

# Chapter 26

## Safeguarding Biodiversity Islands in Northern Ethiopia Amidst Political Change



Emily Sigman

**Abstract** This chapter concerns the safeguarding of biodiversity islands established through community-based restoration in Northern Ethiopia, and centers particularly on the case study of a kebele (or village, also spelled q'ebele) called Abreha we Atsbeha. Severely degraded landscapes in the Tigray region of Northern Ethiopia have enjoyed extensive restoration efforts in recent decades, and these efforts have intensified further since Ethiopia joined the African Resilient Landscapes Initiative (ARLI) and became a member of the Bonn Challenge. The resultant restored areas serve as biodiversity islands in an otherwise highly degraded area. While praise abounds for the restoration successes and benefits to communities like Abreha we Atsbeha, there is scant research exploring how the restoration takes place, and insufficient attention has been paid to the capacity of these restoration efforts—and the biodiversity islands they enable—to survive in the midst of political change. This chapter therefore investigates the communal labor activities that enliven successful ecological restoration and relies on a political ecology framework to discuss governance and restoration in this context. Overall, the chapter demonstrates that restoration-based biodiversity islands in Abreha we Atsbeha are created and safeguarded through a robust single-party political system. This system at once mandates universal participation in restoration activities while limiting the participation of many community constituents in the planning of restoration activities. The author argues that this social-ecological system needs to be adapted to ensure that rural, restoration-based biodiversity islands in the region can continue to flourish alongside more pluralistic and democratic political norms and institutions.

**Keywords** Communal labor · Dryland · Political ecology · Restoration · Social-ecological systems · Watershed

---

E. Sigman (✉)

Yale School of Forestry and Environmental Studies, Yale Jackson Institute for Global Affairs,  
New Haven, CT, USA

e-mail: [Emily.sigman@aya.yale.edu](mailto:Emily.sigman@aya.yale.edu)

## 26.1 Introduction

The term ‘biodiversity islands’ tends to conjure up a certain image, one of pristine ecosystems kept away from the destructive hand of human civilization. High levels of degradation and destruction wrought on the planet—careless disregard for precious soils, rapacious plundering of the world’s forests, flagrant pollution of life-giving air and water systems—do much to cement this idea. Environmental degradation is a powerful driver, motivating conservationists to do all they can to safeguard what precious few biodiversity islands have been spared from the clutches of human shortsightedness.

Yet environmental degradation also motivates a different, concurrent response: the push to restore. Increased awareness of humanity’s mutual dependency on intact, connected, and diverse ecosystems has arisen in tandem with improved understandings of the role that human beings have played in the stewardship of magnificent ecosystems, from the Amazon rainforest (Levis et al. 2017) to the Great Plains of North America (Krech 2000). Moreover, we as a global community are beginning to appreciate and acknowledge the role that we can play in reversing the tides of environmental degradation. We are increasingly aware of our collective capacity to usher in a new era of flourishing. Harnessing the power of restoration, we can do more than simply protect biodiversity islands: we can also create them.

In rural areas across Ethiopia, especially in the Northern province of Tigray, many local communities have already long been exercising this capability. This chapter explores biodiversity islands in the context of one community in the Tigray Region of Northern Ethiopia, called Abreha we Atsbeha. There, rural farmers have successfully implemented impressive soil and water conservation techniques and pioneered new social norms that have effectively restored watersheds, catalyzed natural plant regeneration, and over time, provisioned biodiversity islands in landscapes that were otherwise so severely degraded that they were deemed uninhabitable by humans. These novel socio-ecosystems—which exist only because of extensive and direct human mediation—pose an interesting set of questions for those seeking strategies to safeguard biodiversity islands.

The following sections will synthesize recent developments in socio-ecological restoration, parse out the case study, and offer commentary on the often-understudied attributes of these kinds of restored landscapes, in particular local labor and political dynamics. The chapter swivels around the concept of a Restoration Dilemma, described in 2.3, with the goal of assuaging the tensions that arise as restoration ambitions and initiatives progress in scale. Overall, this chapter aims to highlight the active role that local communities can, do, and must play in creating biodiversity islands. It imagines a future where the fruits of restoration labor can be effectively safeguarded—and equitably savored—by all.

## 26.2 Restoration, Local Actors, and Biodiversity Islands

### 26.2.1 *Global Impetus for Restoration*

Recent decades have witnessed an increasing global awareness of the need to restore landscapes on a mass scale. Deforestation and degradation have advanced so thoroughly that it is no longer enough to conserve what vestiges of intact forest remain; the task of safeguarding the world's ecosystems must also be fulfilled by efforts to actively restore what's been destroyed.

Globally, more than 2 billion hectares of deforested and degraded lands hold potential for restoration (Minnemeyer et al. 2014). The benefits of restoration are multitudinous, and are often encapsulated as 'ecosystem services' in the field's contemporary literature (Daily 1997; Costanza et al. 2014). Increased biodiversity ranks chiefly among the ecosystem services sought by restoration advocates (Mace et al. 2012). In foundational island biogeography theory (MacArthur and Wilson 1967), biodiversity islands—which in these early studies referred to physical islands surrounded by water—comprise areas in a landscape with biodiversity measures significantly higher than those of the surrounding landscape. Extending this concept, restored areas generally possess higher biodiversity metrics relative to their surrounding degraded environments, that is, restored areas serve as biodiversity islands in and of themselves in the context of degraded landscapes (Benayas et al. 2009). Biodiversity gains in these spaces can take the form of increased plant, wildlife, insect, and soil diversity—among many other measures—and many of these gains are understood to be of both direct and indirect human benefit (Aerts and Honnay 2011).

'Restored' biodiversity islands geared primarily towards human use (i.e. agroforests, timberlands, foraging areas, or other such zones intended to be regularly utilized) can likewise enhance other, most restrictive biodiversity islands (such as national parks or pristine zones). These areas can, for example, provision connective corridors between conservation areas, serve as reservoirs for pollinators and dispersers, contribute to increased genetic diversity needed to support healthy species reproduction, and help stabilize large-scale soil and water dynamics, which improve mosaic landscape function as a whole (Boesing et al. 2018). Moreover, with careful planning and proper governance, these areas can alleviate pressure to extract from protected zones, serving as sources of food, fuel, timber, fibers and other materials while acting as areas of intermediate biodiversity between degraded landscapes and zones of extreme conservation importance (Schroth et al. 2004; Kumar 2010).

A number of restoration initiatives have emerged from this understanding, and chief among them is the Bonn Challenge. The Bonn Challenge is a global, multi-stakeholder effort that was launched in 2011 with the goal of restoring 150 million hectares of degraded and deforested lands by the year 2020 and 350 million hectares

by 2030.<sup>1</sup> It offers institutional, policy, and technical support to developing countries, which in turn have pledged to restore a certain number of hectares. The challenge promotes regional collaboration platforms, such as the African Resilient Landscape Initiative (ARLI) (World Bank 2015). ARLI, in turn, supports initiatives like the African Forest Landscape Restoration Initiative (AFR100), a country-led effort to bring 100 million hectares of land in Africa into restoration by 2030.<sup>2</sup>

Twenty-nine countries have so far made a commitment of more than 125 million hectares to the initiative, with Ethiopia pledging 15 million hectares, by far the region's largest single contribution. In exchange, development banks have contributed more than US\$1 billion, with an additional \$481 million pledged by the private sector (Anderson and Piembert 2019).

### ***26.2.2 Increasing Focus on Local-Level Community Engagement***

Early attempts in the last decades to formalize restoration studies, projects, and initiatives worldwide tended to focus primarily on biophysical dynamics, without incorporating—or even acknowledging—the complex political, economic, and social forces at play in restoration projects (Brudvig 2011). More recent years have witnessed an outpouring of literature seeking to correct the course and expand the restoration lens to better capture and understand the intricacies of multipart cultural-environmental landscapes (Rovere 2015).

As ecologists have progressed in their understanding of forest stand dynamics—no longer viewing forest succession as advancing towards a 'climax' state, but rather existing in a process of perpetual evolution—so too have restoration scholars relaxed the tendency to view restoration as a reversion 'back' to some previous ecosystem (Trigger et al. 2008). Such a view allows 'restoration' to focus on key attributes of ecosystems—such as soil dynamics, watershed health, and biodiversity measures—while permitting and even encouraging the emergence of novel socio-ecosystems (Hobbs et al. 2009). At the same time, the intersecting fields of anthropology, environmental history, and political ecology have substantially rewritten the conservation script in recent years, convincingly illuminating the key role that human societies have historically played in the stewardship and even creation of ecosystems once considered unmediated or primary forests (Fernandez-Manjarres et al. 2018).

These streams of knowledge have started to merge, each contributing new dimensions to a growing, interdisciplinary inquiry that seeks to align the development of human society with environmental conservation and ecosystem regeneration. A Social-Ecological Systems (SoESs) framework was first proposed by Berkes and Folke (1998) to analyze resilience in local resource management systems; since

---

<sup>1</sup> Bonn Challenge. In: Bonn Challenge. <https://www.bonnchallenge.org/>. Accessed 25 Jan 2020

<sup>2</sup> AFR100 In: [Afr100.org](https://afr100.org). Accessed 25 Jan 2020

then, the term has come to refer to a number of frameworks that expressly recognize the complex linkages between human and ‘natural’ systems (Martin 2017), especially in restoration and resilience contexts (López et al. 2017). Socio-ecological restoration, in turn, has emerged at the confluence of these schools of thought, as a practical discipline working to address interconnected social and environmental challenges (Colding and Barthel 2019).

This understanding—while stressing the need to restore ecosystems on a landscape-scale—has emphasized the importance of local community dynamics. This emphasis recognizes that local communities are often the direct beneficiaries and/or agents of restoration (Brancalion et al. 2014). It highlights the value of local ecological knowledge (Uprety et al. 2012), and promotes community participation (Maynard 2013), improved understanding of local power dynamics (Habtezion et al. 2015), long-term community monitoring and evaluation (Wortley et al. 2013), and an intentional awareness and anticipation of potential unintended consequences and pernicious outcomes (Daily and Maston 2008).

Scholars, public agencies, and non-government institutions have increasingly adopted the perspectives and practices advanced by the social-ecological restoration agenda, some of which now operates under the global framework promulgated by the UN Sustainable Development Goals (SDGs). This self-professed ‘blueprint to achieve a better and more sustainable future for all’ unambiguously understands the interconnected nature of the world’s most pressing social and environmental problems (United Nations 2020). Many of the targets and indicators are expressly concerned with community integration and engagement. Despite this improved understanding, effective community-scale work remains difficult in practice, and coordination among actors across different scales has likewise proven challenging.

### 26.2.3 *The ‘Restoration Dilemma’*

On the whole, literature from socio-ecological restoration tends to suggest that the most effective and durable restoration projects are idiosyncratic, take place at a local level, are culturally and ecologically site-specific, and therefore tend to resist scaling. Yet irrefutable evidence from studies concerned with climate change, mass extinction and biodiversity loss, and reliable resource provisioning—bolstered by the imperatives of the international development agenda—clearly articulates the need for restoration at a global scale.

Restoration practitioners therefore face a profound dilemma. A *dilemma* is defined as ‘a problem offering two possibilities, neither of which is unambiguously acceptable or preferable’ (Garner 2009). Focusing on global-scale restoration often has pernicious outcomes at the local scale (which is not acceptable). Focusing on local-scale restoration often stymies practitioners attempting to transform “a thousand random acts of restoration” into a “coherent strategy” that can realistically meet global needs (Covelli-Metcalf et al. 2015; Budiharta et al. 2016) (which is not preferable).

Escaping through the horns of this dilemma requires careful, consistent and adaptive feedback about how national, regional, and global restoration directives reverberate at the local level and vice versa. A firm grasp on *how* restoration actually happens—the human as well as the non-human agencies involved—offers key insights into project dynamics and vulnerabilities, and in so doing, improves prospects for multi-scalar success.

## 26.3 Restoration in Ethiopia – The Case of Abreha We Atsbeha

### 26.3.1 *The Case Study in Context*

Ethiopia offers fertile ground for those seeking to explore the kinds of biodiversity islands that emerge from restoration, and in particular, for studies examining how to safeguard such biodiversity islands in the midst of political change. Ethiopia today comprises Africa’s second most populous country<sup>3</sup>—the most populated landlocked country to exist anywhere in the history of the planet—and by many accounts is home to the fastest growing economy in the world. Yet this growth occurs in the context of a largely rural society, comprised of a roughly 80% agrarian population.<sup>4</sup> Despite the fact that Ethiopia is essentially governed by a one-party state with a planned economy, the country’s vast population is spread out over more than a million square kilometers and divided into nine politically autonomous ethnic states, each possessing unique socio-ecological features and agronomic patterns. The country as a whole is thus best conceived as a quilted patchwork stitched of an extraordinary diversity of landscapes, languages, and life-ways.

Restoration and conservation in this context are therefore highly suited to an ethno-regional focus. The country often garners substantial coverage in public media outlets and has earned a reputation among international agencies for its eye-catching national restoration activities, such as, for example, the recent planting of 350 million trees across the country over a period of 12 hours (UNEP 2019). Yet the attention paid to country-level restoration blitzes such as these tends to obfuscate an understanding of the heterogeneity of long-term restoration activities at the federation- and even regional-level. It is at these smaller scales where connections between restoration, livelihoods, and biodiversity are made apparent, and where prospects for safeguarding biodiversity islands are most accessible. This study is therefore

---

<sup>3</sup>The population of Ethiopia is roughly 112,000,000. The most populous country in Africa is Nigeria, with a population of roughly 201,000,000. From Ethiopia Overview. In: The World Bank: Where we Work. (2019) <https://www.worldbank.org/en/country/ethiopia/overview>. Accessed 25 Jan 2020

<sup>4</sup>Rural population (% of total population) – Ethiopia. In: The World Bank Data Indicators 2018 revision. <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ET>. Accessed 25 Jan 2020

restricted to the northern Tigray region, and focuses on the dynamics of one kebele (or community, village, also spelled ‘q’ebele’) within this context. The case study helps concretize the ‘Restoration Dilemma’ outlined in Sect. 26.2.3, and draws out the multi-scalar dynamics that bind participatory restoration, biodiversity provisioning, and socio-political change.

### 26.3.2 *Physical, Ecological, and Social Characteristics of Tigray*

The wrinkles of humanity are etched in the broken, volcanic plateaus of Tigray. The heart of the ancient Aksumite kingdom, one of the cradles of modern civilization, once pumped through this region, drained by the Tekeze and Gash rivers which ran to the Red Sea, along with the Upper Nile. This made of the empire a vast marine trading power unlike the territorial constraints that today render the whole of Ethiopia landlocked (McKenna 2019). The region has remained dominated by an Orthodox Christian population (95.6% in 2007 – IHSN 2019), which has a longstanding history as a seat of political power for the country as a whole, though Ethiopia’s capital is in Addis Ababa, located some thousand kilometers away in the Amhara region (Van Veen 2016). This political history—which also includes a notable lack of prolonged European colonialism, the survival of Haile Selassie’s Imperial Kingdom well into the twentieth century, and a punctuated, brutal communist interlude throughout the 1970s and 1980s—reverberates in contemporary Ethiopia and has important implications for understanding and promoting restoration and biodiversity initiatives in Tigray and beyond.

Tigray’s topography is characterized by its relatively high elevations, ranging from 1000 to > 3500 m in altitude, and semi-arid temperate climate, with a mean annual precipitation of 700–1200 mm (Bard et al. 2000). Temperatures range between 15 and 25° C, while soils range in agricultural quality, from Vertic Cambisols in the upper reaches, to Vertic Calcisols, Vertic Cambisols, Calcaric Phaeozems and Calcaric Regosols<sup>5</sup> in the lower regions (Rabia et al. 2013). Despite the difficult conditions, the highland regions served as a center of African plant domestication and agricultural innovation, and extensive human manipulation of the landscape has taken place for millennia (Bard et al. 2000). The Tigrean Plateau was once vegetated with dry evergreen, montane forests and deciduous wooded grasslands, yet today it is mostly montane grassland (Pankhurst and Ingrams 1988).

---

<sup>5</sup> A **Cambisol** is a soil with little or no profile differentiation. They are typically found in landscapes with high rates of erosion, and are exploited for agriculture. A **Calcisol** is a soil with a layer of migrated calcium carbonate in the soil profile. They are typically found in arid zones, and their chief use is for animal grazing. **Phaeozem** is a dark soil with high base status typically exploited for intensive agriculture. **Regosols** are poorly developed mineral soils in unconsolidated materials, extensive in eroding lands in arid areas.

This loss of forest cover is the result both of natural disasters such as drought and landslides, and human activity, including intensive deforestation, agriculture, and livestock grazing (Nyssen et al. 2000).

It is important to recognize that the barren landscape of present-day Tigray is not a phenomenon of recent decades, but likely dates back to at least the seventeenth century (Pankurst 1988). Few, if any, remnant forests exist that are not the direct result of human intervention in the region. Many such forests are the direct result of coordinated restoration activities undertaken in the absence of the edaphic and hydraulic conditions that would facilitate natural regeneration. As such, the great majority of biodiversity islands that exist in Tigray today should be understood as the result of intentional restoration and management, which enabled the growth of forests in an otherwise highly degraded landscape – a point which deserves great emphasis.

### ***26.3.3 Contemporary Restoration in Ethiopia***

While the history of restoration in Ethiopia is not well studied, attempts at better documentation of present-day restoration activities furnish a cursory understanding of contemporary restoration dynamics. Much of the restoration is driven by a desire to deliver ecosystem services, notably the renewal of watersheds to provision water for agricultural systems (Gebregziabher et al. 2016). Over time, the lack of woody vegetation on hillsides has destabilized watersheds; instead of percolating slowly through the rocky soils, episodic rainfall rushes off the slopes, carrying with it precious topsoil and seedbanks. This not only leads to periodic inundation, sedimentation and gully formation in lowland settlements, but also to the gradual impoverishment of valley groundwater supplies. The persistent threat of drought was—and continues to be—compounded by this chronic incapacitation of groundwater, which was one of many factors that led to the perilous famines witnessed during the late twentieth century (Keller 1992). Today more than a quarter of the population of Tigray remains chronically food insecure, requiring the continued provision of international food aid (Alemu et al. 2014). This precariousness is further exacerbated by the growing incidence of erratic precipitation and rising temperatures associated with climate change (Teshome and Zhang 2019).

To reverse this trend and build resilience, international agencies and local communities recognize the need to restore watersheds, which in turn requires afforestation of degraded hillsides. As a signatory of the Bonn Challenge, supported by the AFR100, Ethiopia has committed to restore 15 million hectares, or roughly one-sixth of its total land area, by 2025 (African Resilient Landscapes Initiative, ARLI, <https://afr100.org>). Tremendous efforts have been taking place across the country under the banner of the Sustainable Land Management Programme (SLMP), a multi-stakeholder project commissioned by the World Bank and GIZ (GIZ 2020), which contributes to these substantial re-greening goals through programs broadly referred to as ‘Soil and Water Conservation’ (SWC) (Hurni et al. 2016), constituting





**Fig. 26.1** Free Labour Contribution Period (FLCP) activities. On left: two women use a repurposed food sack to carry stones from the excavation site to the terracing site. On right: A mixed group of men and women construct a stone terrace. These activities happen side by side continuously. (Photos: E. Sigman, with permission from community members photographed)

watershed-level interventions on agricultural landscapes. Numerous additional NGOs, research, and foreign government aid organizations have likewise made substantial investments towards conservation and reforestation in Ethiopia. While these are nation-wide efforts, a special emphasis has been placed on the Tigray region.

With such severe levels of degradation, natural regeneration typically does not take place even with the exclusion of agricultural and grazing activities on hillsides (Aynekulu et al. 2009). Moreover, in addition to proving cost-prohibitive, reforestation through active tree planting has shown to have dubious benefits, as—in the absence of underlying functional water and nutrient cycles—many trees do not survive to catalyze forest succession (Shono et al. 2007). Extensive efforts have therefore focused on the repair of watersheds, which—in the absence of financial and technical capital—has been conceived through mass hillside stabilization programs. Such programs are carried out by large groups of rural residents, often equipped with little but their own hand tools (see Fig. 26.1), and are followed by ‘enclosure’ systems that restrict access to these areas while natural or assisted regeneration takes place over several decades (Mekuria et al. 2017). The resultant forests, constituting newly created biodiversity islands, in addition to provisioning water and other ecosystem services, support populations of native wildlife and insects and facilitate connections to other conservation areas.

The greatest contribution to restoration and the creation of biodiversity islands in Northern Ethiopia therefore comes from rural communities. Farmers and pastoralists are the agents that ultimately contribute the labor required to stabilize hillsides, reverse watershed degradation, restore nutrient cycles, and catalyze functional regeneration. They are also the agents that must significantly alter their land practices to accommodate these programs, and consent to continued land-use restrictions which generate, maintain, and safeguard the newly-created biodiversity islands.

### ***26.3.4 Abreha we Atsbeha as a Model Community for Restoration in Ethiopia***

As noted, Ethiopia has gained recognition within the international restoration community for its recent activities and successes. Since the launch of a series of nationwide programs in 2010 (MOFED 2010), together with substantial financial investment from interested international agencies, Ethiopia has invested more than US\$1.2 billion annually in restoration activities across the country, rehabilitating more than 12 million hectares of land and over 3000 watersheds, and supporting more than 1.6 million hectares under active ‘Sustainable Land Management’ (Seyoum 2016). Recent research published by the International Center for Tropical Agriculture (CIAT) confirms that these investments have significantly reduced runoff and soil erosion, increased crop yields, and enhanced soil organic carbon (Tamene et al. 2018). Meanwhile, other studies have demonstrated the benefits of coupling active restoration with community enclosures (Mekuria et al. 2018), particularly in Tigray, which has led to increased vegetation cover and biodiversity (Asefa et al. 2003; Mengistu et al. 2005; Mekuria et al. 2012), along with enhanced soil fertility (Mekuria et al. 2017), water flows (Dessalew et al. 2016), and ground-water recharge (Anwar et al. 2016).

According to some researchers (Nyssen et al. 2014), as a result of this blend of national initiatives, foreign assistance, and local participation, “Ethiopia is now greener than it has ever been during the last 145 years. . . human investments have overridden the impacts of climate change.” In the midst of this movement—what some (e.g. Dodd 2015) refer to as Ethiopia’s ‘Green Revolution’—a community called Abreha we Atsbeha has garnered substantial recognition for its achievements in both implementation and innovation in the intersecting fields of restoration and conservation.

Abreha we Atsbeha—a village of about 5030 people in the Tigray Region of Northern Ethiopia (see Fig. 26.2)—has been widely promoted by both the Ethiopian federal government and a bevy of international research and aid organizations as a key example of restoration best practices, both from a biophysical and socioeconomic perspective (Lamond 2012).

Several journal articles and reports have been published specifically studying Abreha we Atsbeha. Some of these detail historical, demographic, ecological, and hydrologic conditions of the site and summarize water harvesting and restoration techniques (e.g. Tadesse et al. 2015), while others measure labor inputs to restoration (e.g. Hachoofwe 2012). Other reports have focused on livelihoods and economic stability, detailing the positive impacts of restoration activities on biodiversity, socioeconomics, production, and policy, while outlining some pathways forward for sustainability and replication (UNDP 2013).

The majority of information on Abreha we Atsbeha, however, comes from grey literature, much of which centers on the community’s charismatic chairman Gbremechel Giday, better known as ‘Aba Hawi’. In 2012, Aba Hawi traveled to Brazil to attend the Rio + 20 summit and accept the UN Equator Prize, an award



**Fig. 26.2** A day at the market in Abreha we Atsbeha. In the background is the Abreha we Atsbeha church for which the community is named. This rock-hewn edifice has been in continuous use since at least the tenth century. (Photo: E. Sigman)

bestowed by the UN Development Program (UNDP) upon 25 initiatives in recognition of their “outstanding projects working to advance sustainable development solutions for people, nature and resilient communities”. Aba Hawi also features prominently in a documentary called *Ethiopia Rising: From Red Terror to Green Revolution*, which has won several international film awards, and has enjoyed thousands of public screenings throughout the globe. Stories of Abreha we Atsbeha’s success have been published in BBC (Haslam 2015), Reuters (Win 2019), The Guardian (Watson 2016), and many other national and international news publications.<sup>6</sup> Blog posts about Abreha we Atsbeha are common among the websites of several major international organizations working in Ethiopia, including the World Food Program,<sup>7</sup> The World Agroforestry Center (Kuria et al. 2016), World Vision, World Resources Institute (Rejj 2015) and many others. There are also a number of short films about Aba Hawi—focusing on his role as a charismatic leader who has championed for restoration and inspired his constituents to undertake volunteer restoration work—and about Abreha we Atsbeha, created by visitors and international organizations on YouTube and Vimeo.

Ethiopia’s regional and federal governments, as well as a number of international research and development organizations, are actively working to try to ‘scale’ Abreha we Atsbeha’s success. Yet precisely how this ‘scaling’ will take place remains unclear. Most efforts thus far have centered on replicating specific ecological

<sup>6</sup>See “Ethiopia, 30 Years on from Famine and Live Aid.” EthiopiaOnline.

<sup>7</sup>Ethiopian Village Recognized At Rio + 20 For Innovative Hunger Solution. In: United Nations World Food Program Blog. Accessed 25 Jan 2020

interventions, spreading practices through ‘farmer-to-farmer’ trainings, or provisioning particular resources such as materials for check-dam construction or nurseries for on-farm agroforestry intensification. Despite the significant attention paid to this community, critical gaps in research remain to understand both why the community has been so successful and how those successes could be most effectively scaled. Filling these research gaps is key to assuaging the ‘Restoration Dilemma’ at play in this case study, and safeguarding the biodiversity islands that have been created in communities like Abreha we Atsbeha.

## **26.4 The Free Labor Contribution Period (FLCP)**

### ***26.4.1 Contributions of Coordinated Group Labor to Restoration Programs and Biodiversity Outcomes***

Concomitant with rising global awareness and promotion of participatory restoration and conservation, coordinating bodies—particularly those emanating from international agencies—have celebrated Ethiopia’s ‘community-based’ environmental activities. Widespread praise abounds for what are conceived as democratic, cooperative, and innovative restoration initiatives like those underway in Abreha we Atsbeha. Yet few international agencies, even those heavily vested in restoration programs, have made systemic inquiries into how participation in restoration is motivated and coordinated in practice, and existing studies examining cooperative structures have so far proven simplistic.

‘Scaling’ restoration in the Ethiopian context is not simply a matter of identifying and promoting technical landscape interventions. The agrarian nature of the county’s overwhelmingly rural population, coupled with severe levels of environmental degradation, renders scaling a highly social and political undertaking. Moreover, though Ethiopia’s economy is growing swiftly, and despite significant monetary investments in restoration, levels of financial and technical capital in these vast rural landscapes remain low. In this setting, unpaid communal labor provides an effective means to achieve needed restoration outcomes. For all of these reasons, residents of local communities are almost invariably the agents of restoration and the stewards of resultant restored landscapes. The way such residents are motivated, organized, and sustained in this work should consequently be of paramount interest to those researchers and agencies concerned with scaling restoration and safeguarding biodiversity islands.

It is therefore surprising to see how little attention has been paid to the coordinated group labor systems that animate restoration in practice. Who organizes people? How are they organized? What incentives motivate this participation? Few have sought answers to these questions, despite the vital role coordinated labor plays in achieving the highly praised restoration outcomes in Ethiopia, and despite the central function such coordinated systems must therefore occupy in attempts to scale existing successes.



**Fig. 26.3** Newly constructed check dams in an outwash area in Abreha we Atsbeha. (Photo: E. Sigman)

In particular, little attention has been paid to a widespread phenomenon called in Tigrinyan “*Israin Tshanta*”—translating to “Twenty (20) Days”—and referred to by others in the region as the “Free Labor Contribution Period” (FLCP). The FLCP is a central feature of rural life in the Tigray region; it is a period lasting between 20–60 days, typically carried out during the driest season (January–March). During this time, all able-bodied members of a community are expected to volunteer on community projects. Communities work on a wide range of tasks during this time, but most of them revolve around landscape restoration. Often, this includes labor-intensive undertakings such as terracing, check-dam construction (Fig. 26.3), and other SWC activities, organized and managed with high levels of oversight and coordination by local and regional officials (Sigman 2019a). The origins and evolution of the FLCP remain unclear, making it difficult to parse if and how perceptions about the FLCP have changed over time (Sigman 2019b).

It is estimated that between 2010 and 2015 more than 15 million rural dwellers in the region contributed the unpaid labor equivalent of US \$750 million annually (Seyoum 2016). Initial assessments report that Tigray—a mountainous area approximating the size of Italy—has been almost entirely terraced. Laid end-to-end the terraces of Tigray would be longer than the Great Wall of China (Dodd 2015). All of this has occurred in the last 20–30 years, and much of it through the apparatus of the FLCP (see Fig. 26.4).





**Fig. 26.4** A mountainside in Abreha we Atsbeha undergoing active restoration via terracing and ‘enclosure’ programs. Vegetation and soil can cover evidence of terracing over time, obscuring from view the human labor required to catalyze regeneration. The two images are identical; on the right image the author has added lines to show where terracing has taken place. Human shapes in the photo give a sense of the scale of the undertaking. (Photo and rendering: E. Sigman)

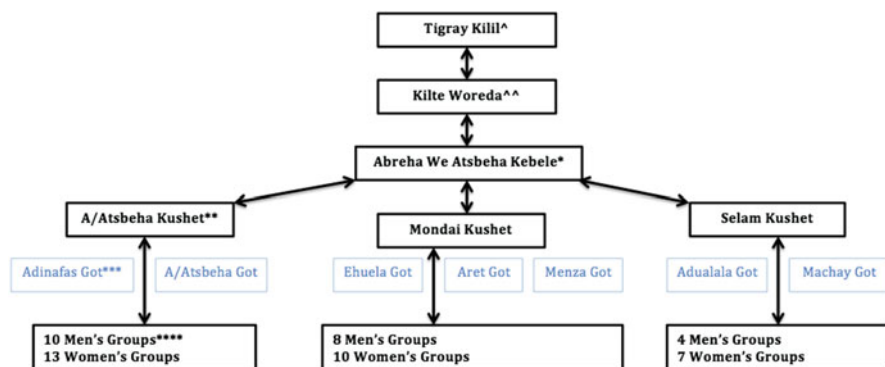
The FLCP has been central to the success of restoration in Abreha we Atsbeha and elsewhere, and should be understood as the direct human mechanism through which restoration activities take place. Yet despite the obvious centrality of the FLCP to Ethiopia’s many large-scale restoration initiatives, the FLCP as a social and political institution is rarely acknowledged. Though it is a critical feature of rural life in Tigray, and plays a key role in translating international, federal, and regional land management strategies to the local level, the FLCP is virtually absent from the discussions by the international development and restoration community surrounding how to best design, manage, evaluate and scale landscape changes, and how to safeguard resultant biodiversity islands.

The FLCP is a massive social and political institution, through which initiatives like the Bonn Challenge and AFR100 reverberate, and a substantial portion of Ethiopia’s pledged 15 million hectares of restoration will likely be facilitated through the apparatus of this established group labor system. Studying the FLCP furnishes a keen understanding of how large-scale projects are implemented at the local level, making it an instructive lens through which to try to parse the ‘Restoration Dilemma’. Such an understanding can help develop projects that are compatible with local systems, assess how the responsibilities and benefits of such projects flow through a community, and highlight possible synergies or incongruences that emerge at the intersection of landscape restoration and political power. These insights in turn improve prospects for scaling up restoration projects and minimizing threats to the region’s newly established biodiversity islands.

### 26.4.2 Mechanisms of the Free Labor Contribution Period

Theories and methods from political ecology supported the author’s immersive field visits to Ethiopia in 2017 and 2018, oriented with the express purpose of documenting the FLCP and illuminating its centrality in restoration and conservation (Sigman 2019b). These visits focused on deepening an understanding of the labor dynamics at play during the FLCP in Abreha we Atsbeha, hypothesizing that this knowledge would provide a more accurate picture of what restoration actually entails, and therefore improve prospects for linking local level successes to global goals through scaling efforts (i.e., to assuage the ‘Restoration Dilemma’).

Participant observation, purposive sampling, interviews with key informants, and other qualitative methods undertaken during visits coinciding with the local FLCP, led to the creation of a local governance map (Fig. 26.5). This map provided a



**Fig. 26.5** ^The Kilil is a region, or state, of Ethiopia. There are 9 Kilils in Ethiopia, divided ethnolinguistically

^^Woredas are districts within Kilils. There is an assigned woreda liaison responsible for A/Atsbeha, who occasionally comes to kebele meetings and also assigns and manages A/Atsbeha’s 3 on-site development agents

\*The Kebele is “the village” over which the chairman, Aba Hawi, presides. Aba Hawi is elected by a 208-person parliament (made up of the wahayo or “cells”, of which all are members of the TPLF. Aba Hawi then appoints a 14-person cabinet: 3 wudaba members (people responsible for coordinating with the Woreda), 3 propaganda ministers, 2 finance ministers, 3 ministers of men’s associations, and 3 ministers of women’s associations. He also selects from this same pool various committees (including watershed committee), and kushet leaders. Everyone in the cabinet and committees are TPLF members

\*\*The Kushet is the sub-village unit, determined geographically. Each Kushet is assigned a leader from the 14-person cabinet. All kushet leaders are party members. Kushet leaders meet with group leaders every Friday, and with committee members every Saturday

\*\*\*The ‘Got’ is a neighborhood unit, determined geographically. Gots do not have assigned representatives, but rather serve as organization units, mostly for the watershed committee when determining where to do restoration activities

\*\*\*\*Groups consist of about 25–30 people and can be made up of both party and non-party members. Each contain a ‘cell’ which is made up of 4 party members: cell leader, representative of the cell leader, secretary, and finance. The cell leader represents the group at Friday meetings

conceptual documentation of the decision-making structures that govern the community as a whole, and which of those are adapted to facilitate the FLCP and other related programs. It likewise furnished an understanding of important cleavages in the community, chief among them political affiliation, kushet residence (i.e., geographic partitioning) and gender.

Figure 26.5 represents a strong hierarchical system exercising power from the regional government to the household level. Figure captions explain how households in Abreha we Atsbeha, and other Tigrinyan kebele, are partitioned into gendered ‘groups’, which send representatives both to a local parliament (which elects the community chairman) and to regular weekly meetings, where decisions concerning the community as a whole are regularly made. It is during these regular weekly meetings, and through directives from the parliamentary-elected community chairman’s chosen cabinet, that agendas concerning land use and the FLCP are set. While the meetings themselves are participatory and democratic from the perspective of the elected and appointed members, access to these meetings turned out to be highly restrictive.

One of the key insights that emerged from the conceptual mapping exercise was that, while in theory, residents of any political denomination could serve as cell members (i.e., as parliamentary and weekly meeting representatives), in practice, only recognized members of the ruling party (The Ethiopian People’s Revolutionary Democratic Front – EPRDF) had ever held these positions. This homogeneity occurs despite the fact that less than a sixth of the population in Abreha we Atsbeha are recognized as EPRDF members.

Given Ethiopia’s recent political history, this single-party hegemony is hardly surprising. However, recognizing that the supremacy of the party reaches all the way down to the kebele and even household level is important, especially given the fact that such a small portion of the population possesses access to representation and agency. This recognition contends with the realities of ‘community-driven’ restoration. What the conceptual map revealed is that restoration activities, carried out through the FLCP, are conducted by a rural citizenry that remains systematically removed from the decision-making processes that govern them, and possesses little to no recourse for meaningful participation in anything other than the FLCP itself.

This is not to say that local actors do not understand the value of their work, or appreciate the ways in which the restoration activities they undertake—and the biodiversity islands they collectively safeguard through exclosures—benefit them directly. Local actors benefit mostly via the increased provisioning of water, and through ‘cut and carry’ systems, wherein citizens are allowed to enter the exclosures on foot and hand harvest grasses and other fodder to bring back to their on-farm livestock. Ecological literacy and favorable perceptions of the ‘water banks’ created by restoration was high among virtually all surveyed respondents in Abreha we Atsbeha. Rather, it is to suggest that outside perceptions of restoration in Ethiopia—particularly those of international agencies lavishing praise on the participatory nature of the restoration activities—typically do not comprehend the stratification of power in local communities, and therefore fail to grasp the degree to which participation in restoration relies on a system of mass labor mandated by an elite political minority.



This realization raises a number of thorny questions for those interested in promoting and scaling participatory restoration initiatives. Most germane to this chapter is the question of longevity; such an asymmetrical system has the potential to breed discontent, and therefore threatens to destabilize restoration programs in the long-term. Safeguarding biodiversity islands in this context therefore requires an explicit understanding of the governance structures that sustain them, and a wholesale accounting of the myriad ways international agencies and initiatives reverberate through local configurations.

### ***26.4.3 The Free Labor Contribution Period in a Pluralizing Context***

In early 2018, Ethiopia declared a national state of emergency following a mounting series of protests which culminated in the resignation of Hailemariam Dessalegn, the Prime Minister of Ethiopia and Chairman of the EPRDF.<sup>8</sup> These events coincided with the FLCP in Abreha we Atsbeha, whose regularly planned activities were interrupted by a series of emergency meetings held in kebeles at the behest of concerned district and regional party leaders. At various meetings, ranging in size and topic, registered party members were asked to voice their grievances, and share their ideas and opinions. A palpable aura of discontent—much of it directed at the FLCP and related programs—permeated throughout the course of these intensive, multi-day hearings. Decades of suppressed criticisms were unleashed as the fear of sharing long-held negative views dissolved.

Grasping the significance of these meetings requires some understanding of Ethiopia's recent political history. Starting in 1974, following the famine-induced collapse of the empire of Haile Selassie, Ethiopia was governed by a brutal military junta known as The Derg, followed by a dictatorial regime administered by a communist state party called People's Democratic Republic of Ethiopia (PDRE). Opposition to the Derg came primarily from groups based in the North, in Tigray. These opposition movements coalesced in the late 1980s, forming a powerful shadow government known as the Ethiopian People's Revolutionary Democratic Front (EPRDF) in 1988 (Rahmato 2009).

The EPRDF inflicted a total military defeat on the communist regime and established in 1991 a new government that has ruled Ethiopia ever since. This government has presided over nearly three decades of essentially single-party rule, exercising considerable control over the entire federation (Feltor 2018). The EPRDF is both the political party that committed Ethiopia to the Bonn Challenge and related restoration targets, and the political party that oversees and administers the FLCP, one key method through which these targets are currently met in Tigray and expected to be met across the country. This is especially true in the Tigray region, where Abreha we Atsbeha is located, and where the hegemony of the EPRDF is particularly strong.

---

<sup>8</sup>Ethiopia declares national state of emergency. BBC News (2018)

The EPRDF has suppressed many critical groups movements throughout its tenure, but mass protests and unrest beginning in 2016 have proven—so far—politically transformative. In April 2018, shortly after the conclusion of the FLCP in Abreha we Atsbeha, notable reformist Abiy Ahmed was sworn in as the new Prime Minister, becoming Ethiopia’s first ethnically Oromo leader, thereby weakening the stronghold of Tigrinyan power. Ahmed swiftly launched a wide program of internationally-acclaimed political and economic reforms, and was awarded the 2019 Nobel Peace Prize for his work in brokering reconciliation with Eritrea, Tigray’s tumultuous northern neighbor. Most recently, Sahle-Work Zewde was installed as Ethiopia’s first female president, and Africa’s only serving female head of state. The international community has generally lauded Ethiopia’s recent progress towards a more open, pluralistic society and improved international relations.

Yet the single-party, restrictive government of Ahmed and Sahle-Work’s predecessors remains central in places like Abreha we Atsbeha, and still resides at the core of rural institutions like the FLCP. During the emergency meetings held in lieu of 3 days of FLCP activities in Abreha we Atsbeha, many community members levied significant complaints and accusations against the party: its structure, its leaders, and specifically, the restoration and conservation programs it engenders. These events, along with the governance hierarchies described in Fig. 26.5, made clear that this autocratic system of government, especially at the local level—is the force that is overwhelmingly responsible for current restoration programs. Likewise, it is the same authority that sets norms and bylaws around continued safeguarding of the community’s hard-earned biodiversity islands.

Scaling Abreha we Atsbeha’s ecological success currently involves replicating these obscured socio-political dynamics. At the same time, there is little guarantee that such programs—invariably bound up in the politics of the last several decades—will prove compatible with the evolution of the country’s governance systems as a whole. Safeguarding biodiversity islands therefore requires an explicit recognition of the FLCP, the socio-political structures that animate it, the misalignment between these existing structures and the advancement of Ethiopia’s social, political and economic systems as a whole.

## **26.5 Sustaining Restoration and Safeguarding Biodiversity Islands Amidst Social and Political Change**

### ***26.5.1 Acknowledging Labor Realities in Restoration and Conservation Programs***

This chapter has repeatedly stressed the central role that coordinated group labor plays in the rural regions of Tigray. This centrality is a reflection of the region’s manifest socio-ecological conditions: the landscape is semi-arid, mountainous, and

highly degraded and the communities living there chronically lack financial capital and equipment. Establishing biodiversity islands where prolonged environmental degradation limits the ability for ecosystems to regenerate naturally requires substantial acts of human intervention, and this intervention must fit within the existing limits of community capacities.

These human interventions, moreover, must be thoughtfully planned and executed. Restoration of watersheds and the creation of biodiversity islands is a multifarious undertaking, requiring not only ecological but also sociological expertise and coordination. If human labor is the ultimate and direct mechanism through which restoration is achieved, then those concerned with promulgating successful restoration must be expressly concerned with the dynamics of that labor. The paucity of attention paid to this critical aspect of restoration in the region suggests that international and federal agencies alike largely take labor—including mass coordinated labor like the FLCP—for granted.

The previous section detailed the operations of a substantial local hierarchy, supported by a hegemonic regional authority that has been historically empowered by a single-party federal government. This hierarchy coordinates rigorous restoration activities among large segments of rural society, organizing, incentivizing, and monitoring individual and group performance in a calculated, iterative, and—from many perspectives—effective manner. Owing to this hierarchy, inhabitants of local communities abide by social norms dictating that their contributions be made reliably, compulsorily, and without pay. Acceptance of these bylaws thus substantially reduces the costs associated with restoration and thereby makes it possible in this otherwise limited context. Furthermore, the maintenance of this hierarchy and system of labor control is presently critical to the continued creation and protection of biodiversity islands in Tigray.

It is difficult to overstate the point that biodiversity islands in this region are generally *not* forest remnants to be protected against human encroachment, but rather are sites reflecting extraordinary feats of intentional restoration. The continued provisioning of such enclosure systems requires enormous community buy-in, strong bylaws against harvesting infractions, and high levels of ecological literacy that entail an understanding of the connections between hillside vegetation and lowland agriculture.

At the same time, these enclosure systems are not akin to national parks or protected areas; they typically remain the communal property of the kebele. Such ecosystems therefore depend not only on the regeneration of woody species and the encouragement of native animals and insects, but also on the continued renewal of community consent and respect for use-norms. The landscape of Tigray is a cautionary tale: systems don't always regenerate automatically. This is as true of the ecosystems as of the socio-political systems that are bound in the biodiversity islands of Abreha we Atsbeha. Paying attention to community labor programs is key for pinpointing critical vulnerabilities and building capacity around them before the system reaches a tipping point.

### ***26.5.2 Recognizing Complexity in Local-Level Motivations***

Precisely because people are not compensated financially for their contributions in the FLCP, scholars and practitioners must carefully consider the other motivations at play in these spaces. The author conducted interviews in Abreha we Atsbeha, where people generally displayed an impressive understanding of the complex watershed dynamics in the area, and were motivated by the understanding that restoring vegetation to hillsides would secure water supplies in their agricultural fields (Sigman 2019a). They also appreciated other benefits of restoration, such as increased biodiversity—especially wild animals—and access to cooler microclimates. At the same time, individuals also reported that they participated in the FLCP because they feared punishment if they withheld their labor or complained (Sigman 2019b).

This punishment could come in the form of social castigation or perceived favoritism of others by those in power, suggesting strong local norms around group participation. Additionally, participation in the FLCP is a prerequisite for membership in Tigray's welfare system, called the Productive Safety Net Program (PSNP). Through the PSNP, vulnerable members of society can receive subsistence amounts of food or money in exchange for an extension of their labor contribution to restoration activities. However, those members who are physically able to work must still contribute their labor without compensation during the FLCP in order to be eligible for the program. There is thus a complexity of compulsion-based motivations at play, which affect different segments of society asymmetrically, and may constitute a major obstacle to effective scaling.

There is a wide range of perceptions and motivations surrounding restoration and biodiversity islands in the area. These constitute not only different perceptions between different people, but individual people can have blended motivations—both positive and negative—for participating. Continued adherence to enclosure zones (i.e., the safeguarding of biodiversity islands) is driven by both positive and negative motivations; people can appreciate biodiversity islands (or enclosures) and the work it takes to create and maintain them while still holding negative views about the process. As demonstrated in the emergency meetings, these negative views are linked with feelings of disempowerment. Empowerment of stakeholders in the community therefore plays a key role in safeguarding biodiversity islands against these negative perceptions.

### ***26.5.3 Understanding 'Political Monoculture' as a Threat to Biodiversity***

Best practices in socio-ecological restoration demand that all stakeholders be able to actively influence and make decisions about the restoration activities that impact their daily lives. Yet in Abreha we Atsbeha—perhaps Ethiopia's most

famous socio-ecological restoration case study—the majority of people who dedicate substantial time, labor, and resources to the work of restoration have very little access to the decision-making structures that would afford them a meaningful voice in the deliberation process. The nature, duration, location, and timing of restoration activities in Abreha we Atsbeha’s FLCP, for example, are largely dictated by decisions made by Aba Hawi (the community chairperson) and his cabinet. The cabinet—relying on information gleaned from the *kushet*<sup>9</sup> meetings and taking into account directives from the *woreda*—will come up with a plan for the FLCP, which is then approved by the parliament. This entire process remains confined to registered party members, though the work of the FLCP necessarily involves many people who do not have a voice in the party system. Participatory restoration projects call for exactly the opposite structure, with full participation of all involved community members at each stage of the planning process.

Knowledge of this local political process is critical for understanding how the FLCP operates, and for thinking about how agency, attitudes, and voluntary labor are bound up in the restoration activities the FLCP advances. Within Abreha we Atsbeha’s participatory restoration program, representation and agency among local stakeholders is essentially limited to EPRDF party members, despite the fact that registered members comprise only a sixth of the population. This asymmetry in representation, and its implications for long-term management of restoration programs, is therefore concerning.

The administrative system which has historically enabled restoration and safeguarded biodiversity islands in the region can be thought of as a political ‘monoculture’. There exists one elite party, which despite comprising only a fraction of the population, dictates all of the activities of that population, in particular the labor-intensive activities associated with restoration, and the restrictive norms governing community enclosure from newly established biodiversity islands. This concentrated local political power may be seen as a consequence of the region’s unique political history, and its extant behaviors perhaps justified to many by the exigencies of extreme land degradation coupled with the looming threat of famine. For these reasons and others, this system has been able to operate on the margins of the rights concerning representation and labor conditions which are otherwise typically espoused by the international development agenda.

However, those seeking to replicate this case study and safeguard the biodiversity islands in the region should recognize that intensive manual labor, ironclad bylaws, and political hegemony have played a central role in its evolution. The task of organizing thousands of people to give up communal grazing lands, volunteer up to two months of hard labor, and wait decades to reap the benefits of their work has been won in part by charisma and solidarity, and also in part by intense social pressures, by fear of castigation, and by a local political system that restricts much meaningful participation to all but a hand-selected elite.

---

<sup>9</sup>See Figure 26.1 caption for description of ‘*kushet*’ and ‘*woreda*’ units

This elite is bound up in what—for three decades—has been a recalcitrant, ‘political monoculture’ across the country. Just as diversity is a critical component of ecological resilience, so too is diversity a critical component of socio-political resilience. Restoration and conservation systems that rely in large part on political hegemony may be vulnerable to political changes, whether as a result of acute emergencies or long-term stressors.

While political hegemony may in fact be central to the success Abreha we Atsbeha has enjoyed in the past, Ethiopia’s political system is becoming increasingly pluralistic at the national level, and—as emergency meetings held during the author’s fieldwork activities in 2018 demonstrated—this shift is having growing impacts at the local level. Those interested in continuing Ethiopia’s restoration success must therefore begin to think about how such large-scale and labor-intensive projects can continue or be supplemented if local political institutions start to divest power to a wider range of voices and agendas.

#### ***26.5.4 Need for Reassessment and Realignment Among International Coordinating Organizations***

Abreha we Atsbeha is undoubtedly a case study in successful dryland restoration across a number of metrics. Through decades of thoughtful, ecologically-sound and socio-economically sensitive interventions and innovations, the community of Abreha we Atsbeha has effectively stewarded a resilient biophysical ecosystem in their kebele. This effort has provided substantial social and economic benefit to the community as a whole.

At the same time, Abreha we Atsbeha’s ecological and economic success is linked to the perpetual reifying of its social and political systems. The international community may be inadvertently bolstering these systems in Abreha we Atsbeha through its unexamined praise of the community’s restored biodiversity islands. Moreover, it may be unwittingly promoting the replication of such systems in other areas in the attempts to scale Abreha we Atsbeha’s successes in order to meet the demands of the Bonn Challenge and other such initiatives. A healthy debate on whether or not international sustainability and development organizations want to be associated with these kinds of political systems cannot even begin until there is a greater degree of reflection on the existence of these systems—and indeed their centrality—in the work of restoration in the first place.

Thorny questions on alignment between potentially conflicting development priorities aside, there is a pressing issue of practicality. With the country’s recent national reforms, civil society in Ethiopia seems to be moving in a number of positive directions, including provisioning a more democratic, open and pluralistic public sphere. Could this increased plurality and openness pose an unrecognized threat to restoration and conservation programs built on hegemony? Can FLCP-mediated restoration be modified to be more inclusive in this new political

landscape, perhaps by embracing more voices in the decision-making process? If not, what replaces the FLCP? What safeguards the enclosure zones? In short, how will restoration weather democratization? (NB: this chapter was authored prior to the surge in political violence that began sweeping the Tigray region in 2021 and, unfortunately, has reversed the country's progression towards peaceful pluralism. Recent events pose an even more urgent question: how will restoration weather another civil war?)

Those concerned with safeguarding biodiversity islands like those in Abreha we Atsbeha would do better to stay ahead of these questions than behind them. This can start with acknowledgement of local labor realities, recognition of complexity in local-level motivations, an understanding of relationships between 'political monoculture' and landscape-level biodiversity, and better alignment between international coordinating organizations, national initiatives, and local actors.

## 26.6 Conclusion

High levels of environmental degradation worldwide have spurred an increased appreciation for the contributions restoration can and must make towards ameliorating a number of interconnected global challenges. Restored areas serve as biodiversity islands in otherwise degraded landscapes, improving ecosystem connectivity and function, and offering a number of irreplaceable services to human societies around the globe. Recent years have witnessed mounting enthusiasm for restoration and an expanding consciousness surrounding the intricacies of socio-ecosystems. Substantial initiatives like the Bonn Challenge and the UN Sustainable Development Goals have elevated this awareness to the international arena, and have catalyzed mass-scale restoration movements while provoking research on local-level behaviors and impacts.

While this upsurge in awareness and activity has promised great benefits—such as improved food and water security, increased rural economic development, climate change adaptation and mitigation, and biodiversity protection—the realities of restoration in practice are still unfolding. Chief among the challenges faced by restoration practitioners is a phenomenon introduced here as the 'Restoration Dilemma'. The dilemma posits that restoration is highly site-specific and therefore resists scaling, and yet, degradation tends to be so pronounced that restoration usually *must* be scaled in order to realize its promised benefits (Sigman 2021).

To explore possibilities for assuaging the 'Restoration Dilemma', the present chapter focused on a case study from Northern Ethiopia, in the community of Abreha we Atsbeha. Here, a local community successfully re-vegetated substantial areas of highly degraded landscapes through integrative watershed management and hillside enclosures. This local-level restoration occurs in the context of a significant nationwide restoration platform called the Sustainable Land Management Program (SLMP)—the largest of its kind in Africa—and has been supported by a number of multinational restoration initiatives, including The Bonn Challenge.

The restoration activities of the village, and the biodiversity islands they enabled, have been widely lauded by the international community, and many have offered Abreha we Atsbeha as an example of how effective, coordinated, multi-scale restoration and conservation might proceed throughout the region and across the globe. Yet, as this analysis demonstrates, an insufficient amount of attention had been paid to the local-level dynamics that enable these restored landscapes. In particular, there has been little to no appreciation of the substantial 'Free Labor Contribution Periods' that were key to the creation of current biodiversity islands and remain central to the restoration programs in the region.

The expectation of substantial amounts of uncompensated rural labor exists in the context of a hegemonic, single-party 'political monoculture'. This stands at odds with the present-day realities of a country that is rapidly becoming politically pluralized. Sustaining restoration and safeguarding biodiversity islands amidst social and political change in Ethiopia therefore requires: (1) acknowledgement of local labor realities; (2) recognition of complexity in local-level motivations; (3) understanding relationships between 'political monoculture' and landscape-level biodiversity, and; (4) better alignment between international coordinating organizations, national initiatives, and local actors.

As the international community looks to the future of restoration, and together shapes the aims and aspirations of the global restoration movement, we must pay attention to governance and to power. Just as we work to promote diversity in our ecosystems, so too should we explore questions of political plurality and governance. This exploration should begin with an appreciation for the substantial and complex human labor dynamics that enable biodiversity islands, and should motivate us to probe deeper into the political structures that motivate, organize, and conscript them. In this way, we may begin to untangle the 'Restoration Dilemma' and, with care, enable diverse political, social, and ecological systems to thrive.

**Acknowledgements** This work would not have been possible without the generosity, assistance, knowledge, and hospitality offered by Aba Hawi, his family, and the many gracious citizens of Abreha we Atsbeha. Additionally, Cathy Watson, Niguse Hagazi, and Dr. Kiros Hagdu of the World Agroforestry Centre (ICRAF) supported the initial stages of this project, and were instrumental in facilitating later independent research. Abrha Berhane (Mekelle University) and Zufan Tsadik provided key translation and additional field analysis. Dr. Gordon Geballe (Yale FES) provided advice and resources at the planning stages, and Dr. Florencia Montagnini (Yale FES) served as advisor throughout the research process, and offered constructive editing. This work was supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. DGE1122492, as well as by the Yale Tropical Resources Institute, the Yale Jackson Institute for Global Affairs, and Yale FES. The author also gratefully acknowledges the financial support of the CGIAR Research Program on Forests, Trees and Agroforestry and the CGIAR Trust Fund Donors.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author's and do not necessarily reflect the views of supporters.



## References

- Aerts R, Honnay O (2011) Forest restoration, biodiversity and ecosystem functioning. *BMC Ecol* 11:29. <https://doi.org/10.1186/1472-6785-11-29>
- Alemu A, Getahun M, Bezabih T (2014) Comprehensive Food Security and Vulnerability Analysis (CFSVA). Ethiopia Central Statistical Agency/World Food Program
- Anderson W, Pembert N (2019) Across Africa, restoring land is climate action. *AFR100 Blog*
- Anwar AA, Dessalew WA, Seifu AT, Mekuria W, Mulugeta A, Tammo SS (2016) Effectiveness of land and water management interventions in reducing runoff and soil erosion in the north-western highlands of Ethiopia. Paper presented at First African ESP Conference; Nairobi, Kenya
- Asefa D, Oba G, Weladji R, Colman J (2003) An assessment of restoration of biodiversity in degraded high mountain grazing lands in northern Ethiopia. *Land Deg & Dev* 14:25–38. <https://doi.org/10.1002/ldr.505>
- Aynekulu E, Denich M, Tsegaye D (2009) Regeneration response of *Juniperus procera* and *Olea europaea* subsp *cuspidata* to exclosure in a dry afro-montane forest in northern Ethiopia. *Mount Res and Dev* 29:143–152. <https://doi.org/10.1659/mrd.1076>
- Bard K, Coltorti M, DiBlasi CM, Dramis F, Fattovich F (2000) The environmental history of Tigray (northern Ethiopia) in the middle and late Holocene: a preliminary outline. *Afr Archaeol Rev* 17: 65–86. <https://doi.org/10.1006/30609041>
- Benayas J, Newton A, Diaz A, Bullock J (2009) Enhancement of biodiversity and ecosystem services by ecological restoration: a meta-analysis. *Science* 325:1121–1124. <https://doi.org/10.1126/science.1172460>
- Berkes F, Folke C (1998) Linking social and ecological systems: management practices and social mechanisms for building resilience. Cambridge University Press, Cambridge
- Boeing AL, Nichols E, Metzger JP (2018) Biodiversity extinction thresholds are modulated by matrix type. *Ecography* 41(9):1520–1533
- Brancalion P, Cardozo I, Camatta A (2014) Cultural ecosystem services and popular perceptions of the benefits of an ecological restoration project in the Brazilian Atlantic forest. *Restor Ecol* 22: 65–71. <https://doi.org/10.1111/rec.12025>
- Brudvig L (2011) The restoration of biodiversity: where has research been and where does it need to go? *Am J Bot* 98:549–558. <https://doi.org/10.3732/ajb.1000285>
- Budiharta S, Meijaard E, Wells J (2016) Enhancing feasibility: incorporating a socio-ecological systems framework into restoration planning. *Environ Sci Policy* 64:83–92. <https://doi.org/10.1016/j.envsci.2016.06.014>
- Colding J, Barthel S (2019) Exploring the social-ecological systems discourse 20 years later. *Ecol Soc.* <https://doi.org/10.5751/es-10598-240102>
- Costanza R, de Groot R, Sutton P, van der Ploeg S, Anderson SJ, Kubiszewski I, Farber S, Turner RK (2014) Changes in the global value of ecosystem services. *Glob Environ Chang* 26:152–158
- Covelli-Metcalf E, Mohr J, Yung L (2015) The role of trust in restoration success: public engagement and temporal and spatial scale in a complex social-ecological system. *Restor Ecol* 23:315–324. <https://doi.org/10.1111/rec.12188>
- Daily G (1997) *Nature's services*. Island Press, Washington, DC
- Daily G, Matson P (2008) From theory to implementation. *PNAS* 105:9455–9456. <https://doi.org/10.1073/pnas.0804960105>
- Dessalew WA, Anwar AA, Seifu AT, Mekuria W, Charles FN, Tammo SS (2016) Enhancing ecosystem services in the upper Blue Nile Basin, Ethiopia through the implementation of soil and water conservation measures. Presented at First African ESP Conference, Nairobi
- Dodd M (2015) Ethiopia rising: Red terror to Green Revolution. 1080 Films, Abreha we Atsbeha, Ethiopia
- Felter C (2018) Ethiopia: East Africa's emerging giant. Council on Foreign Relations Background Paper
- Fernández-Manjarrés JF, Roturier S, Bilhaut AG (2018) The emergence of the social-ecological restoration concept. *Restor Ecol* 26(3):404–410
- Garner B (2009) *Garner's modern American usage*. Oxford University Press, USA, Oxford

- Gebregziabher G, Abera DA, Gebresamuel G, Giordano M, Langan S (2016) An assessment of integrated watershed management in Ethiopia. Colombo, Sri Lanka: International Water Management Institute (IWMI). 28p. (IWMI Working Paper 170). <https://doi.org/10.5337/2016.214>
- GIZ (2020) Sustainable use of rehabilitated land for economic development (SURED). In: Giz.de. <https://www.giz.de/en/worldwide/18912.html>. Accessed 25 Jan 2020
- Habtezion S, Adelekan I, Aiyede E (2015) Earth system governance in Africa: knowledge and capacity needs. *Curr Op in Envi Sust* 14:198–205. <https://doi.org/10.1016/j.cosust.2015.06.009>
- Hachoofoe, EM (2012) Local ecological knowledge of trees on farms, constraints and opportunities for further integration in Tigray Region, northern Ethiopia: A case study of smallholder farmers in Abreha Wa Atsbeha and Adi gudom. MSc thesis in Agroforestry. Gwynedd, UK: Bangor University
- Haslan C (2015) Turning Ethiopia's desert green. BBC News
- Hobbs R, Higgs E, Harris J (2009) Novel ecosystems: implications for conservation and restoration. *Trends Ecol Evol* 24:599–605. <https://doi.org/10.1016/j.tree.2009.05.012>
- Hurni H, Berhe WA, Chadhokar P, Daniel D, Gete Z, Grunder M, Kassaye G (2016) Soil and water conservation in Ethiopia: guidelines for development agents. Second revised edition. Bern, Switzerland: Centre for Development and Environment (CDE), University of Bern, with Bern Open Publishing (BOP). 134 pp
- Keller E (1992) Drought, war, and the politics of famine in Ethiopia and Eritrea. *J Mod Afr Stu* 30: 609–624. <https://doi.org/10.1017/s0022278x00011071>
- Krech S (2000) *The ecological Indian*. W.W. Norton, New York
- Kumar P (ed) (2010) *The economics of ecosystems and biodiversity ecological and economic foundations*. Earthscan, London and Washington, 422pp
- Kuria A, Winowiecki, L, Ouya D (2016) Fresh water, the reward of land restoration, flows in Ethiopia's dry zone. In: *Agroforestry World*. <http://blog.worldagroforestry.org/index.php/2016/11/10/water-reward-land-restoration-flows-ethiopias-dry-zone/>. Accessed 29 Jan 2020
- Lamond, G (2012) Local knowledge training using the AKT5 software and methodology at Mekelle University, funded by the AfricaRISING project: a report on a two week research study in the village of Abreha We Atsbeha in Tigray Region, northern Ethiopia. Nairobi, Kenya: World Agroforestry Centre
- Levis C, Costa F, Bongers F (2017) Persistent effects of pre-Columbian plant domestication on Amazonian forest composition. *Science* 355:925–931. <https://doi.org/10.1126/science.aal0157>
- López DR, Cavallero L, Easdale MH, Carranza CA, Ledesma M, Peri PL (2017) Resilience management at landscape level: an approach to tackle social-ecological vulnerability of agroforestry systems. In: Montagnini F (ed) *Integrating landscapes: agroforestry for biodiversity conservation and food sovereignty, advances in agroforestry* 12. Springer, Cham, pp 127–148
- MacArthur RH, Wilson EO (1967) *The theory of island biogeography*. Princeton University Press, Princeton, 203 pp
- Mace G, Norris K, Fitter A (2012) Biodiversity and ecosystem services: a multilayered relationship. *Trends Ecol Evol* 27:19–26. <https://doi.org/10.1016/j.tree.2011.08.006>
- Martin D (2017) Ecological restoration should be redefined for the twenty-first century. *Restor Ecol* 25:668–673. <https://doi.org/10.1111/rec.12554>
- Maynard C (2013) How public participation in river management improvements is affected by scale. *Area* 45:230–238. <https://doi.org/10.1111/area.12015>
- McKenna A (2019) Tigray, historical region, Ethiopia. *Encyclopedia Britannica Online*, <https://www.britannica.com/place/Tigray-historical-region-Ethiopia>
- Mekuria W, Veldkamp E (2012) Restoration of native vegetation following enclosure establishment on communal grazing lands in Tigray, Ethiopia. *App Veg Sci* 15:71–83. <https://doi.org/10.1111/j.1654-109x.2011.01145.x>
- Mekuria W, Langan S, Noble A, Johnston R (2017) Soil restoration after seven years of enclosure management in northwestern Ethiopia. *Land Deg & Dev* 28:1287–1297. <https://doi.org/10.1002/ldr.2527>

- Mekuria W, Wondie M, Amare T (2018) Restoration of degraded landscapes for ecosystem services in North-Western Ethiopia. *Heliyon* 4:e00764. <https://doi.org/10.1016/j.heliyon.2018.e00764>
- Mengistu T, Teketay D, Hulten H, Yemshaw Y (2005) The role of enclosures in the recovery of woody vegetation in degraded dryland hillsides of central and northern Ethiopia. *J Arid Env* 60: 259–281. <https://doi.org/10.1016/j.jaridenv.2004.03.014>
- Ministry of Finance and Economic Development (MoFED) (2015) The Federal Democratic Republic of Ethiopia Growth and Transformation Plan (GTP). Ministry of Finance and Economic Development (MoFED), Addis Ababa
- Minnemeyer S, Laestadius L, Sizer N (2014) Atlas of forest and landscape restoration opportunities. In: World Resources Institute. <https://www.wri.org/resources/maps/atlas-forest-and-landscape-restoration-opportunities>. Accessed 29 Jan 2020
- Nyssen J, Haile M, Moeyersons J (2000) Soil and water conservation in Tigray (Northern Ethiopia): the traditional dagat technique and its integration with introduced techniques. *Land Deg & Dev* 11:199–208. [https://doi.org/10.1002/1099-145x\(200005/06\)11:3<199::aid-ldr376>3.0.co;2-y](https://doi.org/10.1002/1099-145x(200005/06)11:3<199::aid-ldr376>3.0.co;2-y)
- Nyssen J, Frankl A, Haile M (2014) Environmental conditions and human drivers for changes to north Ethiopian mountain landscapes over 145 years. *Sci Total Environ* 485–486:164–179. <https://doi.org/10.1016/j.scitotenv.2014.03.052>
- Pankhurst R, Ingrams L (1988) Ethiopia engraved. Kegan Paul International, London
- Rabia AH, Afifi RR, Gelaw AM, Bianchi S (2013) Soil mapping and classification: a case study in the Tigray Region, Ethiopia. *J Agri Env Int Dev* 107(1):73–99. <https://doi.org/10.12895/jaeid.20131.81>
- Rahmato D (2009) 2 peasants and agrarian reforms: the unfinished quest for secure land rights in Ethiopia. *Land Rights* 33
- Reij C (2015) How Ethiopia went from famine crisis to Green Revolution. In: World Resources Institute Blog. Accessed 25 Jan 2020
- Rovere A (2015) Review of the science and practice of restoration in Argentina: increasing awareness of the discipline. *Restor Ecol* 23:508–512. <https://doi.org/10.1111/rec.12240>
- Schroth G, Fonseca G, Harvey C (2004) Agroforestry and biodiversity conservation in tropical landscapes. Island Press
- Seyoum Y (2016) Forest landscape restoration experiences in Ethiopia. AFR100 Conference, Addis Ababa
- Shono K, Cadaweng E, Durst P (2007) Application of assisted natural regeneration to restore degraded tropical forestlands. *Restor Ecol* 15:620–626. <https://doi.org/10.1111/j.1526-100x.2007.00274.x>
- Sigman, E (2019a) The role of group labor in socioecological restoration: perspectives from Abreha we Atsbeha, Fourth Annual World Agroforestry Congress, Montpellier, France
- Sigman E (2019b) Who decides? Restoration policies, local governance, and group labor: a case study from Ethiopia. Yale Environmental Leadership and Training Initiative. Yale University, New Haven
- Sigman E (2021) The Dilemma of Scale: competing imperatives for global restoration. *Restor Ecol*, 29: e13408. <https://doi.org/10.1111/rec.13408>
- Tadesse A, Gebrelibranos T, Geberehiwot M, Mezgebu A (2015) Characterization and impact assessment of water harvesting techniques: a case study of Abreha Atsbeha watershed, Tigray, Ethiopia. *Open Agricultural Resources (OER) Africa*
- Tamene L, Abera W, Woldearegay K, Tibebe D, Tadesse M, Admassu Z, Yaekob T, Tefere H, Alene T, Dubale W, Amede Y, Hailu H, Demeke G, Mekonnen K, Thome P (2018) Land restoration initiatives and their performances in Ethiopia: a systematic assessment based on meta-data analysis. *AfricaRISING*
- Teshome A, Zhang J (2019) Increase of extreme drought over Ethiopia under climate warming. *Adv Met* 2019:1–18. <https://doi.org/10.1155/2019/5235429>
- Trigger D, Mulcock J, Gaynor A, Toussaint Y (2008) Ecological restoration, cultural preferences and the negotiation of ‘nativeness’ in Australia. *Geoforum* 39:1273–1283. <https://doi.org/10.1016/j.geoforum.2007.05.010>

- United Nations (2020) About the sustainable development goals. In: United Nations Sustainable Development. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>. Accessed 25 Jan 2020
- United Nations Development Program (2013) *Abrha Weatsbha Community*, Ethiopia. NY, New York
- United Nations Environment Program: News and Stories (2019) Ethiopia plants over 350 million trees in a day, setting new world record
- Uprety Y, Asselin H, Bergeron Y (2012) Contribution of traditional knowledge to ecological restoration: practices and applications. *Écoscience* 19:225–237. <https://doi.org/10.2980/19-3-3530>
- Van Veen E (2016) Perpetuating power: Ethiopia's political settlement and the organization of security. Chapter 1: dynamics of political power in Ethiopia: Past and Present
- Watson C (2016) No one leaves anymore': Ethiopia's restored drylands offer new hope. *The Guardian*
- Win T L (2019) With fruits and green shoots, Tigray swaps image of famine for resilience. Reuters
- World Bank (2015) NEPAD launches initiative for the resilience and restoration of African landscapes
- Wortley L, Hero J, Howes M (2013) Evaluating ecological restoration success: a review of the literature. *Restor Ecol* 21:537–543. <https://doi.org/10.1111/rec.12028>