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Thematic Section: Forests in Flux

Migration and a New Landscape of Forest Use and Conservation

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Summary

The nature of migration–forest linkages in migrant-sending regions is underreported and poorly understood. In rural Latin America and elsewhere, out-migration, together with agricultural crises and the deterritorialization of rural livelihood, are transforming forests and the communities that manage them. Drawing on research in indigenous communities of Oaxaca (Mexico), we identify the parameters of a new landscape of forest use and conservation, finding that: migration challenges community practices for self-governance of forest resources; declines in agriculture create new spaces for forest recovery and use; and forest conservation policies create economic opportunities around both extractive and non-extractive forest use.

Introduction

Local and indigenous communities in Latin America are critical actors in forest governance and conservation (Robson & Lichtenstein 2013, Boillat et al. 2017), but these land managers frequently migrate to cities and other countries (McSweeney & Jokisch 2007, Cohen 2016). The temporary, circular or permanent movement of people away from rural areas presents a dilemma for community-based forest governance. Out-migration might decrease the pressure of the population on forest resources, but what happens when communities are potentially weakened by the absence of so many members? Given the remarkable overlap between hotspots of forest biodiversity and community-controlled territories (Gorenflo et al. 2012, Sarukhan & Jimenez 2016), researchers need to understand how out-migration affects possibilities for community-based conservation (Hajjar et al. 2016).

So far, much of the understanding of the migration–environment nexus has focused on migration as a response strategy to environmental change (Black et al. 2011, Piguet 2013, Neumann & Hilderink 2015). Conversely, out-migration from rural areas drives the 'forest transition', whereby an absence of people creates space for forest recovery (Rudel et al. 2005). Migration also helps explain land-use changes in sending areas (e.g., Radel & Schmook 2008, Moran-Taylor & Taylor 2010, Gray & Bilsborrow 2014). Nevertheless, and especially in places where people and forests coexist, integrative analyses of migration and socio-environmental change remain elusive (Hecht et al. 2015, Hunter et al. 2015).

In Mexico, two-thirds of the country's forests are found on common property lands (Barnes 2009, Herrera Guerra 2015). These forests shelter globally important biodiversity, regionally important ecosystem services and resources vital for local livelihoods (Boege 2008, Sarukhán & Jiménez 2016). Mexican forest communities engage in land-use zoning and planning, cooperative coffee production, commercial forestry, ecotourism, payment for environmental services (PES) and other forest conservation activities (Klooster 2013, Van Vleet et al. 2016). As many as 2000 communities are involved with logging and/or timber-processing activities nationwide (Del Angel-Mobarak 2012, Herrera Guerra 2015). Reflective of trends elsewhere (Porter-Bolland et al. 2012), community forest management in Mexico better integrates forest use, rural development and biological conservation than either state-decreed protected areas or large forest concessions (Bray et al. 2009). This forest governance, however, requires village labour and institutions, which may be depleted or weakened by migration (Robson 2010, Klooster 2013, Robson et al. 2018).

Community-based forest management is prominent in Oaxaca, Mexico's most biologically and culturally diverse state, which is home to 6 major forest ecosystems and 16 ethnic groups (CONABIO-CONANP 2007, Boege 2008). Here, indigenous communities protect the vast majority of forests (Duran et al. 2012). The social institutions through which these communities organize territorial governance and collective work are the *cargo*, the *tequio* and the *asamblea*. A *cargo* is an unpaid, elected post (12–36 months in duration) governing religious,

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civic and communal aspects of village life. *Tequio* is unpaid labour on community projects, which can include tree planting, fighting forest fires and maintaining territorial borders. In the *asamblea* (community assembly), community members invest time in debating courses of action and electing members to perform *cargos*.

A hundred years ago, few Oaxacans saw a need to leave their villages except for occasional seasonal work within the region (Maldonado 2011). This changed in the 1940s and 1950s when men participated as guest-workers in the US Bracero Program. From the 1960s onwards, women and men began to leave in large numbers (Nolasco 1992), most as internal migrants, settling in Oaxaca City or the nation's capital (Molina 1991). By the mid- to late-1970s, indigenous Oaxacans joined new migration streams to the USA (Nolasco 1992) or found economic opportunities in Mexico's northern agricultural zones and border regions. Migration rates peaked in the late 1990s and early 2000s (Passel et al. 2012), before dropping sharply in the late 2000s because of increased enforcement at the USA–Mexico border (Massey et al. 2015), the effects of economic recession in the USA and lawlessness in Mexico's northern states (Cohen 2016). Nevertheless, many communities remain burdened by small and ageing resident populations as first-generation migrants remain absent (Bada & Formann 2016), fertility rates drop to historical lows (CONAPO 2014) and young people leave to pursue education and regional job opportunities (Aquino-Moreschi & Contreras-Pastrana 2016; Robson, personal observations 2007–2017).

This paper examines the case of Oaxaca, an area known for strong community-based forest governance, to understand how out-migration affects village governance, land use/cover and conservation opportunities. We find that migration transforms forest communities and forest landscapes. While the loss of villagers can challenge community practices of self-governance, it also creates spaces for forest recovery. We report on communities' divergent experiences with migration to show how they are contributing to a new landscape of forest use and conservation.

Methods

To understand how migration affects forest use and forest management in Oaxaca, we conducted multi-sited research with five indigenous communities in the northern highlands (Sierra Norte) and a migrant diaspora spread across Mexican and US destination centres (Fig. 1). While these five study communities represent different ethnicities, population sizes, territorial configurations and forest types (Table 1), they share similar histories, land uses and ways of life based around territory, collective work, communal governance and ritual celebrations (Martínez Luna 2010, Robson et al. 2018).

Key methods included household surveys, semi-structured interviews (individual and group) and territorial mapping exercises, all designed to identify the impacts of migration on self-governance, farming, forest use and other forms of local environmental practice and knowledge. Field data were collected in Analco and Comaltepec during the period 2007–2010, and in Analco, Comaltepec (including all three settlements comprising this community), Yavesia, Maninaltepec (see also Gutiérrez Estrada 2011) and Tepetotutla during the period 2013–2016. Study participants included communal authorities and residents living in the five communities in Oaxaca and migrants from these communities residing in Oaxaca City, Mexico City, Los Angeles, Las Vegas and Chicago. Please see the supplementary files (Supplementary Documents S1 & S2, available online) for further explanation of survey design, guiding themes/questions for interviews and the number and type of interviews conducted.

In Comaltepec and Analco, ecological and land-use data were collected through forest transects in tropical dry, dry oak, mixed pine–oak and cloud forests, as well as territorial walking tours across extensive areas of current and former farmed lands (more details in Robson 2010). In Tepetotutla and Maninaltepec, questions concerning land-use and land-cover change were included in interview guides. For the communal territories of Comaltepec, Analco and

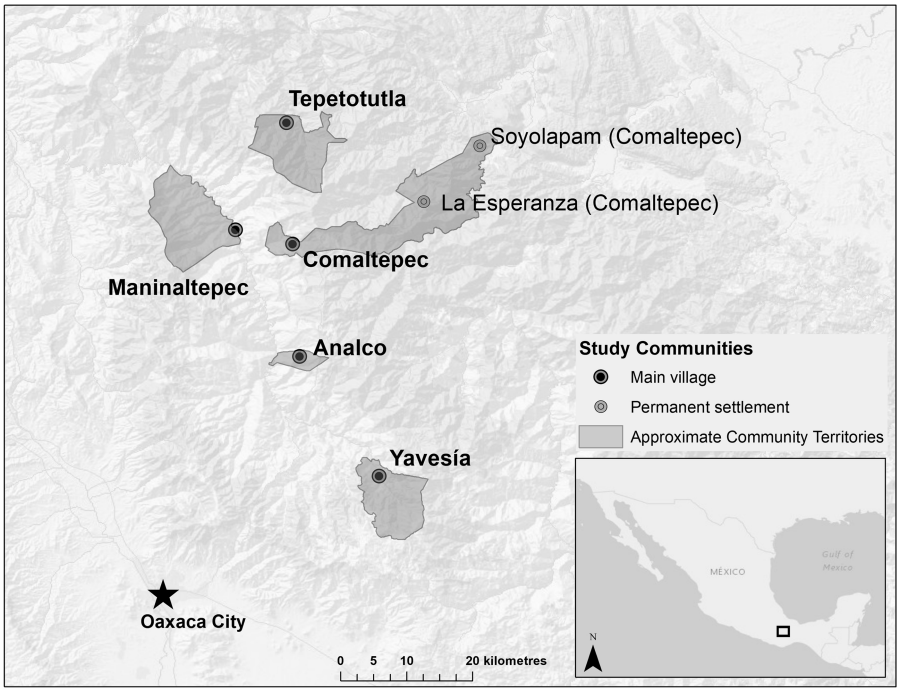

Fig. 1. Diagrammatic map showing the locations of study communities in Oaxaca's northern highlands.

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Table 1. Study communities' resident populations, territorial sizes and forest types and extents

Community	Resident population size (INEGI 2010)	No. of first-generation migrants (in 2015)	Territorial size (ha)	Extent and diversity of forest types
Comaltepec	1115	–	18 300	16 000 ha of forest, including large tracts (>4000 ha) of tropical lowland rainforest and montane cloud forest, small stands of dwarf pine and conifers and small- to medium-sized tracts of temperate pine forest, mixed pine–oak, dry oak–pine forest and dry tropical forest.
Analco	404	362	1650	*c.* 900 ha of forest, with just over 300 ha of temperate pine and pine–oak forest, and remainder split between dry oak–pine forest and dry tropical forest
Yavesia	448	332	9147	6135 ha of forest, ranging from dry oak–pine forest to large extensions of temperate pine forest, with important stands of conifer at the highest elevations
Tepetotutla	429	–	11 248	*c.* 9000 ha of forest, with almost 7000 ha of cloud forest, 950 ha of oak forest and the remainder split between pine–oak forest, elfin forest and montane tropical rainforest
Maninaltepec	347	–	13 746	Over 10 000 ha of forest, with over 5500 ha of pine and pine–oak forest under forest management. Also important areas of oak forest, oyamel firs, cloud forest, dry tropical forest and matorral

Tepetotutla, these field-based observations of change in land use were supplemented by comparing aerial photographs and LANDSAT imagery (INEGI databases) for the period 1990–2015 with what we could observe in the field and discuss with our informants.

Migrants living in the USA were contacted via letters of introduction from communal authorities or via family members in the community of origin. Both strategies proved crucial for establishing contact and trust with migrants in the USA, many of whom remain undocumented. Nearly all interviewees were first-generation migrants who had spent at least 15 years (and in some cases as many as 55 years) living outside their home village.

All interviews were either audio-recorded or jot-noted and transcribed shortly thereafter. Transcriptions were coded through a process that allowed themes to be read across interviews, for associations to be identified between such themes and for insights to be refined based on those relationships (Bernard 2017). For the purpose of maintaining anonymity, direct quotes used in this manuscript are not credited to identifiable individuals.

Results

Migration Is Dynamic and Varied

The migration history of the study communities follows the general pattern for the state, with some differences. In the case of Yavesia and Analco, initial experiences with labour migration to areas of plantation agriculture on the Oaxaca–Veracruz border (1930s–1940s) were followed by temporary migration to the USA under the Bracero Program (1940s–1960s) and intense periods of wage labour migration to Oaxaca City and Mexico City (1960s–1980s) and to the USA (late 1970s–mid 2000s). In the case of Comaltepec and Maninaltepec (see also Gutiérrez Estrada 2011), internal migration to Oaxaca City and Mexico City was limited, with migration taking hold in the 1980s as USA-bound wage labour migration intensified, almost exclusively to Los Angeles (California). Yavesia is the one study community with additional participation (since the mid-1990s) in seasonal, guest-worker migration to the USA, although a few Maninaltepec residents obtained similar worker visas starting in about 2014. In Tepetotutla, migration exploded in the mid-1990s, when coffee prices collapsed at the same time that the community was demanding many days of unpaid labour building a road, a health clinic and a powerline.

For the five study communities, rural out-migration has had a significant impact on resident population numbers (Fig. 2) and shifted age–sex structures (Fig. 3). This includes a particularly sharp decrease among school-age populations.

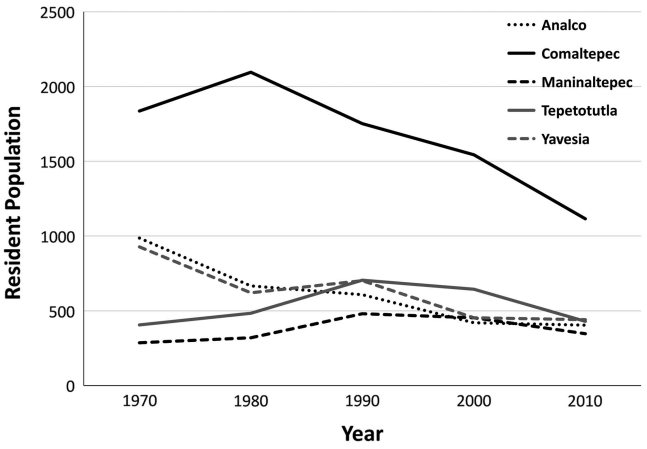

Fig. 2. Plot of resident population size over the period 1970–2010 among the five study communities.

Nevertheless, none of the case study communities have emptied completely. Furthermore, our interviews showed that a previous pattern of circular migration had changed to one in which migrants in the USA more often remain there, returned migrants and deportees are unlikely to attempt to cross back into the USA and young people are increasingly reluctant to attempt migrations that their parents and older siblings would have undertaken. The following interview with a community member of Maninaltepec, recently returned from a sojourn in Long Beach (California), is indicative:

> Informant: [Because of economic difficulty in the USA since 2008] people don't come and go like they used to. There's not enough money to go [back to Mexico] and rest.
> DJK: Is it more difficult to cross [the border]?
> Informant: That too, and because there is more security in the border, crossing is a lot more expensive. I remember the first time I crossed [in 1993] they charged US$300. They tell me now it's around US$10,000! Why would I go? It is more difficult now, more complicated. I've heard that nobody's crossing anywhere.

Potential migrants told us about the dangers, difficulties and costs associated with the trip north and the resistance they face from family members who fear for both their physical safety and the moral risks of drug and alcohol addictions. At the same time,

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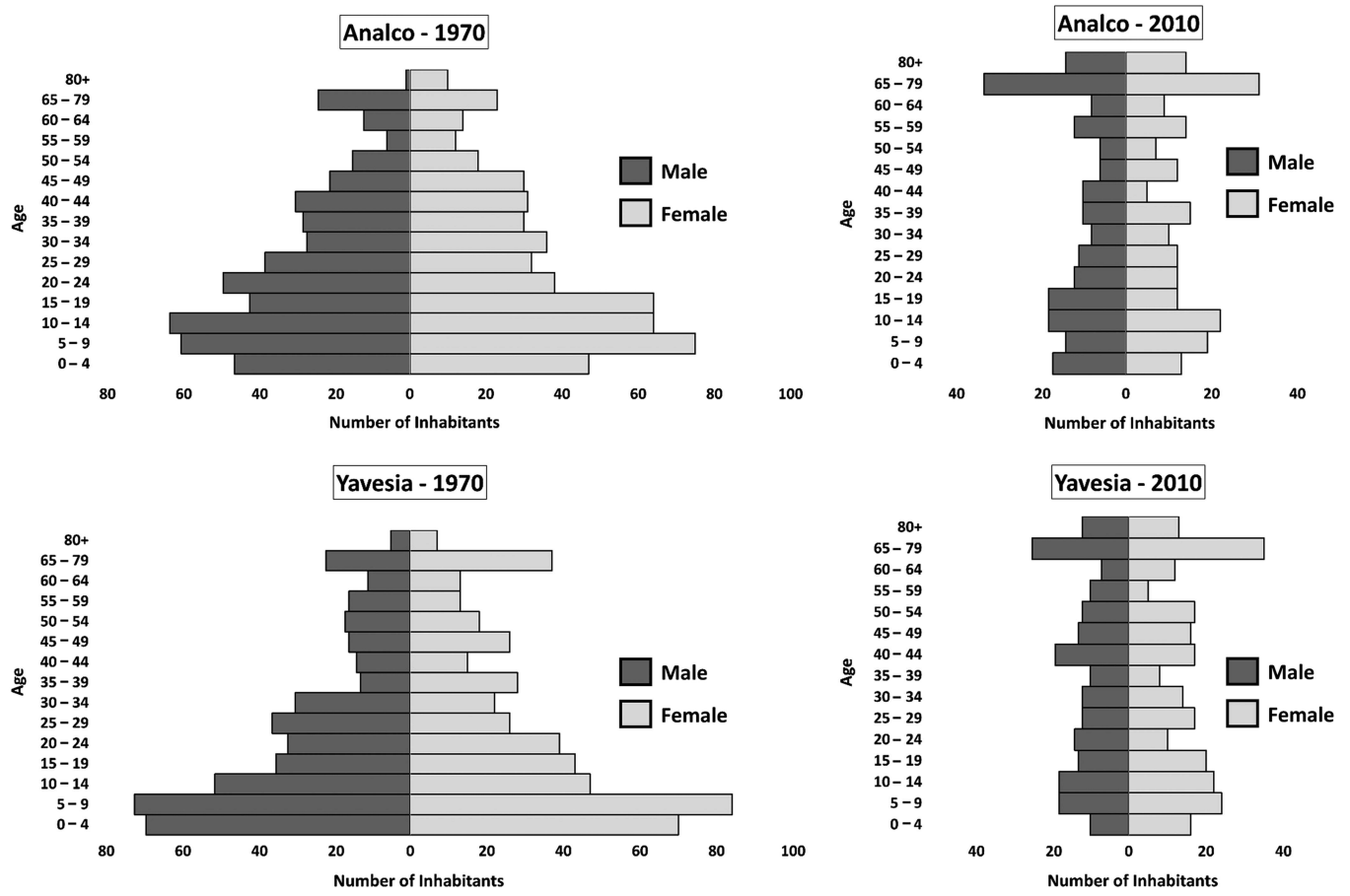

Fig. 3. Population age distributions of Analco and Yavesia in 1970 and 2010.

migrants from these communities living in the USA are mostly undocumented, with almost no chance of legalizing their status. Their ability to remain in the USA indefinitely cannot be taken for granted. Already, small numbers of USA-born young people are living with their deported parents in our case study villages. They are growing up as indigenous Mexicans, but have the rights of US citizens.

Agriculture Has Declined, with Subsequent Forest Recovery

Traditional agricultural, pastoral and subsistence forest activities are on the decline, but not disappearing. Over the past 40 years, households have significantly reduced their reliance on agriculture in favour of off-land activities. In the head village of Comaltepec, for example, approximately a quarter of households had stopped farming altogether as of 2008. The average area under cultivation per farming household had decreased, with survey data showing that households in Analco and Comaltepec were working less than half the area in 2009 that they were in 1995. As a La Esperanza farmer explained, "People no longer work in the countryside, there are fewer every year." Production has tended to decline further as the pool of available labour dwindles, while patterns of agricultural abandonment and contraction reduce the territorial mobility of community members. This is most apparent in extensive territories, such as those of Comaltepec and Maninaltepec, where informants told us that seasonal settlements in different microclimates are no longer used. Farmers told us that they now carry out land-based activities much closer to their homes, abandoning more distant cultivation zones.

In Comaltepec, Analco and Yavesia, agricultural abandonment over a 50-year period has led to significant forest regeneration, as confirmed by our interviews, walking tours with local land users (e.g. Supplementary Figs S1 and S2) and our direct landscape observations compared to historic aerial photographs and satellite imagery we took with us to the field. Interviews confirm that this pattern of retrenchment also extends to Maninaltepec and Tepetotutla (Table 2).

In temperate–cold and temperate–dry zones, new stands of pine have colonized former corn and bean fields. On the windward side of the range, fewer areas of cloud forest are opened up for long-fallow agriculture or thinned out to establish small-scale coffee and banana plantations. In Tepetotutla, community members proudly describe their community's land-use plan, which stabilizes their coffee agroforestry and slash-and-burn-and-fallow hillside *milpas* (traditional corn–bean–squash agriculture found across Mesoamerica) in discrete zones (e.g., Supplementary Fig. S3).

With agricultural retrenchment comes a decline in other land-use practices (Table 3). In part, this is because fewer farmers mean fewer people harvesting wild foods and materials opportunistically as they travel to and from their plots or pastures. Declines are also attributable to the fall in average household size, a preference for modern building materials, a switch from firewood to gas for cooking and the advanced age of many community members.

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Table 2. Observed and reported change in land use and resource practice in the study communities and localities (1995–2015)

	Analco	Comaltepec	La Esperanza	Soyolapam	Yavesia	Tepetotutla	Maninaltepec
Milpa agriculture	Decline	Decline	Decline	Decline	Decline	Decline	Decline
Mono-cropping	Increase	Increase	No discernible change	No discernible change	Increase	No discernible change	Yes, in some cases
Home gardens and orchards	Decline	Decline	Decline	No discernible change	Decline	Increase – to reduce reliance on coffee	No data
Animal husbandry	Decline	Decline	Decline	Increase	Decline	Decline	No discernible change
Gathering of wild plants and fungi	Decline	Decline	Decline	Decline	Decline	No data	No data
Hunting	Decline (restricted by communal law)	Decline	No discernible change	No discernible change	Decline	Decline (restricted by communal law)	No discernible change
Harvest of medicinal plants	Decline	Decline	Decline	Decline	Decline	No data	No data
Harvest of ornamental plants	Decline	Decline	Decline	Decline	Decline	No data	No data
Domestic forestry and firewood collection	Decline	Decline	Decline	Decline	Decline	No discernible change	Decline (low)
Commercial forestry	New practice	Reported decline (2008) followed by increase (2014)	n/a	n/a	No change	n/a	Continues with ups and downs
Ecotourism	New practice	Reported decline (2008) followed by increase (2014)	Increase	No discernible change	New practice	New practice	Not present
Formal conservation	New practice	New practice	New practice	New practice	New practice	New practice	New practice

Table 3. Estimated citizen:*cargo* ratios in 2015 and the late 1970s

Community/locality	No. of *cargos*	Number of active resident citizens	Citizen:*cargo* ratio in 2015	Citizen:*cargo* ratio in the late 1970s
Analco	79	81	1.02	4.25
Yavesia	77	90	1.16	No data
Tepetotutla	74	190	2.57	No data
Maninaltepec	26	65	2.5	No data
Comaltepec	83	225	2.71	5.51
Santiago Comaltepec	52	165	3.02	5.08
La Esperanza	17	34	2.00	5.50
San Martin Soyolapam	14	26	1.85	No data

Interviewees noted that migration and agricultural decline have contributed to an erosion of the knowledge needed to farm and forage. Younger community members now remain in school until 16, 17 or 18 years of age, thus taking them away from regular work in the fields. While active farmers continue to produce environmental knowledge through the application of long-standing practices, as well as experimenting with new activities, few share these experiences with their children. As one Comaltepec farmer noted, "My sons do not go up into the mountains… they don't know them." Across all study communities, older informants lamented the lack of interest of many young people to continue to work in traditional land-based activities.

Lastly, by reducing the presence of community members in areas of their territory where they no longer farm, graze animals, hunt or gather, the authorities of several communities acknowledged difficulty monitoring their densely forested commons.

Alternative Forest Uses Have Appeared

Forestry, conservation and ecotourism activities have remained or increased (Table 2). Land-use planning now places greater emphasis on non-extractive and non-agricultural uses (ecotourism and PES), supported by the explicit protection of high-conservation-value forest lands. Tepetotutla, Comaltepec, Analco and Yavesia invest in physical infrastructure (e.g., rustic cabins, trout farms, restaurants) designed to generate revenue from domestic and international tourists. PES schemes in Tepetotutla and Maninaltepec generate funds used to address employment, infrastructure and health service shortfalls and to discourage young people from migrating. In some communities, the trend towards formalized conservation accompanies commercial forest use. Comaltepec and Maninaltepec have long-established logging operations that provide work for community members and funds for community projects. In Analco, secondary pine forests on abandoned agricultural fields have allowed the community to establish, for the first time, a commercial forestry operation. In all such cases, commercial forestry plans include conservation areas.

Migration Challenges Self-Governance

Migration presents challenges for the customary governance of these forest commons (Klooster 2013). Migration can leave remaining village residents overburdened with the work of meeting their *cargo*, *tequio* and *asamblea* duties, impacting the long-term viability of these collective work institutions. In the five study communities, migration has produced marked declines in

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local citizen:*cargo* ratios (Table 3), with lower ratios equating to an increased collective workload.

When interviewed, village authorities and residents acknowledged that ratios have reached worryingly low levels in the smaller communities of Analco and Yavesia and in two of Comaltepec's localities (La Esperanza and Soyolapam). As one resident of Analco explained, "We suffer from a lack of people… there are no citizens, no people to carry out *cargos*… those that are here are older people, there are few youngsters, and it is the same group of citizens that have to do all the work." As the number of active resident citizens has fallen because of migration, some of the new resource practices to emerge (e.g., forestry, ecotourism) have led to the establishment of new committees and an increase in the overall number of *cargos*, thus exacerbating the overall sense of burden. Communities are choosing to forgo less urgent collective tasks and dedicating their *tequio* requests to the most urgent activities, which now take longer due to the shortage of labour. The above changes impact the work that communities can carry out within their communal territories, including forests, and also reduce the pool of qualified people to hold *cargos* in the Comisariado de Bienes Comunales (Office of the Common Property Commissioner) and Consejo de Vigilancia (Surveillance and Oversight Council).

It is through the collective work of attending *asambleas* and making decisions jointly that effective self-governance is possible in these communities and political power exercised. As fewer members participate in the *asamblea*, informants explained how this translates into fewer insights and opinions to help them when making collective decisions and too few candidates to choose from when electing members to perform *cargos*. Migration draws away some of the brightest and most energetic minds and can leave the assembly depleted, overly reliant on an ageing congregation of members and unable to rely on the full range of disparate points of view needed for critical discussion. This is particularly apparent in Yavesia, where in addition to the impact of traditional migrant streams, 30–40 adult men leave for the USA for six months each year to work as temporary legal wage labourers.

Interviews with village authorities in Oaxaca and migrant organizations in Mexican and US cities pointed to the challenge that all study communities face in getting migrants to serve *cargos* and *tequios* and attend *asambleas*.

To mediate these tensions, the commoners of Tepetotutla developed rules to control their migrants' behaviour, which evolved into a written *reglamento comunitario* (constitution) adopted in assembly in 2003. It requires migrants to request permission from the assembly to leave and to appoint a representative to comply with their *tequio* obligations while they are absent and it gives migrants a three-year window (of absence) without charge or sanction to the migrant. After that, the community assesses annual fines of US$500 per year that migrants remain away. The other four communities have also begun to develop rules to encourage migrants to comply with their responsibilities to their communities of origin, such as by paying for a resident to serve *cargos* in the migrant's place.

Yet the ability (and willingness) of migrants to provide greater support to the home community has limits. Household survey data showed two main remittance trends: most money is spent on house construction, emergency medical care or to cover daily household and school expenses (rather than community-level investments); and the amount remitted has dropped significantly over the past five to ten years, as migration rates to the USA have fallen, economic opportunities in the USA have declined and long-term absentees have seen their own family needs take precedence. As a migrant from Analco living in Los Angeles explained, "Things were better before, everyone had more to give, now there isn't as much work, household expenses are really high and it's difficult to contribute funds." Money remitted back to Comaltepec indicated a 50% decrease during the period 2004–2014. In addition, when migrants do organize collectively to send money for village projects, they prioritize cultural events and public infrastructure, not natural resource-related projects.

Interviews with migrants in both Mexican urban centres and the USA point to lulls in many migrant organizations' memberships and activities. As one US-based informant noted, "There are a lot of non-active people here, the moment that they get settled they no longer have any interest in the village or its problems." It is too soon to tell if the limited efficacy of present arrangements can be overcome or whether collective migrant organizing represents a temporary boost to village development, with support slowly being eroded by changes in attitude and the ageing-out of organizational leadership.

Discussion

Our work contributes to a better understanding of migration and change in forested landscapes (Hecht et al. 2015). In Oaxaca, traditional agricultural, pastoral and subsistence forest activities are declining, but not disappearing, while new forestry, conservation and ecotourism activities are increasing. The work supports previous findings from Mexico that migration stresses customary resource management (Robson 2010, Klooster 2013), drives agricultural abandonment and contracts territorial use (Robson & Berkes 2011) and creates emergent opportunities through forest recovery (Klooster 2013).

Such insights matter for community-based forest management and conservation. Researchers have convincingly argued that secure tenure rights and local economic opportunities are essential for communities to conserve forests and improve economic well-being (Charnley & Poe 2007, Persha et al. 2011). Yet across global regions, people are leaving forest communities, even when they have those rights (Hecht et al. 2015). New patterns of livelihood and territorial use, increases in forest cover, reductions in resident populations and challenges to self-governance institutions shape potential trajectories for community forest management.

These trajectories partly depend on the forest resources that communities access. Analco's territory is both small (1600 ha) and located wholly on the leeward side of the Sierra Madre Oriental, such that the community has limited biodiversity conservation or PES opportunities. However, maturing stands of pine, established on corn fields abandoned 50 years ago, have enabled the community to make its first forays into commercial logging. In Tepetotutla, an extensive, extremely biodiverse rainforest territory, combined with the realities of a reduced and stabilized agricultural frontier, permits the community to access PES programmes, ecotourism and scientific tourism programmes. This reinforces internal conservation goals and generates economic alternatives to migration. In other communities, the options are less clear-cut. Yavesia's communal territory contains important areas of old-growth pine and fir where neither PES programmes nor ecotourism reach. The lack of local economic opportunities for young people has led some to call for commercial logging to be considered.

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New forms of environmental knowledge also shape potential trajectories. An emergent economy based around non-consumptive forest use alters people's links to territory, since residents are rarely required to move across multiple territorial zones. Knowledge of hunting, harvesting and planting (see Martin 1996, Robson 2010) is supplanted by knowledge developed by mapping boundaries, doing conservation zoning, developing ecotourism activities and creating forest management plans.

For some communities, the combination of a reduced territorial presence and collective action institutions eroded by migration can increase vulnerabilities to the interests of external actors, including those of neighbouring communities, protectionist conservation organizations or large-scale mining and forestry operators. Village authorities acknowledge such risks and are working to consolidate their memberships and strengthen trans-local linkages with migrant organizations in order to create arrangements that reflect a membership now spread across an expanded social field (Robson et al. 2018). However, with regards to territorial governance, migrants in our study communities have had little direct effect on environmental use and management to date. This contrasts with multiple cases in Latin America where migrants actively drive farming and forest activities and other land-use changes (Hecht et al. 2015, Taylor et al. 2016).

Community futures in Oaxaca depend upon young people deciding to remain or to return to live in their home villages, but migration – including student migration in pursuit of higher-education opportunities – might be undermining that future. The challenge facing forest communities and the governmental and non-governmental actors supporting them is to develop a culture of forest-related work that is attractive to young people. Such a perspective has been adopted by rural development policies in Europe (Plieninger et al. 2006) and is argued for in other regions and contexts (Hajjar et al. 2011, Davidson-Hunt et al. 2016). The study communities' efforts to establish opportunities in ecotourism, PES and logging align with this perspective. Unfortunately, limited benefits from these activities enable only a few families to make a long-term living from their forests.

New trajectories of community forestry will also depend on changeable migration dynamics. Mexican migration to the USA has plummeted due to stricter US immigration policies, increased border enforcement, the US recession and insecurity on the Mexican side of the border. Future immigration policies might repatriate millions of undocumented migrants, returning large numbers of indigenous migrants to rural Oaxaca. At the same time, the USA-born young now living in indigenous villages will grow to adolescence and adulthood. What kinds of transnational lives will they construct? These possibilities indicate the importance of longitudinal research in order to understand such changes as they unfold over time.

Conclusion

Migration can drive deep-seated change among local forest communities – partially depopulating them, requiring changes to self-governance institutions, reducing the reliance on land and forests for livelihood, transforming territorial practices and altering forms of environmental knowledge. Communities actively respond to these challenges by adapting their social institutions of self-governance to integrate migrants, with limited success. Migration also drives declines in agriculture that open up spaces for forest recovery and creates opportunities for extractive and non-extractive forest uses. These changes can combine to create a new landscape of forest use and conservation.

The Oaxacan experience suggests that despite intense out-migration, forest communities remain viable, especially those with the natural capital to take advantage of emergent opportunities. These are communities that continue to fight to maintain their place in the world, even as their membership is stretched across borders and becomes less and less rooted in the agricultural and forest traditions of the past. However, more work is needed to understand the degree to which benefit streams tied to contemporary forest management can compensate for the declining agricultural component of rural livelihoods and territorial occupation. These findings hold important policy implications for the agencies and donors that support forest communities. As these actors work to improve community-based forest management, community-based applications of REDD + and other PES projects, they need to understand how demographic and associated livelihood and cultural changes shape the ability of communities to provide the labour and expertise needed for future forest strategies.

Supplementary Material. For supplementary material accompanying this paper, visit www.cambridge.org/core/journals/environmental-conservation

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Ethical Standards. None.

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