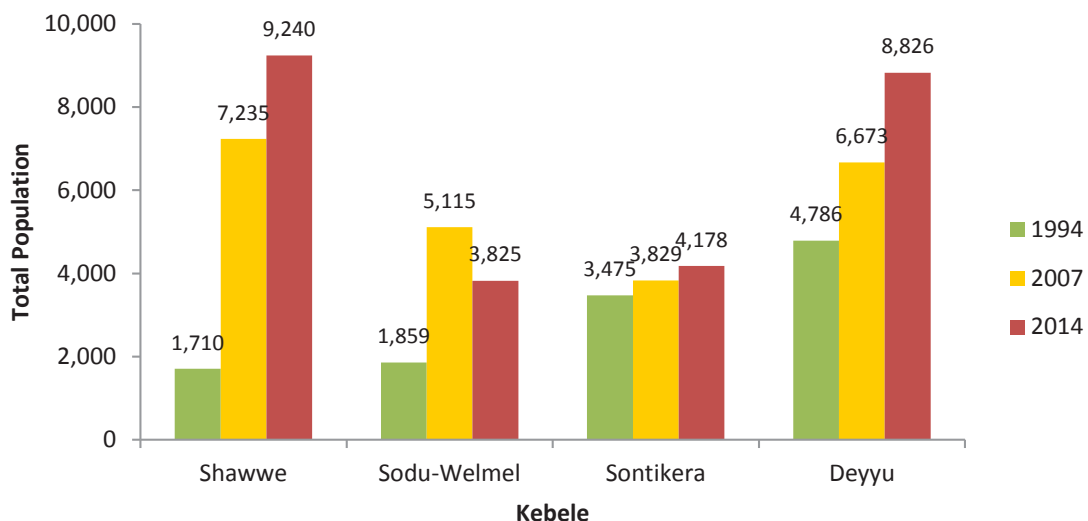


FIGURE 4. POPULATION TRENDS IN CASE STUDY FOCUS KEBELES

Source: Authors' data.

Figures 3 and 4 show that migration into Harena Buluk appears to be slowing down. Qualitative information collected from respondents indicates that, while migration continues, the availability of land has sharply decreased. This may be limiting additional migration.

According to the 2007 Population and Housing Census of Ethiopia's Statistical Report for the Oromia Region, there were over 20,000 migrants living in Harena Buluk in 2007, just over 25 per cent of the total woreda population in 2007. In the absence of more recent quantitative data in this regard, this would suggest that as of 2013 there should have been about 24,000 migrant residents in Harena Buluk, assuming that the proportion of migrants in the woreda remained close to 25 per cent. In 2014, Harena Buluk officials registered migrants who settled in the woreda after 2011. 853 migrant households were registered as having arrived over the past three years, equivalent to 3,582 people. This suggests an influx of approximately 1,200 migrants each year into Harena Buluk over that three-year period. This corresponds to an average household size of 4.2 individuals, which could be an underestimate; the average migrant household in the woreda, as per the research questionnaire, was seven people.

Migration Drivers in Harena Buluk and Delo Mena

Migration to the area really began in the mid-1990s, and was in large part driven by the local politics of the area's administrative subdivisions. Prior to 1996, Harena Buluk had existed as a separate woreda to Delo Mena. However, with a population of just under 32,000 (Central Statistical Agency, 2007), Harena Buluk was deemed too small to function cost-effectively as an independent district, and in 1996 the two woredas were merged (Guinand, 2000). Thus, to the deep dissatisfaction of the Harena Buluk political elites and public sector functionaries who lost out in terms of power and government positions, all local administrative institutions and functions were transferred to Delo Mena. Local political elites in Harena Buluk lobbied for the re-establishment of a separate woreda, with the support of ordinary residents who felt they would benefit from locally accessible government facilities and staff. Considering rapid population growth a key prerequisite for their plan to succeed, local leaders actively promoted migration into the area. In 2005, Harena Buluk was re-established as a separate *woreda*.

Convincing outsiders to settle in Harena Buluk was not difficult; the area had traditionally included one of the largest military facilities in Ethiopia and was well known to thousands of ex-army conscripts from across the country for its favourable climate and lush vegetation. These conditions particularly appealed to farmers from the East and West Hararghe zones in Eastern Oromia Regional State, which during the 1990s had been severely affected by erratic or failing rains, pest infestations and crop diseases that had rendered large sections of the population highly vulnerable to food insecurity (Guinand, 2000). Farmers from East and West Hararghe, and to a lesser extent from the arid Arsi Zone in central Oromia, constitute the overwhelming majority of those who have settled in Harena Buluk over the past 20 years. The politically motivated decision by Harena Buluk's political leaders to informally allocate public land to migrant settlers in the mid-1990s resulted in two decades of uninterrupted migration². By contrast, migration to Delo Mena *Woreda* has not been actively promoted and has therefore been minimal, despite similar climate, rainfall and soil conditions.

Nearly a decade has passed since Harena Buluk was re-established as a separate district, and migration into the area is no longer driven by local politics. Today, scarcity of land, population pressures, poor climate in the migrants' areas of origin, and the relative economic success of previous migrants to the area are the main drivers. New migrants continue to follow the successful migrants of the 1990s, despite the rapidly declining availability of land and changing political context.

Weak governance and enforcement of national regulations on public land tenure at the local level have also promoted migration to the area, particularly as it pertains to the forested areas and forest glades just outside the BMNP boundary, which have seen a significant increase in agricultural encroachment over the past 20 years. This has facilitated a thriving informal land market in which land that is technically under public ownership is sold to private individuals, mostly migrants. The on-going influx of settlers would not have been possible without the common practice among local officials and leaders of implicitly condoning informal (and technically illegal) land transactions, if not directly profiting from them. Migrants settling in the area require local contacts to broker the purchase of public land on the informal land market, and prior migrants who have already established themselves in Harena Buluk often serve as middlemen to facilitate deals between their newly arrived relatives and friends

² Some key informants report that in 1995 the Bale Zone administration may also have pressurised woreda officials to help migrants settle in Harena Buluk by allocating land to them for farming.

and local actors. When migrants buy land, the *kebele* administration registers them as residents, providing them with residents' identification papers and collecting land use taxes from them.

In addition, national resettlement programs implemented by the government in the 1990s and early 2000s to address food insecurity, drought and regional overpopulation also contributed to the migration process. These programs promoted the perception among migrants that they were entitled to fertile agricultural land in the area. While no formal resettlement programs were implemented in either Harenna Buluk or Delo Mena, the large abandoned military camp in Harenna Buluk was used as a temporary collection centre for migrants in 2001–2002 as part of a government resettlement scheme. Though most of the people held at the collection centre would be transported to other *woredas*, their temporary presence in Harenna Buluk may have also contributed to the awareness of the area's agricultural potential among would-be settlers. Lastly, the push factors causing large numbers of migrants from the Hararghe region of eastern Ethiopia to seek resettlement in Harenna Buluk include frequent droughts and increasing competition for arable land. Insecurity also played a part, particularly for those in proximity to areas controlled by Somali rebel groups like the Ogaden National Liberation Front.

Migration Profile

The first migrants settling in Harenna Buluk in the 1990s were mostly extremely poor and escaping food insecurity. Recent migrants have increasingly brought with them sufficient savings to purchase land. Traditionally, new migrants often had to lease land from locals or work in sharecropping arrangements for local landowners, and would only be able to buy the land they occupied after a few years. Resident landowners often invited a migrant worker (usually accompanied by the entire household) to live on their compound and work on the farm on their behalf. Such an invitation would be generally pre-arranged by middlemen—typically previously settled migrants—and would allow forest-adjacent locals to get extra labour support with which to expand their farm holdings by encroaching on the forest. The practice of expanding farm holdings

into densely vegetated areas and forest glades has been very common over the past 20 years but is increasingly difficult due to the introduction of improved forest management systems.

Since 1995, almost all migrants in Harenna Buluk settled in *kebeles* in or around the forest or within forest glades, driven primarily by the area's suitability for farming and the widespread perception that the forest itself was an open access resource. Ethnic Oromo farmers from East and West Hararghe, as well as from Arsi Zone, have settled in nearly all Harenna Buluk *kebeles*. Migrants have generally avoided the more sparsely vegetated *kebeles* in southern Harenna Buluk, which are predominantly pastoral due to the drier climate and soil. Members of the Sidama ethnic group have primarily settled in *kebeles* within the forest, though these *kebeles* lie beyond the geographic scope of this case study.

Settlement patterns within Harenna Buluk *woreda* are also in part influenced by *kebele*-level politics. Inspired by the successful re-establishment of Harenna Buluk following rapid population increase, a number of *kebele*-level political leaders have been trying to establish new *kebeles* by attracting more migrant settlers. These new *kebeles* would in turn create more administrative positions that could pave the way for local political careers for the local elites, as well as to gain access to revenues from informal land use taxes levied at the *kebele* level. In theory, population size is not the determining factor for the formation of new *kebeles*, because access to roads, social services and proximity to existing administrative facilities should be considered first. But misconceptions in this regard are widespread and often fuelled by local political elites and informal market land brokers.

Sodu-Welmel *kebele* provides an example of this phenomenon. This *kebele* was part of Shawe *kebele* until 1996, due to its low population. However with migration, its population quickly doubled and a new *kebele* was established; there are now nearly 700 official households, of which nearly half are made up of migrants (see Table 1, which does not capture unregistered migrants). Similar politically driven settlement patterns have been reported in Sorbira, Hawo and Sodu Tatesa *kebeles*.

TABLE 1. CASE STUDY FOCUS AREAS

WOREDA	KEBELE	NUMBER OF HOUSEHOLDS		
		TOTAL	LOCAL	MIGRANT
Harennna Buluk	Shawe	1,650	1,194	456 (28%)
	Sodu-Welmel	683	362	321 (47%)
Delo Mena	Sontikera	746	746	N/A
	Deyyu	1,576	1,576	N/A
	Forest villages	248	248	N/A

Source: Authors' Data.

Locals generally do not sell their own land to migrants, but instead prefer to occupy and clear new portions of forest, farming it for one or two years before selling it to migrants. Occasionally, members of the host community also sell their long-term plot further from the forest edge and relocate to new farms on newly deforested land, but this is less common. In either case, migrants can facilitate the deforestation process and the conversion of forest glades to agricultural land by providing paid labour.

The Bale Mountains area, including Harennna Buluk and Delo Mena *woredas*, falls within the ancestral homelands of the Oromo who, with over 30 million members, constitute the single largest ethnicity in Ethiopia and the wider Horn of Africa. Oromia Regional State is the largest in Ethiopia both in terms of population and size, and is inhabited primarily by the Oromo. Afan Oromo is the primary language of the majority of native residents in Harennna Buluk and Delo Mena, and nearly all members of the host community are Muslim. The majority of migrants who have settled in Harennna Buluk over the past 20 years are also members of the Oromo ethnic group, are Muslim, and speak variants of Afan Oromo. Inter-marriage between migrants and non-migrants is not uncommon, and social interactions are generally peaceful and broadly speaking balanced in terms of socioeconomic and political power.

Both host and migrant communities are largely economically marginalized, and their livelihoods depend largely on subsistence agro-pastoralism and the harvesting of forest resources. Household surveys indicate that there are noteworthy differences between

the two groups. The level of education among migrant household heads is generally lower than that of their non-migrant counterparts. Migrant households³ are more likely to live in houses with corrugated iron roofs than forest-adjacent non-migrant households, an indicator of higher disposable income. Forest residents from Delo Mena, who are most involved in the comparatively lucrative forest coffee business, are the most likely to use corrugated iron for roofing. Polygamy, closely linked to early marriage, high fertility rates and generally unsustainable population growth rates, is least common among migrant settlers. Survey results also indicate that migrant households are typically slightly larger (with an average of 7.0 individuals) than non-migrant households (where the average household size is 5.7, 6.0 and 6.6 for Delo Mena locals, Delo Mena forest villages and Harennna Buluk locals respectively).

While cultural affinities have traditionally kept conflicts between locals and migrants to a minimum, local attitudes to migrants are changing due to increasing competition over land. Unlike early migrants, those arriving after 2011 are considered illegal settlers by local government and potentially subject to measures to return them to their point of origin (although no such measures have as yet been implemented due to lack of funds). Some members of the host community, in particular landless youth, are also reported to be increasingly resentful of the economic success of some of the early migrants who acquired land relatively cheaply. While conflicts over access to land and natural resources have not escalated into major episodes of violence, they are likely to become increasingly tense and common in a context of continued population growth.

³ i.e. households in which the household head is a migrant.



5.0 Ecosystems Impacts of Migration

Differing migration rates have resulted in different changes to forest-dependent livelihoods and resource use across the two *woredas*. In Hareenna Buluk, land cover and conservation values in the forest and adjacent areas have evolved over the past 20 years in a context of significant, rapid influx of migrants. Delo Mena shows that even in the absence of significant migration, the forest ecosystem and its surroundings are not immune to land conversion processes related to the internal population growth and changing livelihood strategies and socioeconomic expectations of the resident population. This section presents the key changes in terms of land cover that have taken place over the past two decades for each of the two *woredas*, focusing on the

integrity and connectivity of the Hareenna Forest, and the area's key natural resource and conservation values.

In Hareenna Buluk, significant changes have taken place over the past two decades in terms of land cover (see Figure 5). Migration to the area began in earnest in 1995, and since then, satellite images reveal that substantial agricultural encroachment has taken place along the Hareenna Forest's southern edge and in woodland areas south of the forest, but that agricultural expansion has been most marked in the forest glades (see Figure 6). These areas of pasture within the forest, traditionally used for seasonal grazing, have rapidly been converted to agricultural use as a direct consequence of migration, particularly since 2000.

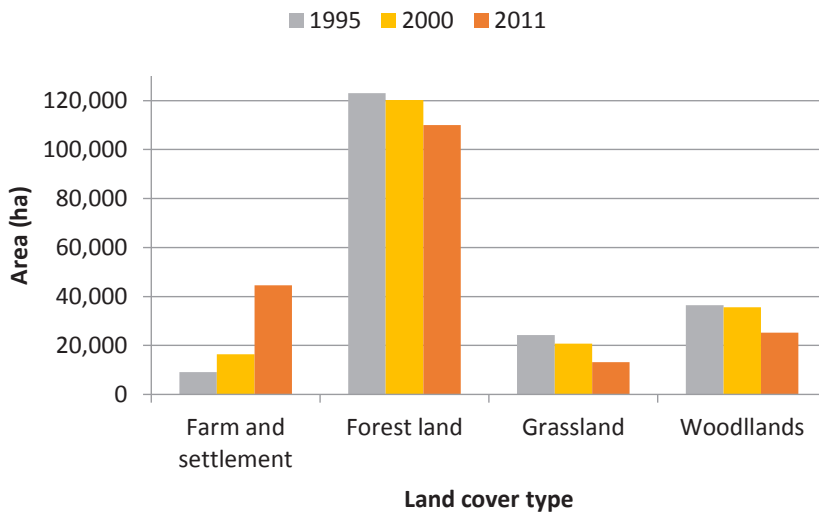


FIGURE 5. HAREENNA BULUK WOREDA LAND COVER CHANGE 1995–2011



Photo credit: Alec Crauford

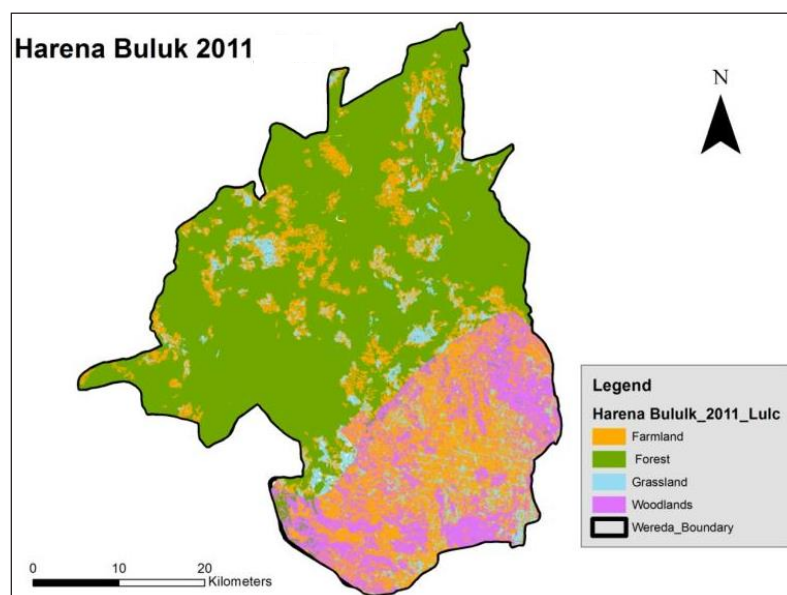
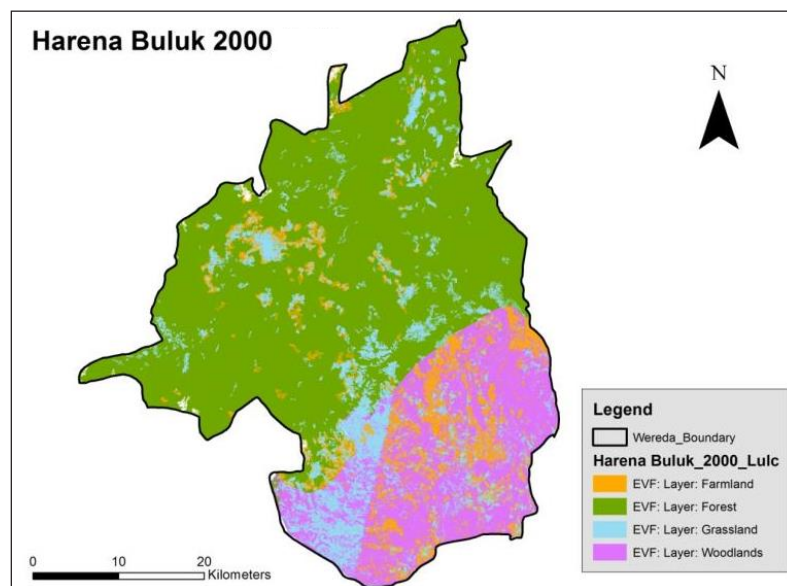
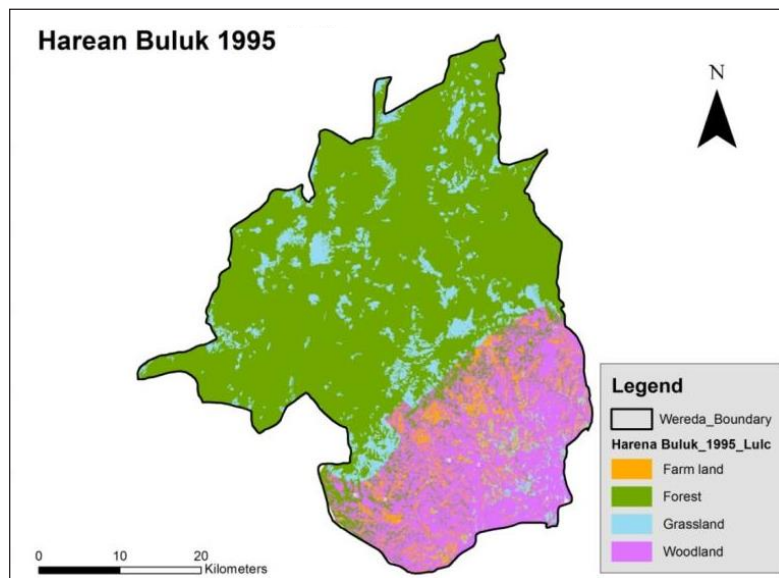


FIGURE 6. HARENNA BULUK LAND COVER IN 1995, 2000 AND 2011

Source: Authors' Data..

The dramatic change in land use in Hareenna Buluk since the onset of migration in 1995 can be seen in Table 2; over that time, agricultural land has increased from

just 5 per cent of the *woreda's* total land area to nearly one quarter, with decreases in forests, grasslands and woodlands.

TABLE 2. HARENNA BULUK LAND COVER TYPES

LAND COVER TYPE	1995		2000		2011	
	AREA (HA)	% TOTAL AREA	AREA (HA)	% TOTAL AREA	AREA (HA)	% TOTAL AREA
Farmed/settlement	9,177	5%	16,383	8%	44,547	23%
Forest	123,030	64%	120,205	62%	109,974	57%
Grassland	24,318	13%	20,744	11%	13,159	7%
Woodland	36,450	19%	35,643	18%	25,295	13%

When comparing baseline data from 1995 with the most recent available data (2011), the differences are stark: by 2011 land used for agriculture or settlement in Hareenna Buluk had increased 385 per cent (see Table 3). Over the same period, the proportion of the *woreda* covered by forest decreased by nearly 11 per cent. As illustrated by the land cover maps (see Figure 25), in Hareenna Buluk

the forest has become increasingly fragmented since the onset of the migration, though satellite data suggest that landscape-scale forest connectivity has been broadly retained.⁴ Areas of pasture, such as forest glades, have been more affected by conversion to agriculture than the forest itself.

In Delo Mena, changes in land cover have also taken

TABLE 3. HARENNA BULUK LAND COVER CHANGE 1995–2011

LAND COVER TYPE	1995		2000		2011	
	1995 TO 2000		2000 TO 2011		1995 TO 2011	
	AREA (HA)	% CHANGE	AREA (HA)	% CHANGE	AREA (HA)	% CHANGE
Farmed/settlement	9,177	5%	16,383	8%	44,547	23%
Forest	123,030	64%	120,205	62%	109,974	57%
Grassland	24,318	13%	20,744	11%	13,159	7%
Woodland	36,450	19%	35,643	18%	25,295	13%

place over the past two decades, but the scenario is markedly different to that observed in Hareenna Buluk (see Figure 7). Farmed and settled areas in Delo Mena have increased since 1995, and there has been a decrease in the proportion of the *woreda* covered by

forest. However satellite image analysis indicates that, in contrast to what took place in Hareenna Buluk, there has been little variation in terms of the areas covered by woodlands and grasslands (see Figure 8).

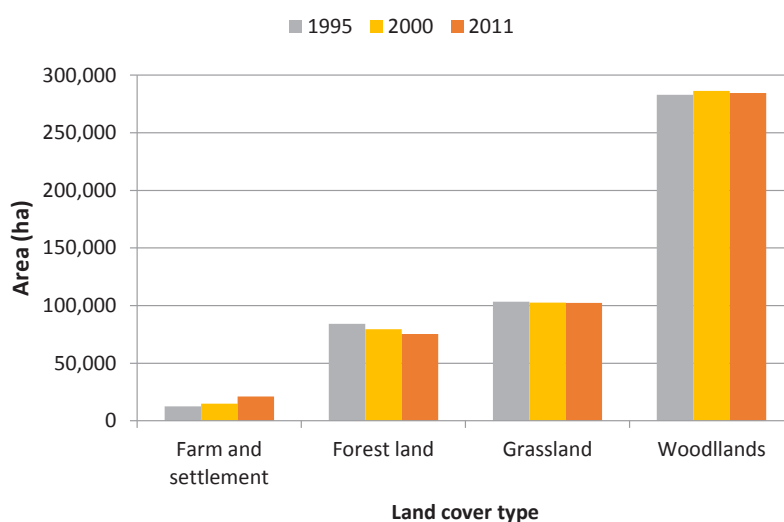


FIGURE 7. DELO MENA LAND COVER CHANGE 1995–2011

⁴ In this context, connectivity is defined as the degree to which the landscape facilitates or impedes movement of key species between resources patches.

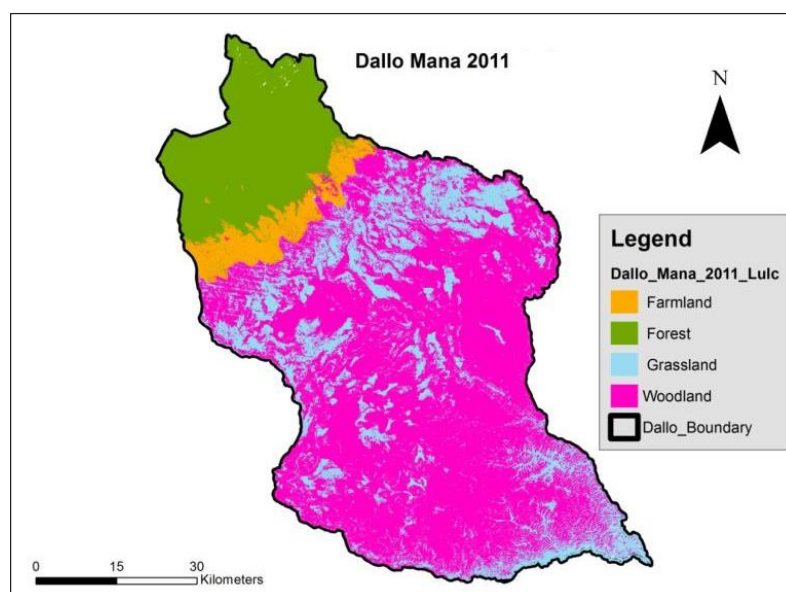
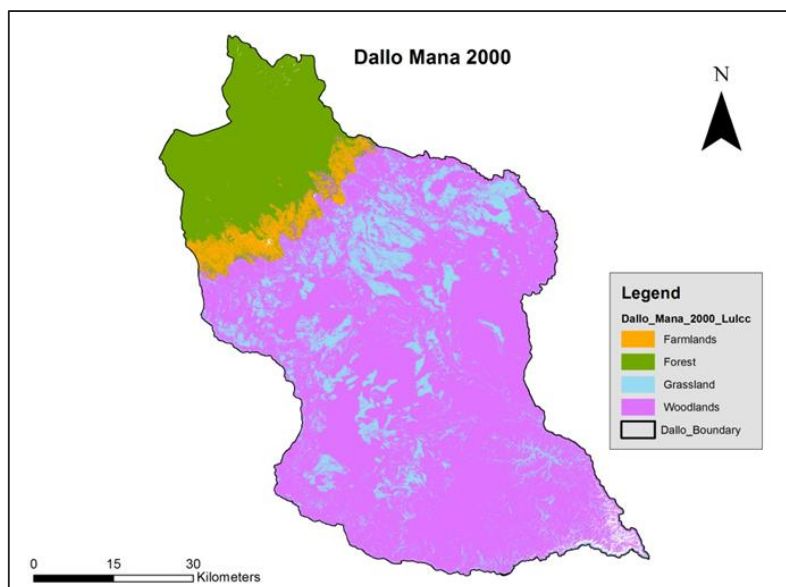
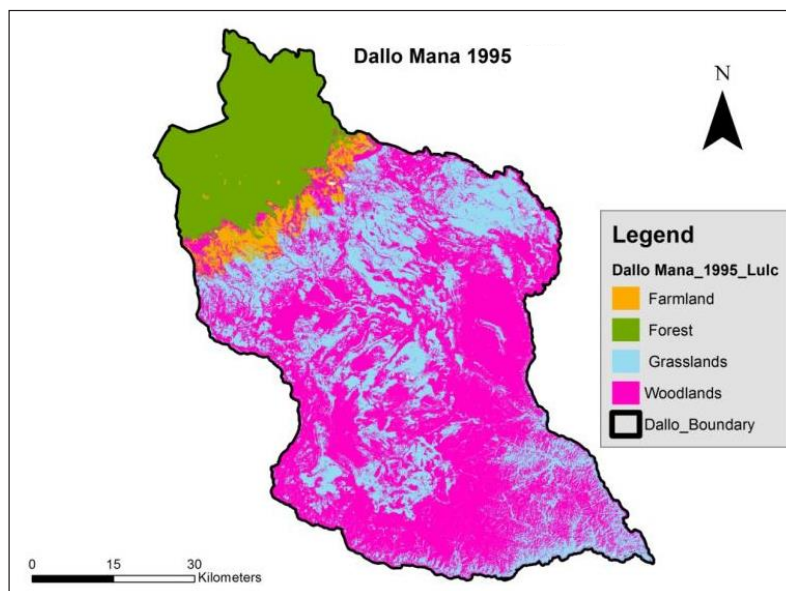


FIGURE 8. DELO MENA LAND COVER IN 1995, 2000 AND 2011.

Changes in land cover in Delo Mena are summarized in Table 4. At the onset of the migration in 1995, agricultural land covered just 3 per cent of the *woreda*. Over the study

period, these farmed areas increased by nearly 10,000 hectares, while over the same period, forests decreased by a similar amount.

TABLE 4. DELO MENA WOREDA LAND COVER TYPES

LAND COVER TYPE	1995		2000		2011	
	AREA (HA)	% TOTAL AREA	AREA (HA)	% TOTAL AREA	AREA (HA)	% TOTAL AREA
Farmed/settlement	12,581	3%	14,791	3%	21,010	4%
Forest	84,144	17%	79,436	16%	75,223	16%
Grassland	103,466	21%	102,643	21%	102,419	21%
Woodland	282,998	59%	286,319	59%	284,537	59%

From 2000 to 2011, the Ethiopian Government sought to increase crop production by encouraging farmers to plow more land. The average annual increase in farmed and settled areas was just under 4 per cent, and after 10 years farmed and settled areas in Delo Mena had increased by 42 per cent. The 10-year period saw Hareenna Forest lose 5 per cent of its surface in the *woreda*, while grassland and woodland areas remained largely unchanged. Most forest loss has occurred along the southern edge of the forest, though at the landscape scale the forest in Delo Mena appears less fragmented than in Hareenna Buluk. While between 2000 and 2008 the intensification of forest coffee management substantially impacted forest cover, in recent years this process has been slowed down, largely due to the introduction of participatory forest management.

Data indicate that between 1995 and 2011, the conversion of forest to agricultural land has taken place at comparable rates across the two *woredas*,

while agricultural encroachment into grazing lands and woodlands has not occurred at the same rate in Delo Mena. This is largely attributable to significant differences in migration between the two *woredas*; migration has been a key driving force in the evolution of critical livelihoods in Hareenna Buluk but not in Delo Mena. However, the change can also be attributed in part to the limited number and size of forest glades in Delo Mena; glades in Hareenna Buluk are more amenable to conversion from pasture into farmland. Delo Mena also extends significantly further into the southern lowlands than Hareenna Buluk, into dry areas that are less suitable for the kind of farming that has become widespread in the Hareenna Buluk forest glades and in the forest-adjacent areas. In addition, intensively managed forest coffee is virtually indistinguishable from natural woodlands in satellite imagery, therefore it is possible that the maps underestimate the loss of woodlands to agriculture in the focus areas, most notably in Delo Mena.

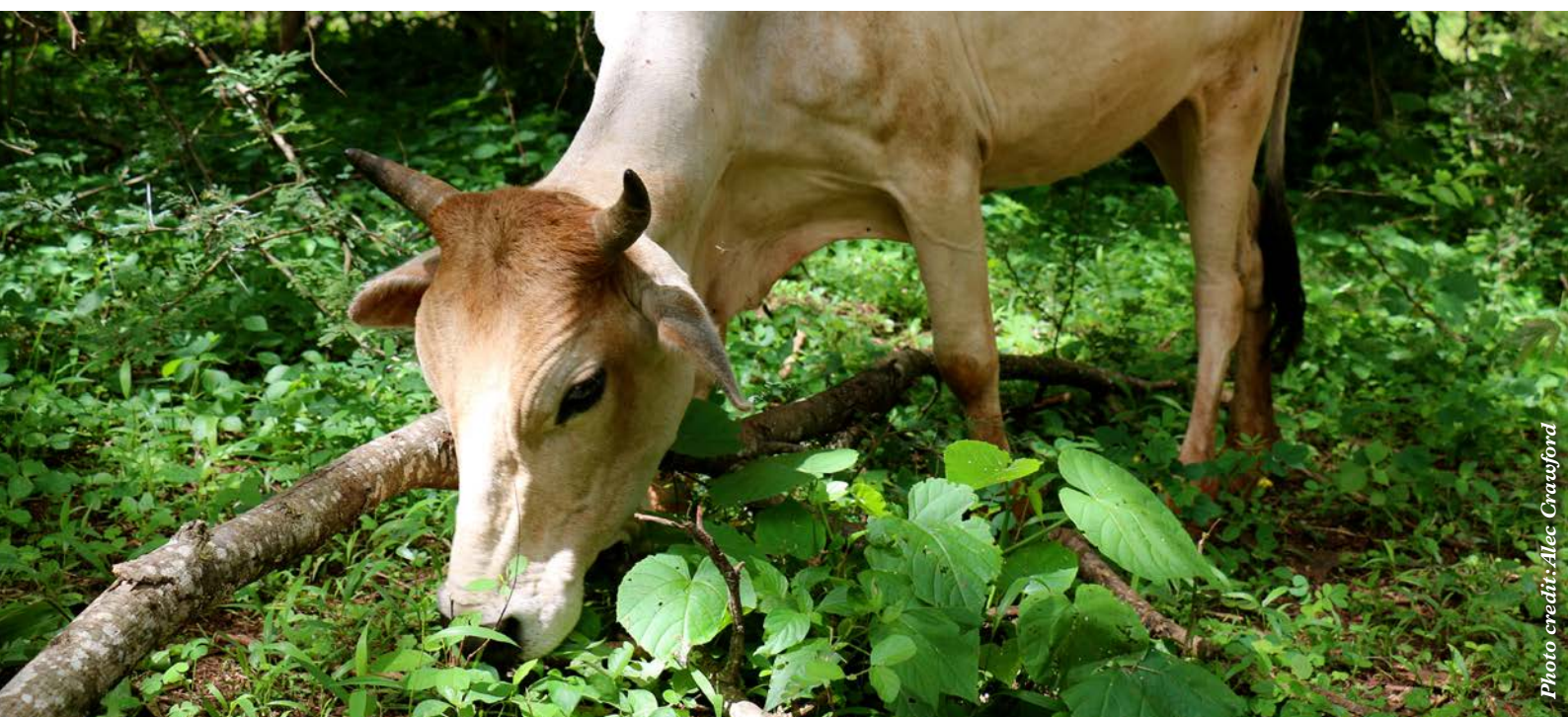


Photo credit: Alec Crayford

6.0 Conclusions and Recommendations

Migration has played a key role in the conversion of forest and grasslands—particularly forest glades—to agricultural land in Harennna Buluk. Migrant settlers have introduced a number of new and more intensive farming practices, such as intercropping and on-farm grazing, which have allowed them to produce more with less land. These methods have gradually replaced the *godantu* system, even among the non-migrants. In the absence of large-scale migration, transhumant pastoralism is still widely practiced in Delo Mena. That said, the long-term sustainability of the *godantu* system is being increasingly questioned even among the native Delo Mena residents, who have been gradually diversifying their livelihood strategies in order to increase their resilience to rapid internal population growth, drought and the loss of grazing lands to agriculture.

A number of key themes emerge from the questionnaires in terms of the involvement of migrants and non-migrants in forest-dependent livelihoods:

- **Adoption of migrant livelihoods by non-migrants:** Due to their limited interactions with migrants, local farmers in Delo Mena have been slower than their counterparts in Harennna Buluk to adopt new, land-intensive farming methods. The livelihoods of forest residents in Delo Mena and migrants in Harennna Buluk are in some cases similar, likely attributable to the similar environments they occupy (i.e., restricted areas surrounded by protected forest) rather than particularly strong cultural or socioeconomic interactions.
- **Minimal involvement of migrants in transhumance:** The percentage of migrant households who take part in transhumant pastoralism was minimal. Conversely, nearly 60 per cent of native resident households living in Delo Mena along the forest edge are involved in seasonal forest grazing, compared to just over 30 per cent of their Harennna Buluk counterparts. This corroborates anecdotal evidence that non-migrants in Harennna Buluk are gradually abandoning the *godantu* system for the more cost-effective farming practices of their migrant neighbours.
- **Limited forest coffee ownership among migrants:** Ownership of forest coffee on the informal land market is common across the case study area, particularly among forest residents in Delo Mena, who also tend to own the largest areas of forest coffee. Migrants are the group least involved in forest coffee ownership, however settlers from eastern Ethiopia have begun planting non-indigenous coffee in open farms without shade, mixed with cereals (Gole & Senbeta, 2008). The high value of forest coffee land on the informal market may be the main factor limiting the migrants' access.
- **Minimal differences in farmland ownership between migrants and non-migrants:** According to the survey data, the mean size of cultivated land owned at the household level does not vary greatly between migrants and locals, although local residents in Delo Mena on average own slightly larger plots.
- **Migrants use land more efficiently than non-migrants:** Migrant settlers use the limited land available to them more intensively and efficiently than their non-migrant neighbours; the overwhelming majority of migrants surveyed use the plots surrounding their homes to cultivate crops and grow fruit trees. Conversely, 70 per cent of local Delo Mena residents living on the forest edge do not farm crops in their home gardens. Local Harennna Buluk residents typically use their home plots more intensively than their Delo Mena counterparts, and according to key informants this is a direct consequence of migrants' land-intensive farming methods being adopted by their local neighbours.
- **Host community may have influenced migrants in adopting forest beekeeping:** Forest beekeeping is an activity traditionally practiced by transhumant pastoralists during seasonal forest grazing. 40 per cent of the migrant households surveyed also practice beekeeping, despite their minimal involvement in transhumance, an example of the migrants adopting the host community's traditional forest-resource dependent livelihoods.
- **Introduction of new crops by migrants:** Migrants from eastern Ethiopia have introduced the cultivation of *khat*, a plant whose leaves are chewed as a stimulant. Locals in Harennna Buluk have now also started small-scale *khat* cultivation, while none of the survey respondents in Delo Mena mentioned *khat* production as a source of income.

Stakeholder maps were developed for Hareenna Buluk and Delo Mena to analyze interactions between key institutions responsible for forest resource management in the two *woredas*, as well as their power and influence relative to each other (see Figures 9 and 10). A particular focus was placed on the ways in which the presence or absence of migrants can impact these interactions. The

maps clarify where the power lies to influence forest resource-management decisions in Hareenna Buluk and Delo Mena, and how relationships between the key stakeholders involved (or lack thereof) may facilitate or hinder the development of sustainable solutions to the current natural resource management and conservation challenges.

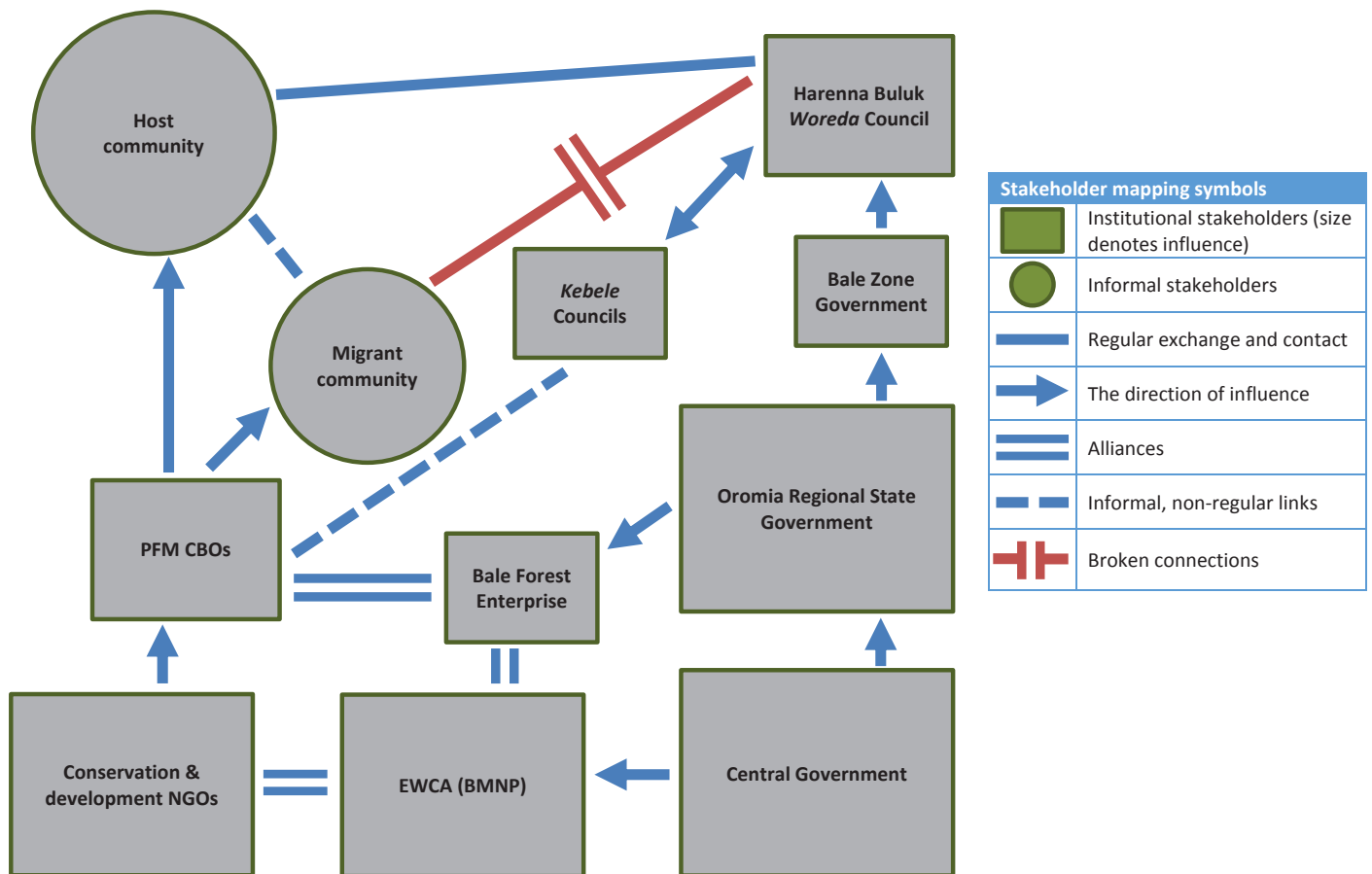


FIGURE 9. HAREENNA BULUK STAKEHOLDER MAP

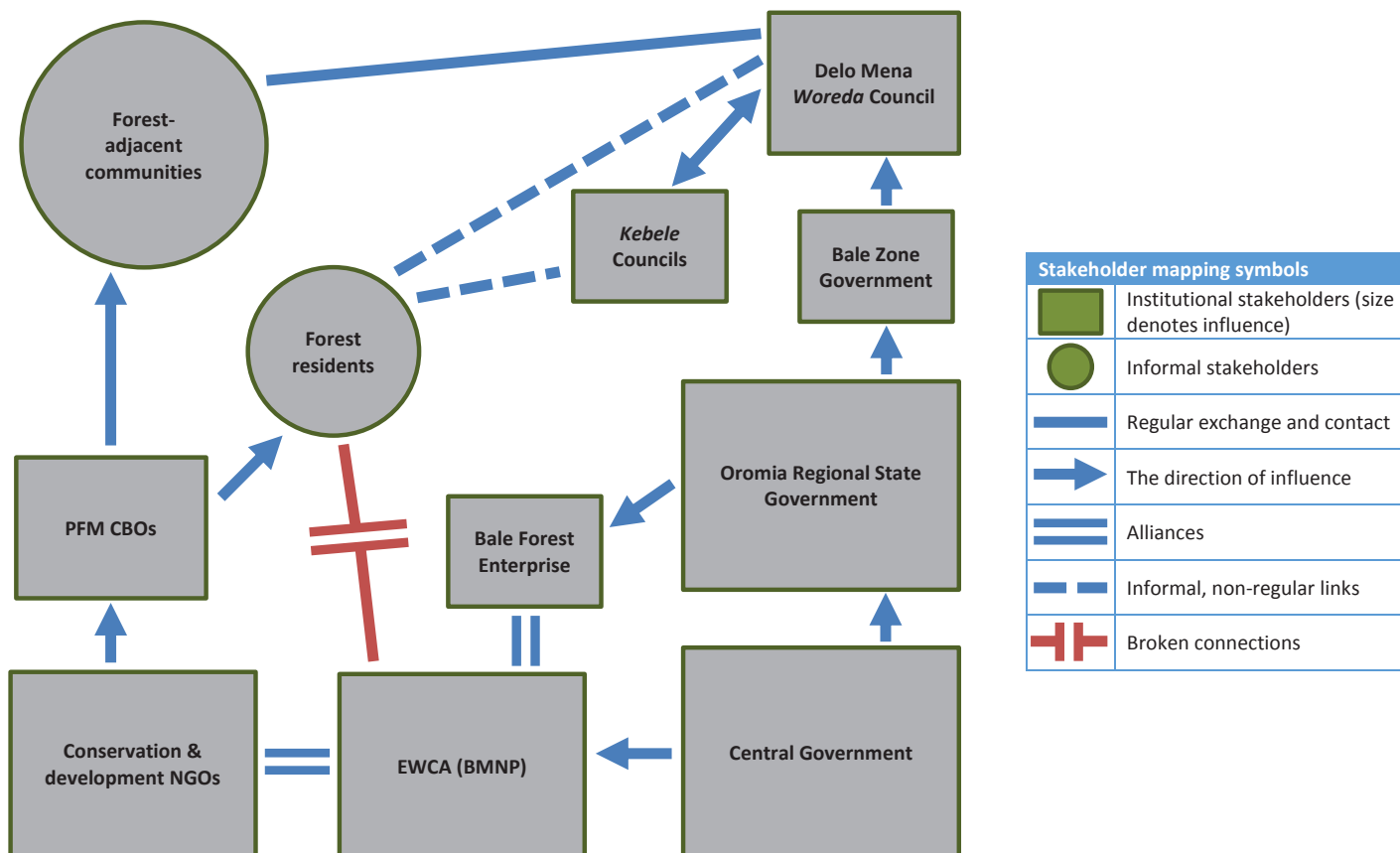


FIGURE 10. DELO MENA STAKEHOLDER MAP

Since the government and community-based institutions responsible for forest resource governance are the same in both *woredas*, the maps have much in common. However, there are key differences. In Hareenna Buluk, the relationships between migrant settlers and the *woreda* administration have become increasingly difficult following the proposed resettlement of migrants who came to the *woreda* after 2011. In Delo Mena it is mainly forest residents who have come into conflict with the authorities—the BMNP management—because of fears that they too will have to be resettled.

Stakeholder profiles can help to establish what can be used as common ground in these types of relationship-rebuilding discussions. Profiles were prepared for the three main stakeholder groups involved in ground-level forest management and exploitation in Hareenna Buluk and Delo Mena: local forest resource users (migrant and non-migrant), PFM CBOs, and EWCA BMNP management (see Table 5). As these groups are either the same (in the case of institutional stakeholders) or are driven by the same needs (in the case of forest users) across the two *woredas*, one table was used to summarize

the situation across the case study focus area. To better understand where stakeholder perspectives diverge, and in particular the key challenges to collaboration and communication between the different stakeholders, five key aspects of each of the stakeholder groups were examined:

- **Positions:** Publicly presented demands and standpoints
- **Interests:** What each stakeholder would like to ideally achieve from engagement with other stakeholders
- **Needs:** Essential requirements for the subsistence and satisfaction of each stakeholder
- **Capacities:** Resources (physical, financial, human, technical and social) that each stakeholder can access
- **Capacity gaps:** Resources (physical, financial, human, technical and social) that each stakeholder would require to address their needs, promote their interests or articulate their positions but cannot currently access

TABLE 5. STAKEHOLDER PROFILES

STAKEHOLDER	FOREST RESOURCE USERS (MIGRANT & NON-MIGRANT)	PFM CBOS	EWCA (BMNP)
Positions	<ul style="list-style-type: none"> • Livelihoods must be improved • Continued access to forest resources (e.g., building materials, wild coffee, etc.) is critical to viability of local livelihoods 	<ul style="list-style-type: none"> • Sustainable resource management should be promoted and supported • To achieve long-term sustainable resource use, PFM bylaws should be enforced by elected CBO members 	<ul style="list-style-type: none"> • BMNP must be managed for conservation and no further land conversion must take place • Use of forest resources must be reduced and local communities should switch to alternative livelihoods outside BMNP in the long term
Interests	<ul style="list-style-type: none"> • Continued access to critical forest resources • Low penalties for transgression of PFM bylaws • Management of forest coffee to maximize production should be allowed 	<ul style="list-style-type: none"> • Enforcement of existing bylaws regulation forest resource access • Strengthening of bylaws to ensure sustainability of forest resource management 	<ul style="list-style-type: none"> • Protection of forest integrity and biodiversity • Recognition that forest within BMNP should be managed for conservation
Needs	<ul style="list-style-type: none"> • Long-term access rights to forest resources • Formal recognition of current informal land tenure of land converted to agricultural use 	<ul style="list-style-type: none"> • Forest sustainably managed • Long-term sustainability of PFM CBO structure 	<ul style="list-style-type: none"> • Preservation of ecological values of BMNP • Promotion of BMNP tourism (including forest tourism)
Capacities	<ul style="list-style-type: none"> • Improved farming practices • Increasing income from forest coffee 	<ul style="list-style-type: none"> • Legal mandate to pass bylaws regulating access to forest resources 	<ul style="list-style-type: none"> • Legal mandate to conserve BMNP (including Harena Forest)
Capacity gaps	<ul style="list-style-type: none"> • Insufficient capacity to adopt alternative (i.e., not forest-dependent) livelihoods • Insufficient access to credit to adopt alternative livelihoods • Limited capacity to market forest products (e.g., wild coffee) internationally 	<ul style="list-style-type: none"> • Limited human resources • Limited resources for effective enforcement of PFM bylaws • Limited technical capacity to develop long-term sustainable management plans • Limited information on status of forest ecosystem 	<ul style="list-style-type: none"> • Limited human resources • Limited resources for equipment and transport • Limited monitoring data on status and trends of forest ecosystem

Based on the analysis above, recommendations are proposed for conservationists to address the ecosystem impacts of migration in Harena Buluk. These recommendations are also largely applicable to the livelihood and environmental issues associated with population growth in Delo Mena. In Delo Mena, an opportunity exists to intervene before pressures related

to internal population growth lead to land conversion and livelihood changes on the same scale as in Harena Buluk. There are a number of significant challenges to be addressed, and the proposed interventions are based around the assumption that the political will exists to move toward sustainable resource management at both the local and national level.

Recommendation 1: Curb the expansion of migrant settlements

Intervention Strategy 1 involves addressing migration in Harenna Buluk. It would require regulating the informal land market and introducing new regulations to curb the expansion of unsustainable settlements and the land conversion processes that are threatening the forest's key conservation values. In Ethiopia, *kebele* administrations have the right to pass bylaws, and in the case study area have successfully done so with PFM regulations (which are effectively *kebele*-level bylaws). It would be possible to formally regulate and restrict settlement expansion in critical areas through this mechanism, given the political will.

In order for this strategy to be effective, existing financial incentives that motivate many *kebele* leaders to allow migrants to informally settle in the area in large numbers (i.e., the informal "land use tax") should also be revised. Local elites, including traditional and *kebele* leaders, are generally those that benefit most from informal land transactions, many of which involve migrants. This makes many of them reluctant to reform the existing system for buying and selling land, which blends traditional and modern elements despite never being officially recognized.

Nevertheless, increasing competition for land among migrant settlers and host communities over the past decade has pushed local administration in Harenna Buluk to register as illegal all migrants who settled in the 10 most migration-affected *kebeles* after 2011. Due to a lack of funds and the sensitive nature of the issue, there are currently no concrete plans to resettle these 3,582 individuals elsewhere. While relations between migrants and the host communities remain for the most part peaceful, conflicts might erupt if directives restricting the settlement of new migrants were to be enforced.

Recommendation 2: Improved protection of key habitats and species

There is a need to strengthen the protection of Harenna Forest. The forest is home to a variety of endemic plant and animal species, many of which are endangered and many of which could be used as flagship species around which support for the park can be generated. Many of these species (African wild dogs, lions, grass frogs, and so on) are umbrella species, and the conservation of their habitat in the Harenna Forest would also ensure the protection of numerous other key plant and animal

species. Unfortunately, EWCA has limited resources and capacity for the protection of BMNP, and most of the Harenna Forest actually falls outside the park boundaries. This would therefore require significant additional funding, not just to implement potential habitat and species-specific management strategies, but even to effectively fulfill EWCA's existing mandate to protect and manage the BMNP in accordance with the 2007–2017 General Management Plan. Conservationists could look into the viability of international forest conservation funding mechanisms for Harenna, including the UN's Reducing Emissions from Deforestation and forest Degradation (REDD) fund.

Recommendation 3: Promote protection by raising awareness

At the local, state and national level, Harenna Forest conservation programs can be promoted through the lens of water conservation. The forest's key role in local and regional water supply and security is threatened by deforestation and forest degradation; by extension, Harenna Forest plays a key role in local economic development and food security, particularly in a context of climate change. Conservationists can use this message to strengthen the case for preservation among local communities and authorities, and to press for the increased enforcement of local laws governing resource access and use. Protecting the forest's key hydrological functions could also be a means of generating financial support for conservation, both from the national government and from bilateral donors and development organizations.

Recommendation 4: Repair damaged stakeholder relationships

Stakeholder maps can be used as a means of identifying entry points for possible action. In order to improve forest management in Harenna Buluk, for example, relationships between the migrant community and the Harenna Buluk *woreda* council must first be repaired. To do so, conservationists could leverage their relationship with the PFM CBOs, which were identified by stakeholders as having a positive influence on the host community. The host community has formal and informal relationships with both the migrant community and the *woreda* council; as such, they may be able to serve as a mediator between the council and the migrant community to resolve their outstanding disputes and come to an agreement on resource access and use.

In Delo Mena, park authorities were identified as being in conflict with forest residents. Under these conditions, it is unlikely that sustainable forest resource management is going to be practiced in forest *kebeles* in a way that supports the objectives of the conservation authorities. From the stakeholder map, it appears as though conservation and development NGOs, as well as the PFM CBOs, might be able to play a similar mediation role given their strong relationships with both parties. The role of mediator should of course be approached with caution; there is always the risk that an attempt to resolve tensions between opposing groups could backfire and lead to further broken connections between other stakeholders. As such, the NGOs and CBOs should try to maintain their neutrality when acting as mediators.

Recommendation 5: Enhance kebele-level PFM regulations

The Bale Forest Enterprise (BFE) and the Bale Eco-Region Sustainable Management Programme (BERSMP) have set up participatory forest management structures that have enabled local communities in both *woredas* to manage the forest resources on which local livelihoods depend in partnership with the BFE. Through these *kebele*-level CBOs, local residents, migrants and non-migrants alike are being empowered to take an active role in the planning and implementation of bottom-up forest resource management. The Ethiopian administrative system also allows for *kebele* officials to pass bylaws, and the PFM CBO regulations developed with the support of the BERSMP have effectively been ratified as *kebele* bylaws across the case study areas.

Further enhancing and tightening recently introduced PFM bylaws in order to improve the long-term sustainability of local forest-dependent livelihoods is essential. While the current PFM regulations in Hareenna Buluk and Delo Mena include penalties for non-CBO members who access forest resources without permission, as well as for CBO members who are caught infringing upon the regulations, these penalties consist of minor fines which are largely symbolic and are unlikely to act as effective deterrents in their current form.⁵ This must be addressed. Further measures are also needed to build the capacity of CBO members to enforce PFM

bylaws. Despite the limited resources, CBO members for the most part already patrol the areas under their management with regularity, but uncertainties relating to the exact boundaries between *kebeles* (each CBO coincides with a *kebele*) limit the effectiveness of such patrols, particularly since a number of *kebele* boundaries have been recently re-demarcated.

Recommendation 6: Develop alternative livelihoods

It is clear from the stakeholder profiles that providing sustainable, viable livelihoods to forest-adjacent communities is of prime concern, both with regards to community well-being and to the well-being of the forest. Forest resource users do not have the capacity or financial resources to adopt these alternative livelihoods themselves, and both CBOs and the conservation authorities have limited human and financial resources. This may represent an opportunity for outside organizations that are concerned with the ecosystem's integrity and that can also mobilize or provide funding for alternative livelihoods. Of course these livelihood options will have to be developed in concert with local communities, to ensure that they meet their needs and interest, and they must be provided in a conflict-sensitive way to ensure that they are not inequitably distributed to just a few well-connected individuals or communities (assuming they are more lucrative than forest-based livelihoods). Benefits should also extend only to those already in the area; organizers would have to avoid a situation in which the alternative livelihoods simply attract more migrants to the region in search of jobs. Tourism may be one viable option that both provides both jobs to locals and migrants and increases awareness among both communities as to the importance of forest conservation.

The decline of Hareenna Forest must be reversed, not only for the sake of its flora and fauna, but also for the communities that rely on it for water, food and livelihoods. For this to happen, policy-makers and practitioners must recognize the role that migration has played in its decline, and work with local and migrants communities to minimize its negative impacts and—where possible—enhance its positive contributions.

⁵ E.g., fines for livestock forest grazing for non-CBO members without permission can be as low as 1 ETB per head of cattle (approximately USD0.05)

References

- Adugna, F. (2009). *Negotiating identity: Politics of identification among the Borana, Gabra and Garri around the Oromo-Somali boundary in Southern Ethiopia* (PhD Thesis). Martin-Luther-Universität Halle-Wittenberg, Halle/Saale.
- Asefa, A. (2011). Mammals of the Bale Mountains National Park, Ethiopia: A compiled and annotated checklist, (Walia-Special Edition on the Bale Mountains). *Journal of the Ethiopian Wildlife and Natural History Society*, 3–14. Retrieved from https://fzs.org/files/3314/1086/8468/Walia_-_Special_Edition_on_the_Bale_Mountains_2011.pdf
- Anteneh, B., Temesgen, Y., & Worku, A. (2013). Recurrent and extensive forest fire incidence in the Bale Mountains National Park (BMNP), Ethiopia: Extent, cause and consequences. *International Journal of Environmental Sciences*, 2(1), 29–39.
- Central Statistical Agency. (2007). *The 2007 population and housing census of Ethiopia: Statistical report for Oromiya Region*. Retrieved from http://www.csa.gov.et/newcsaweb/images/documents/pdf_files/regional/Oromya1.pdf
- Central Statistical Agency. (2011). *Population Statistics Abstract 2011*. Retrieved from http://www.csa.gov.et/images/documents/pdf_files/nationalstatisticsabstract/2011/2011%20population.pdf
- Chiodi, G. , & Pinard, M. (2011). Characteristics and origins of glades in the Harenna Forest, Ethiopia, (Walia-Special Edition on the Bale Mountains). *Journal of the Ethiopian Wildlife and Natural History Society*, 131–145. Retrieved from https://fzs.org/files/3314/1086/8468/Walia_-_Special_Edition_on_the_Bale_Mountains_2011.pdf
- Dutson, G. & Sillero-Zubiri, C. (2005) Forest-dwelling wild dogs in the Bale Mountains, Ethiopia. *Canid News*, 8(3). Retrieved from www.canids.org/canidnews/8/African_wild_dogs_in_Ethiopia.pdf
- Frankfurt Zoological Society. (2007). *Bale Mountains National Park General Management Plan 2007-2017*. Retrieved from <http://www.abdn.ac.uk/bale/BMNP%20GMP%20March2007.pdf>
- Gole, T.W., & Senbeta, F. (2008). *Sustainable management and promotion of forest coffee in Bale, Ethiopia*, submitted to: Bale Eco-Region Sustainable Management Programme SOS Sahel/FARM-Africa. Retrieved from https://cdn.shopify.com/s/files/1/0003/1621/files/Sustainable_forest_coffee_production_in_Bale-final.pdf
- Guinand, Y. (2000). *Haraghe Agro-pastoralists face an uncertain future: Report of UN-Emergencies Unit for Ethiopia mission*, March 2000. Retrieved from www.africa.upenn.edu/Hornet/hara1804.html
- IUCN SSC Amphibian Specialist Group (2013) *Ptychadena harenna*, The IUCN Red List of Threatened Species. Version 2014.2. Retrieved from www.iucnredlist.org
- Lavrenchenko, L. & Hutterer, R. (2008). *Crocidura harenna*, The IUCN Red List of Threatened Species, Version 2014.2. Retrieved from www.iucnredlist.org
- Smithson, J., (2010). Using and analysing focus groups: Limitations and possibilities. *International Journal of Social Research Methodology*, 3(2), 103–119. Retrieved from <http://www.sfu.ca/~palys/Smithson-2000-Using&AnalysingFocusGroups.pdf>
- Teshome, E., Randall, D., & Kinahan, A. (2011). The changing face of the Bale Mountains National Park over 32 years: A study of land cover change (Walia-Special Edition on the Bale Mountains). *Journal of the Ethiopian Wildlife and Natural History Society*, 118–130. Retrieved from https://fzs.org/files/3314/1086/8468/Walia_-_Special_Edition_on_the_Bale_Mountains_2011.pdf
- United Nations Development Programme. (2014). *Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. New York: UNDP. Retrieved from <http://hdr.undp.org/en/2014-report/download>
- Wakjira, D.T. (2014). *Governance of social-ecological systems in an Afromontane forest of southeast Ethiopia: exploring interactions*. Unpublished Ph.D Thesis. The University of Aberdeen, Scotland, UK. Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.600080>
- Wakjira, D.T., Fischer, A., & Pinard, M. A. (2013). Governance change and institutional adaptation: A case study from Harenna Forest, Ethiopia, *Environmental Management*, 51, 912–925.
- Wakjira, K., Gashaw, M., & Pinard, M. A. (2011). A preliminary assessment of the Bale Monkey (*Cercopithecus djamdamensis*): Population size and habitat use in the Harenna Forest (Walia-Special Edition on the Bale Mountains). *Journal of the Ethiopian Wildlife and Natural History Society*, 80–88. Retrieved from https://fzs.org/files/3314/1086/8468/Walia_-_Special_Edition_on_the_Bale_Mountains_2011.pdf
- World Bank. (2014). *World development indicators 2014*. Washington, DC: World Bank. doi: 10.1596/978-1-4648-0163-1.

Annex 1: Case study methodology

The case study research focused on three broad areas: understanding the nature of the migration impacting Hareenna Forest; what are the impacts of the migration on key livelihoods and natural resource use in the case study areas; and how is the migration impacting the ecosystem and its biodiversity. As previously described, the research was carried out in two adjacent *woredas* (Hareenna Buluk and Delo Mena), both of which are home to large portions of Hareenna Forest and both of which have very different migration narratives.

Data from multiple sources were used in this case study, including a review of secondary sources (including published statistics, and published and unpublished texts), semi-structured interviews with key informants, focus group discussions, survey data and satellite image

analysis. Satellite images from three different years (1995, 2000 and 2011) were used to detect land-cover change across the case study area during the major migration period. Using commercially available **remote sensing** and GIS software, the satellite images were analyzed and interpreted to quantify and map the relative changes in the four major land cover categories (i.e., forest, farmland, grassland and woodland) since the onset of the migration. These were obtained from the USGS website. All satellite images were digitally interpreted, analyzed and classified using the ENVI 4.7 software, and image processing included image rectification, re-sampling, interpretation and classification. Cartographic processing was done in ArcGIS 10 using the Adindan⁶ local geodetic datum and the UTM projection (UTM Zone 37 North) as spatial reference coordinate systems.

TABLE A1. SATELLITE IMAGERY USED FOR LAND-COVER CHANGE ANALYSIS

YEAR OF IMAGE	SATELLITE (SENSOR)	RESOLUTION		COVERAGE (KM)	SCENE OR POINT IDENTIFIER	
		SPATIAL (M)	SPECTRAL (BANDS)		PATH/LATITUDE	ROW/ LONGITUDE
1995	Landsat TM	30	6	185 x 185	167	055/56
2000	Landsat ETM	30	6	185 x 185	168	055/56
2011	Landsat ETM	30	6	185 x 185	168	055/56

Site visits were designed to focus on key geographical locations within Hareenna Buluk and Delo Mena *woredas*. The decision was made to focus primarily on four *kebeles*, two from each of the *woredas* covered by the case study. In addition, a number of forest villages in Delo Mena

scattered across four different *kebeles* were also covered. Table A2 below summarizes the key locations where field data were collected during the case study site visits, which were conducted between May and September 2014.

TABLE A2. CASE STUDY DATA COLLECTION FOCUS AREAS

WOREDA	FOCUS AREAS
Hareenna Buluk	Shawe Kebele
	Sodu-Welmel Kebele
Delo Mena	Sontikera Kebele
	Deyu Kebele
	Forest villages (Wabero, Burkitu, Irba and Chirri Kebeles)

Purposive sampling was used to select Shawe and Sodu-Welmel as the two *kebeles* in Hareenna Buluk on which to focus for data collection, because preliminary meetings with key informants had identified them as the main areas where migrants from eastern Ethiopia first settled at the onset of the in-migration process in 1995. Therefore, these two *kebeles* were thought to provide a more accurate picture of the full extent of the on-going migration and its impacts than neighbouring *kebeles* that have only experienced in-migration in recent years. The *kebeles* for data collection in Delo Mena *Woreda* (Deyu

and Sontikera) were selected randomly from eight forest-adjacent *kebeles* bordering the Hareenna Forest.

Field collection also included the four main forest villages in Delo Mena. Data from these forest villages were deemed important because in the long term these settlements are likely to expand and could potentially lead to land conversion similar to that observed in Hareenna Buluk following the influx of migrants, unless sustainable forest management is achieved.

Face-to-face questionnaire surveys were administered to selected households representing migrants, forest-

⁶ Adindan is a geodetic datum (a coordinate system, and a set of reference points, used to locate places on the Earth) suitable for use in Eritrea, Ethiopia and Sudan.

adjacent locals and local forest residents across the case study area in order to evaluate and compare the key assets, livelihood strategies and farming systems of these target groups. Households were used as the unit of analysis for the questionnaires because assets are

typically held and managed at the family level in the case study area. All sample households were selected using random sampling based on the household registration roster of the target *kebeles* and the villages.

TABLE A3. PROPORTION OF TOTAL HOUSEHOLDS IN THE TARGET KEBELES AND VILLAGES SURVEYED

WOREDA	KEBELE	ALL HOUSEHOLDS		LOCAL HOUSEHOLDS		MIGRANT HOUSEHOLDS	
		TOTAL	SURVEYED	TOTAL	SURVEYED	TOTAL	SURVEYED
Hareenna Buluk	Shawe	1650	150 (9%)	1194	109 (9%)	456	44 (10%)
	Sodu-Welmel	683	70 (10%)	362	37 (10%)	321	33 (10%)
Delo Mena	Sontikera	746	46 (6%)	681	44 (6%)	65	2 (3%)
	Deyu	1576	75 (5%)	1515	69 (5%)	61	6 (10%)
	Forest villages*	248	45 (18%)	232	37 (16%)	16	8 (50%)

* The forest villages considered in this case study are located in Wabero, Burkitu, Irba and Chirri Kebeles, all in Delo Mena.

The questionnaire was administered in Afan Oromo, the language of both the native resident population and the migrant settlers from Eastern Oromia, and the data were subsequently translated into English. Annex 2 presents the questionnaire data in tabular form.

Semi-structured interviews were conducted with key informants representing local stakeholder groups such as

migrants, *woreda* officials (Pastoral Development Office Heads), *kebele* chairmen and PFM CBO chairmen in order to obtain insights into the critical drivers of human population growth and the associated socioeconomic and environmental impacts. A total of 12 semi-structured interviews were held across the case study area.

TABLE A4. SEMI-STRUCTURED INTERVIEWS CONDUCTED

KEY INFORMANT CATEGORY	HARENNA BULUK		DELO MENA
	SHAWE	SODU-WELMEL	ALL KEBELES
Migrants	3	4	
PFM CBO Chairmen	1	1	
Kebele Chairmen		1	
Woreda officials		1	1

Focus group discussions were held with a number of key stakeholders, including PFM CBO executives, elders, youths, forest residents and forest-adjacent residents in order to analyse the target communities' understanding and perception of key socioeconomic and environmental changes that have taken place in the case study area

over the past two decades. The groups were also used to collect information on stakeholder perceptions with regard to the current status and expected future trends and challenges in terms of the conservation of the Hareenna Forest, the ecosystem services it provides, and the livelihoods it supports.

TABLE A5. FOCUS GROUP DISCUSSIONS HELD

FOCUS GROUP COMPOSITION	HARENNA BULUK		DELO MENA	
	SHAWE	SODU-WELMEL	DEYU	FOREST VILLAGES
PFM CBO executives				2
Elders	1		1	
Youths		1		1
Forest residents				2

In addition, three analytical tools were used to help identify entry points for action. Migration timelines were used primarily to document the case study area's local history in terms of migration and other population pressures, as well as the resulting changes in livelihoods, natural

resource use and conservation over time. Stakeholder mapping was used primarily to examine the relationships between the key stakeholders. Stakeholder profiles were used to assess in more detail the perspectives and actions of key stakeholders.

Annex 2: Summary of household questionnaire results

HOUSEHOLD CATEGORY	ROOF COVER OF MAIN HOUSE			
	GRASS	CORRUGATED IRON	PLASTIC SHELTER	ALL
Migrants	36 (39%)	52 (56%)	5 (5%)	93
Locals Harena Buluk	72 (50%)	67 (47%)	4 (3%)	143
Locals Delo Mena	73 (65%)	34 (30%)	6 (5%)	113
Forest villages, Delo Mena	8 (22%)	23 (62%)	6 (16%)	37
Total	189 (49%)	176 (46%)	21 (5%)	386

HOUSEHOLD CATEGORY	MARITAL STATUS OF HOUSEHOLD HEAD			
	MONOGAMOUS	POLYGAMOUS	WIDOWED OR DIVORCED	ALL
Migrants	69 (74%)	19 (20%)	5 (5%)	93
Locals Harena Buluk	77 (54%)	55 (39%)	9 (6%)	143
Locals Delo Mena	71 (63%)	39 (35%)	3 (3%)	113
Forest villages, Delo Mena	23 (62%)	10 (27%)	4 (11%)	37
Total	240 (62%)	123 (32%)	21 (5%)	386

HOUSEHOLD CATEGORY	HEAD OF HOUSEHOLD EDUCATION LEVEL				
	ILLITERATE	LITERATE BUT NO FORMAL EDUCATION	ATTENDED PRIMARY SCHOOL	ATTENDED SECONDARY SCHOOL AND/OR ABOVE	ALL
Migrants	58 (62%)	11 (12%)	18 (19%)	6 (6%)	93
Locals Harena Buluk	76 (53%)	26 (18%)	35 (25%)	6 (4%)	143
Locals Delo Mena	41 (36%)	25 (22%)	31 (27%)	16 (14%)	113
Forest villages, Delo Mena	15 (41%)	1 (3%)	15 (41%)	6 (17%)	37
Total	190 (49%)	63 (16%)	99 (26%)	44 (9%)	386

HOUSEHOLD CATEGORY	PRIMARY LIVELIHOODS OF HOUSEHOLDS				
	CROP FARMING	ANIMAL REARING	FOREST COFFEE PRODUCTION	OTHER	ALL
Migrants	77 (83%)	0	10 (11%)	6 (7%)	93
Locals Harena Buluk	125 (87%)	4 (3%)	12 (8%)	2 (1%)	143
Locals Delo Mena	100 (89%)	4 (4%)	7 (6%)	2 (2%)	113
Forest villages, Delo Mena	10 (27%)	0	27 (73%)	0	37
Total	312 (81%)	8 (2%)	56 (15%)	10 (3%)	386

HOUSEHOLD CATEGORY	SECONDARY LIVELIHOODS OF HOUSEHOLDS					
	CROP FARMING	ANIMAL REARING	COFFEE PRODUCTION	KHAT PRODUCTION	OTHER	ALL
Migrants	10 (11%)	12 (13%)	23 (25%)	36 (39%)	12 (13%)	93
Locals Harena Buluk	13 (9%)	53 (37%)	48 (34%)	12 (8%)	17 (12%)	143
Locals Delo Mena	9 (8%)	39 (35%)	59 (52%)	0	6 (5%)	113
Forest villages, Delo Mena	23 (62%)	1 (3%)	9 (24%)	0	4 (10%)	37
Total	55 (14%)	105 (27%)	139 (36%)	48 (12%)	39 (10%)	386

HOUSEHOLD CATEGORY	HOUSEHOLDS' HOME GARDEN CATEGORY				
	HOUSE ONLY	HOUSE & CROPS	HOUSE, CROPS & 1 TYPE OF FRUIT	HOUSE, CROPS & MULTIPLE FRUIT TYPES	ALL
Migrants	14 (15%)	8 (9%)	53 (57%)	18 (19%)	93
Locals Harenna Buluk	41 (29%)	38 (27%)	41 (29%)	23 (16%)	143
Locals Delo Mena	79 (70%)	27 (24%)	5 (4%)	2 (2%)	113
Forest villages, Delo Mena	8 (22%)	1 (3%)	21 (57%)	7 (19%)	37
Total	142 (37%)	74 (19)	120 (31%)	50 (13%)	386

HOUSEHOLD CATEGORY	DO YOU OWN COFFEE IN THE FOREST?		DO YOU PRACTICE BEEKEEPING?		ARE YOU INVOLVED IN TRANSHUMANCE?	
	NO	YES	NO	YES	NO	YES
Migrants	41 (44%)	52 (56%)	56 (60%)	37 (40%)	90 (97%)	3 (3%)
Locals Harenna Buluk	24 (17%)	119 (83%)	71 (50%)	72 (50%)	99 (69%)	44 (31%)
Locals Delo Mena	23 (20%)	90 (80%)	61 (54%)	52 (46%)	49 (43%)	64 (57%)
Forest villages, Delo Mena	0	37 (100%)	11 (30%)	26 (70%)	24 (65%)	13 (35%)
Total	88 (23%)	298 (77%)	199 (52%)	187 (48%)	262 (68%)	124 (32%)

HOUSEHOLD CATEGORY	DO YOU HAVE LIVESTOCK?		DO YOU HAVE FARM LAND?	
	NO	YES	NO	YES
Migrants	5 (5%)	88 (95%)	3 (3%)	90 (97%)
Locals Harenna Buluk	4 (3%)	139 (97%)	0	143 (100%)
Locals Delo Mena	1 (1%)	112 (99%)	6 (5%)	107 (95%)
Forest villages, Delo Mena	1 (3%)	36 (97%)	1 (3%)	36 (97%)
Total	11 (3%)	375 (97%)	10 (3%)	376 (97%)

MEAN HOUSEHOLD LAND SIZE (HA), LIVESTOCK (TLU) AND FOREST COFFEE AREA (HA)

HOUSEHOLD CATEGORY	LAND HOLDING (HA)	LIVESTOCK (TLU)	FOREST COFFEE AREA (HA)
	NO	YES	NO
Migrants	1.3 ^a	3.6 ^a	0.5 ^a
Locals Harenna Buluk	1.4 ^a	6.6 ^b	0.8 ^a
Locals Delo Mena	1.7 ^b	4.9 ^{ab}	0.8 ^a
Forest villages, Delo Mena	1.4 ^{ab}	6.1 ^b	3.5 ^b

Different superscript indicate the means are different at 0.01; 1TLU=250 Kg

HOUSEHOLD CATEGORY	HOUSEHOLD HUMAN CAPITAL			CHILDREN NOT ATTENDING SCHOOL (5-15 YEARS)
	TOTAL FAMILY SIZE	ADULT EQUIVALENT	DEPENDENCY RATIO	
Migrant	7 (3) ^b	2.9 (1.4) ^a	1.6 (1.0)	1.6 (1.6) ^a
Locals, Harenna Buluk	7 (3) ^b	2.6 (1.3) ^{ab}	1.8 (1.2)	1.6 (1.5) ^a
Locals Dello Mena	6 (2) ^a	2.4 (0.8) ^b	1.5 (0.9)	0.9 (1.0) ^b
Locals, forest village	6 (3) ^{ab}	2.5 (1.3) ^{ab}	1.8 (1.1)	0.6 (0.8) ^b
F	3.09	3.26	1.14	10.91
P value	0.03	0.02	0.31	0.00

©2015 The International Institute for Sustainable Development
Published by the International Institute for Sustainable Development.

Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700
Fax: +1 (204) 958-7710
Website: www.iisd.org
Twitter: @IISD_news

Geneva Office

International Environment House 2
9 chemin de Balexert, 1219 Châtelaine
Geneva, Switzerland

Tel: +41 22 917-8683
Fax: +41 22 917-8054
Website: www.iisd.org
Twitter: @IISD_news



IISD.org