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Kmoch, L., Palm, M., Persson, M. et al (2021). Access mapping highlights risks from land reform in upland Myanmar. *Journal of Land Use Science*, 16(1): 34-54.

<http://dx.doi.org/10.1080/1747423X.2020.1836053>

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To cite this article: Laura Kmoch , Matilda Palm , U. Martin Persson & Martin Rudbeck Jepsen (2021) Access mapping highlights risks from land reform in upland Myanmar, Journal of Land Use Science, 16:1, 34-54, DOI: [10.1080/1747423X.2020.1836053](https://doi.org/10.1080/1747423X.2020.1836053)

To link to this article: <https://doi.org/10.1080/1747423X.2020.1836053>



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Access mapping highlights risks from land reform in upland Myanmar

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ABSTRACT

Secure land access is vital for Myanmar's upland households, who rely on crops and forests to meet their subsistence needs. But recent land reforms threaten to undermine customary tenure and land-use practices in Myanmar. This paper combines income accounting methods with access theory to assess how new legislation may affect four Chin communities in the country's north-west. Our assessment of 94 households' land-access mechanisms and economic benefits from different types of land reveals existing land-access inequalities among Chin households and demonstrates communities' continued dependence on environmental resources, especially those from swidden fields, home gardens and forests. A majority of households would lose all of their land-derived income, if they were denied access to communities' customarily governed land, e.g., under the Vacant, Fallow and Virgin Land Management Law. Policy stakeholders should therefore intervene, to alleviate land-access inequalities among Chin households and to direct Myanmar's land-system dynamics onto more just development trajectories.

ARTICLE HISTORY

Received 9 June 2020

Accepted 5 October 2020



KEYWORDS


Livelihoods; land-use practices; swidden farming; customary tenure; environmental income; Myanmar

Introduction

Insecure land and property tenure adversely affect close to a billion people globally (Feyertag et al., 2020). Rural households in low- and lower-middle-income countries often depend on proximate resources to meet their food, energy and material needs, but lack secure land rights and endure land-access inequalities, which puts them at risk of experiencing poverty and hunger (Food and Agriculture Organisation of the United Nations, 2019). International ambitions to address this vulnerability, through 'ownership and control over land and [...] natural resources' and 'secure and equal access to land' for rural people, have been codified in targets 1.4 and 2.3 of the Sustainable Development Goals (The United Nations, 2015, p. 19). Yet, external commercial interests and associated pressures to formally title and privatise land have intensified rather than decreased across many of the world's marginalised rural areas in recent years (Mousseau et al., 2020).

Socio-political change, state-building and economic integration processes foster the emergence of frontier conditions in such places, disrupt established livelihoods and unravel existing land-governance arrangements (Kelly & Peluso, 2015; Mousseau et al., 2020; Rasmussen & Lund, 2018). Positive livelihood transformations in frontier spaces are possible, e.g., if households retain control over their customary land and access new employment, commercial or agro-technical opportunities

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 Supplemental data for this article can be accessed [here](#).

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(Oberlack et al., 2016). Adverse outcomes are a frequent threat, however, where private investors and state authorities challenge rural communities' control over land and dismiss customary tenure and land-use practices to advance their own land-use agendas (Mousseau et al., 2020; Oberlack et al., 2016).

Answers to fundamental access questions are re-negotiated in such contexts, including present-day Myanmar (Mark & Belton, 2020; Ribot & Peluso, 2003): Who should be able to use, own, or benefit from land in the future? Who should govern land, prescribe or enforce rules? And who should decide which uses of land are desirable and will be prioritised, when trade-offs arise? Access theory (Ribot & Peluso, 2003) directs analytical attention to the role of power and a range of other mechanisms that affect how these questions are answered. By expanding the analysis of factors shaping rural land-use dynamics beyond a narrow focus on formal property rights (Peluso & Ribot, 2020), access theory adds to the toolbox for land-use and governance research in land-system science, by providing a lens for the analysis of place-specific land-access dynamics (Meyfroidt et al., 2018).

This paper combines access theory with quantitative household income accounting methods to contribute to land-system research on the conjunction of governance, ecosystem services and land-use change in Myanmar's frontier landscapes (Feurer et al., 2019; Ivars & Venot, 2020; Schneider et al., 2020). Our case study of land relations in four Chin villages in the country's north-west, provides empirical evidence of Myanmar's customary landowners' struggle to secure their land rights in the face of extensive land-policy reforms that appear to serve powerful elites' resource interests, rather than rural households' needs (Woods, 2019).

Current land relations in Myanmar have been shaped by prolonged military rule and violent conflicts between the country's army and several ethnic groups that remain unsettled (Bächtold et al., 2020; Woods, 2019). Lasting peace in the country's border states remains improbable until struggles over land concessions, resource extraction profits and land-access insecurities of internally displaced people have been resolved (Bächtold et al., 2020; Prescott et al., 2017; Woods, 2019). Central to contemporary land debates in Myanmar are therefore a range of land-related policy reforms, which were passed during the presidency of retired general Thein Sein (2011–2016) and have since been advanced under the political leadership of State Counsellor Aung San Suu Kyi (since 2016).

In past decades, such processes aimed at stimulating agricultural intensification and land-tenure formalisation have often resulted in ambiguous or outright questionable wellbeing gains for rural communities (Dressler et al., 2017; Rasmussen et al., 2018). Income gains, for example, often come at the cost of lost food sovereignty, cultural or natural capital (Dressler et al., 2017), or result in an unjust exclusion of marginalised actors from land (Kelly & Peluso, 2015). Myanmar's land systems need to develop along more just trajectories, if global land-rights and sustainability objectives are to be met (The United Nations, 2015). Prospects for such trajectories are ill-fated, however, as long as Myanmar's Forest Law remains 'hostile' towards swidden practices (Springate-Baginski, 2018, p. 25), criminalises agriculture in the country's permanent forest estate and impedes rural households' commercial use of forest products through bureaucratic controls (Republic of the Union of Myanmar, 2018a). Myanmar's recently amended Vacant, Fallow and Virgin Lands Management Law (VFVLM law), which requires individual land-users to obtain 30-year permits for their agricultural activities, likewise appears ill-suited to advance such change, as it remains vague about safeguards to protect ethnic land users' rights and prevents the registration of customary claims to collectively controlled or following swidden areas (Republic of the Union of Myanmar, 2018b).

Under the proposed VFVLM legislation, upland communities across the country face an imminent risk of land and income loss, because they depend on state authorities' good will to recognise hitherto customary access claims under statutory law, if powerful actors seek control over land by declaring it vacant (Republic of the Union of Myanmar, 2018b; The World Bank, 2019b). Yet, many upland farmers are unaware of these arising risks to their livelihood security (Soe & Par, 2019). Some community-based resistance exists (Khonumthung News, 2019), however, and land-rights activists, donors and academics, aligning to oppose land-related injustices in Myanmar, urge for the

recognition of customary tenure practices across the country's uplands (Myanmar CSOs, 2018; Springate-Baginski, 2018).

Academic and donor-led research on policy changes and land conflicts in Myanmar flourishes in this context (Faxon, 2017; Food and Agriculture Organisation of the United Nations & Mekong Region Land Governance, 2019; Mark, 2016; Mark & Belton, 2020; Thein, n.d.; Woods, 2019). Rural communities' customary tenure systems and how they conflict with statutory law have thus been relatively well documented (Andersen, 2016b; Aung & Pretzsch, 2017; Boutry et al., 2018; University of Forestry and Environmental Science Yezin, 2018; Von der Mühlen, 2018). Surprisingly scant, however, are studies that link knowledge about communities' customary tenure and land-use practices to tangible income flows for rural households, assess which mechanisms enable land-users to realise benefits from specific land types, and analyse how benefit flows may be altered, as governance and land-use practices in Myanmar's uplands change. These are the knowledge gaps, which we address in this study, by asking:

1. Which economic benefits do northern Chin households derive from land under different tenure and land-use regimes?
2. Which mechanisms (e.g., rules, technology, social relations) mediate households' access to these benefits?
3. How could shifts in the constellation of these access mechanisms alter the flow of benefits that households currently derive?

Materials and methods

Study site

Our study site includes four villages – Lailo, Tuilangh, Tualzang and Tungzang – in Tedim township in the northern Chin Hills of western Myanmar (Figure 1). Steeply sloped mountain ranges, spanning an altitudinal gradient from 500 to 1500 m across village territories, characterise this region. Cold, relatively dry winter months and a hot, humid monsoon season are typical for this area, which features a natural vegetation of subtropical mountain forests (Davis, 1960). Patchworks of fields and forest regrowth feature prominently on many hillsides, where swidden practices prevail.

Chin communities have historically been marginalised by Myanmar's national authorities and the incidence of poverty in this state remains the highest in nation-wide comparison (Central Statistical Organisation, United Nations Development Programme & World Bank Group, 2020). Land-based activities of the state's rural communities are primarily subsistence oriented. Many families depend almost solely on forest and farm products, or a mix of off-farm and land-derived income, respectively (Kmoch et al., 2018). However, investors now begin to seize commercial opportunities in the state's agricultural, energy, hospitality, mining, textile and construction sectors (Thia Ko Ko, 2019). There have also been substantial improvements to local roads during the projects' field campaigns from 2016 to 2019. Yet, landslides still seasonally restrict physical access to Tedim's township centre, regional markets and services.

Theoretical framework & methods

Theoretically, we draw on Ribot and Peluso (2003) access theory, which serves as a heuristic framework for our analysis of households' access to land and environmental resources. Access has been defined as 'the ability to derive benefits from things' (Ribot & Peluso, 2003, p. 153), and an analysis of access entails three steps: (i) mapping of benefit flows from a resource of interest; (ii) identification of access mechanisms that mediate different actors' ability to direct and harness these benefit flows; and (iii) an appraisal of causal power relations behind the observed interplay of access mechanisms in a given case (Ribot & Peluso, 2003).

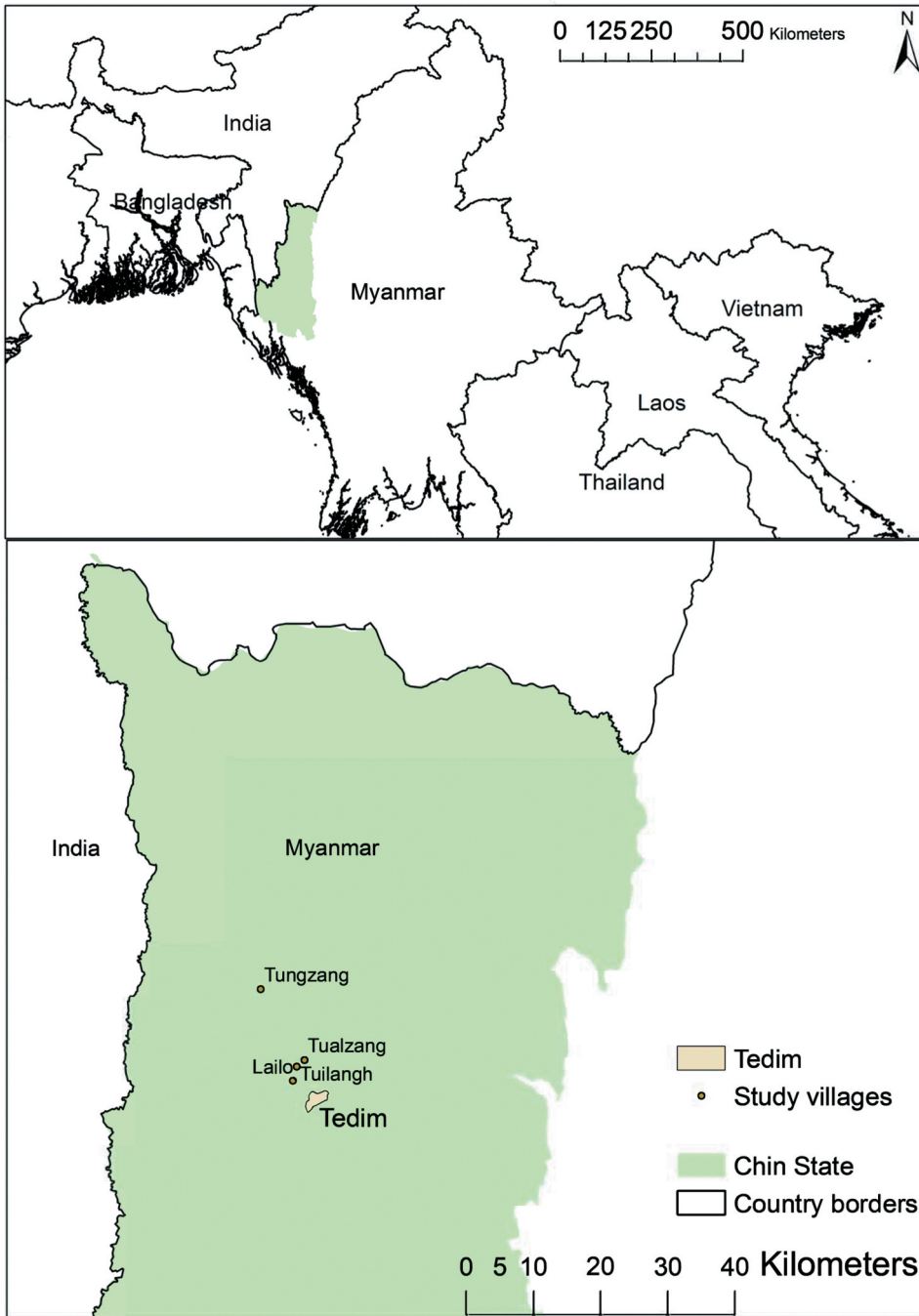


Figure 1. Map of the study area adapted from Kmoch et al. (2018). The figure shows the location of Chin State in Myanmar (green), and the location of the four study villages in northern Chin State.

We operationalised this framework through a mixed-methods approach, combining quantitative survey data from a stratified random sample of 94 households with qualitative data from seven focus group discussions (FGDs) and informal and four key informant interviews with village authorities. The field campaign was realised between December 2016 and February 2017, by

a team of two local field assistants and the first author, who received practical guidance from a local NGO.

Scoping activities with key informants and village residents served to develop an initial understanding of local livelihoods, customary tenure and land-use practices. Participants (6–10 per session) of mixed-gender FGDs were engaged through participatory tools (seasonal calendars, matrix and utility scoring charts) to identify the type, value and origin of farm and forests products that households commonly obtained. The main survey instrument was adapted from established household income accounting methods (Bakkegaard et al., 2016; Center for International Forestry Research, 2007) and implemented to capture disaggregated data about families' land-derived gross income and associated land-management, harvest and post-harvest costs, at plot and product level. We further inquired about local land-change processes and aspirations, as well as households' perceived ease of access to communal land resources and rights to different types of privately controlled land.

The questionnaire was pretested outside the sample frame, digitalised and partially translated into the local language, i.e. Tedim Chin, before its implementation with hand-held tablets. Interviews had an average length of two hours and were conducted with household heads, or the available household member with most knowledge about the household's economy. For a more detailed account of field methods and the household survey, see Kmoch et al. (2018).

Data analysis and interpretation

Land classification

Our survey captured household income streams from land under two distinct customary tenure states – communal or privately controlled (the latter including temporary private land) and eight land-use/cover categories – closed forests, open forests, non-forest scrublands, plantations, active swidden fields, homegardens, paddy fields and semi-permanent gardens (Table 1). This classification

Table 1. Customary tenure states of various types of village land.

	Study villages			
	Lailo	Tuilangh	Tualzang	Tungzang
Customary tenure status	Location			
	23°23'47.82" N, 93°38'06.2" E	23°24'56.6" N, 93°38'29.3" E	23°25'29.5" N, 93°39'07.4" E	23°31'11.3" N, 93°35'21.0" E
Communal	Public & religious built-up areas	Public & religious built-up areas	Public & religious built-up areas Village forest Community forest	Public & religious built-up areas Village forest Water-source protection forest Seasonal forest pasture Fallow swidden fields
Private	Residential areas with homegardens All cropland, forest and scrubland areas including fallow swidden fields	Residential areas with homegardens All cropland, forest and scrubland areas including fallow swidden fields Plantations	Residential areas with homegardens All cropland areas and fallow swidden fields Some forest and scrubland areas Plantations	Residential areas with homegardens Some cropland, forest and scrubland areas Plantations
Temporarily private	n/a	n/a	n/a	Current swidden fields

was adapted from land cover/use categories proposed by environmental income survey experts of the Food and Agriculture Organization of the United Nations (Bakkegaard et al., 2016) and the Poverty Environment Network (Center for International Forestry Research, 2007). Categorisation of Chin village land into these categories was informed by discussions with key informants, participatory mapping during an FGD (using aerial photographs), and field observations and discussions within the research team.

Mapping of economic benefits

Households' net income (cash and subsistence) from different types of land was calculated as the sum of gross income from individual crop, farm-tree, forest and scrubland products, minus incurred costs for purchased planting material, agroindustrial inputs, transport of goods and hired (but not family) labour. Season specific questions and detailed prompt (e.g., for 50+ annual crops) were used to aid respondents' recall for the 12-months income period that the survey captured.

The approach to attribute income flows to different land-types differed for income from customary communal, and privately controlled land. For the latter, respondents were asked to list all plots that their household controlled during the past year. Follow-up questions elicited information about the current land-use designation and income flows from each specified plot. For all other land-derived income, i.e. from communal areas and land of other villages, respondents were first asked to recall the value of specific products. Subsequent questions probed for the relative shares of these products that were obtained from land in different use and tenure states.

Appraisal of access mechanisms

Our appraisal of customary tenure practices and households' land-related property rights built on the notion of 'diverse bundles of rights' that land-users may have to resources (Schlager & Ostrom, 1992, p. 249), and its development by Sikor et al. (2017), who distinguish property rights of three orders (use, control and authoritative rights).

Presented findings on customary tenure regimes and local land-change processes stem from key informant interviews with village authorities, focus group discussions and informal interviews with survey respondents. Data on customary and statutory tenure states of households' privately controlled land was captured through survey questions. Calculation of aggregate income shares from privately controlled land with different statutory tenure states, was based on individual households' plot specific income accounts – similar to the approach for income attribution to different land-use and cover types outlined above. The appraisal of households' perceived ease of access to benefits from different types of communal land was likewise based on the above outlined income attribution methods, supplemented with survey-response data capturing respondents' perception of their households' perceived ease of access to communal land.

The value and spatial extent of households' privately controlled land was captured through plot-specific survey questions. The latter values were equivalence scale adjusted (Cavendish, 2002) to account for difference in household size and demographic composition. The extent of households' land holdings could thus be meaningfully compared and Gini-coefficients of land-access inequalities between households could be reported on a per-capita basis. Insights about relational and structural access mechanisms (Ribot & Peluso, 2003) stem from scoping activities and survey questions about households' land-management activities and interactions with authorities and markets. All survey data were captured using tablets and subsequent data analysis performed in Excel and SPSS.

Results

Classification of village land

Shares of land under different tenure regimes varied across the studied communities, but communally controlled land existed in all villages (Table 1). In Lailo and Tuilangh, this was limited to

public and religious built-up areas, whereas residents of Tualzang and Tungzang also maintained communally managed forests. Common swidden land was only noted in Tungzang, where a lottery system was used to allocate temporarily private use rights to swidden plots among households, for up to five years.

Economic benefits flows

Overview of economic benefits from different types of land

Half of households' aggregate land-derived income stemmed from private swidden fields and homegardens (Figure 2). Net income shares from paddy fields and semi-permanent gardens were comparatively small and incomes from immature teak plantations were yet to be realised. Communally managed village forests and scrublands and other villages' land only accounted for a quarter of the sample's aggregate land-derived income. Still, communal land represented many households' main source of fuel and wild animal products. The sample's aggregate income from private and communal forests and scrublands was of comparable magnitude.

Economic benefits from different cropland categories

Swidden fields were the most important crop-income source throughout the year (Appendix A). Maize and peanuts were the primary summer crops, whereas beans were households' main source of swidden winter-crop income. Homegardens, the second largest source of crop income, were likewise used throughout the year with mustard (in summer) and white cabbage (in winter) contributing the most.

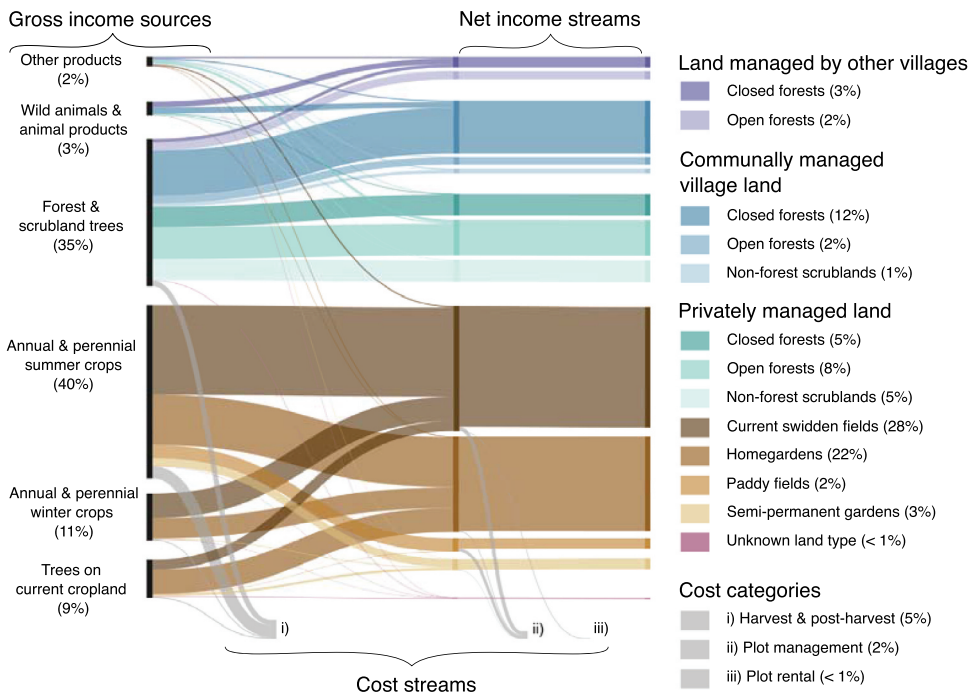


Figure 2. Breakdown of the sample's ($n = 94$ households) aggregate net income from different types of land. The figure shows households' various gross income sources from land-based livelihood activities (left chart side), cost streams associated with the realisation of economic benefits from these income sources (in grey), as well as aggregated net income streams that the sample realised from areas under different tenure and land-use regimes (right chart side). Percentage values in brackets are shares of the sample's aggregate gross land-income, broken down by income sources (left) and net income and cost shares associated with different types of land (right), respectively.

Homegardens were characterised by a substantial crop and farm-tree diversity. During one cropping cycle, the sampled households sourced at least 54 different summer and 45 different winter homegarden crops. Income from homegarden trees stemmed primarily from banana, bamboo and bitter bean trees, whereas mango, citrus, papaya, peach and lime trees contributed more modestly. Across all cropland categories, households' obtained income from an average of 10 (SD = 5.2; SE = 0.550) summer, 3 (SD = 3.5; SE = 0.392) winter and 4 (SD = 3.3; SE: 0.4) different farm-tree products.

Economic benefits from forests and scrublands

Across communal and privately managed forests and scrublands, fuelwood accounted for the largest tree-derived income share (Appendix B). Construction timber and livestock feed were other important forest products. Game meat, various leafy vegetables, mushrooms and 'cingpa' – a wild plant sought after by Chinese traders – also contributed to households' forest and scrubland income (Figure 2; Appendix C). Anecdotal evidence suggests that poor households sold wild forest orchids to traders and fuelwood in the nearby township centre. Yet, this did not appear in households' income budgets.

Relational access mechanisms & statutory rights to land

Community membership and ancestral land rights

Customary authoritative land-rights are in principle jointly held by all resident households in the studied villages. For communally managed land (e.g., village forests) these rights are, however, practically vested with village-heads and village-level committees. Substantial areas of crop, forests and scrublands are further de facto privately managed and controlled (Table 1), because communities recognise individual households' ancestral land claims.

Households have exclusive use and control rights to their ancestral plots, as long as they continue to reside in the village and use their land. Ancestral land can also be sold, leased or transferred to other village households. Private plots of out-migrating households usually fall back to the village commons. In-migrating households gain access to communal and private cropland, usually through sharecropping arrangements, local tenantry, or via allocation from village commons.

Access through village and township-level authorities

Households' relationship with authorities mediates their access to communal and private land. E.g., the private use period for communally owned swidden plots in Tungzang is usually limited to five years. Through access to village authorities, some households have, however, maintained longer-term access or gained private control over such plots to establish semi-permanent gardens with perennial (tree-)crops.

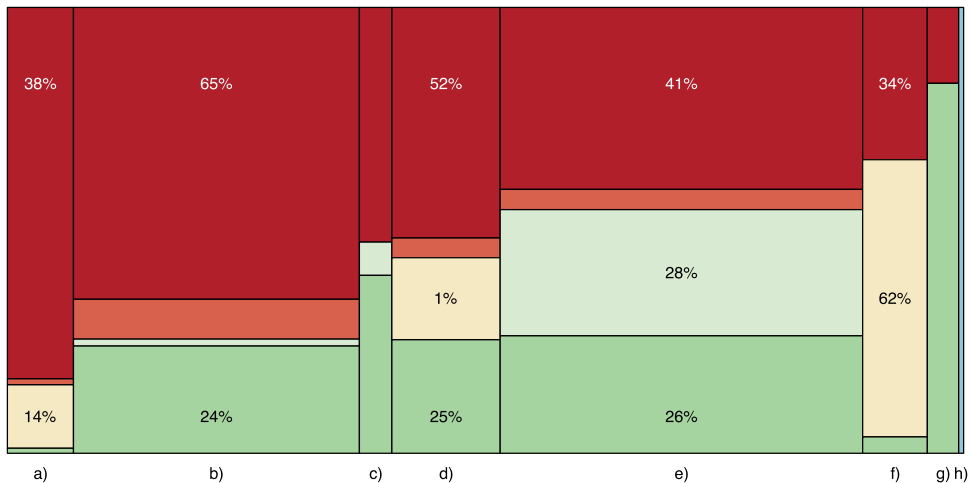
The administrative village heads are pivotal for households striving to gain statutory rights to their ancestral land. That is because village residents require their administrator's permission and confirmation of plot attributes (e.g., size, location), if they wish to formally register land claims with township-level authorities in Tedim. Some respondents find it difficult to gain access to authorities in the township centre and have therefore resigned to obtain written confirmation of their customary land claims from village heads only.

Legal access mechanisms

Households' limited interaction with relevant authorities, and the fact that some have never attempted to gain statutory land-rights meant that claims to just 38% of the sample's privately controlled land had been legally registered (Appendix D). The official status of 12% of the remaining land was unknown to its customary users or tenants; whereas 50% was held without any confirmed recognition through state authorities. Just one third of households held any titled land. As a result, more than half of the sample's income from private land stemmed from plots without statutory

Statutory tenure states

- Without statutory registration (51%)
- Tenure state unknown to customary owner (5%)
- Tenure state unknown to user – land was used without lease (7%)
- Tenure state unknown to user – land was leased (11%)
- With some form of statutory registration (25%)
- Unknown – type of private land not specified (1%)



Land categories

- a) Non-forest scrublands (7%)
- b) Homegardens (30%)
- c) Semi-permanent gardens (3%)
- d) Open forests (11%)
- e) Current swidden fields (38%)
- f) Closed forests (7%)
- g) Paddy fields (3%)
- h) Not specified (1%)

Figure 3. Breakdown of the sample's aggregate net income from privately controlled land by statutory tenure states, across different land categories. The figure shows relative shares of income from private plots without statutory registration (dark red), with tenure state unknown to plots' customary owners (light red), tenure state unknown to plots' users without lease (beige), tenure state unknown to plots' users with lease (light green), private plots with some form of statutory registration (dark green), or from land with unknown statutory status (light blue), across different land categories. Percentage values on the chart are relative shares of income from specific land categories. Percentage values in brackets are relative shares of the sample's total income from privately controlled land.

registration, whereas just a quarter came from titled plots (Figure 3). If access to all land-derived income from plots without legal title was lost, a majority of households would thus lose all of their land-derived income (IQR: 71–100%), equivalent to 41% (IQR: 12–67%) of the entire income for the median household.

Shares of registered private land were further unequally distributed across land categories. Households held titles to almost all teak plantations and paddy fields, whereas semi-permanent garden, homegarden, forest and scrublands were frequently held without title.

Customary rights-based access mechanisms

Rights to communally managed land

By right of residence, households could extract products from common land resources to meet subsistence needs, but not for commercialisation. Ease of access to these resources was commonly perceived as difficult (Figure 4), both where households rightfully used land of their own community and where income was made from other communities' land (likely illegally).

Rights to privately managed land & customary tenancy arrangements

Households' rights to private land translated into median access to one plot (IQR: 0.7–1.7) or 0.5 ha of land per capita (adult equivalent unit, AEU). Most private land was used for swidden

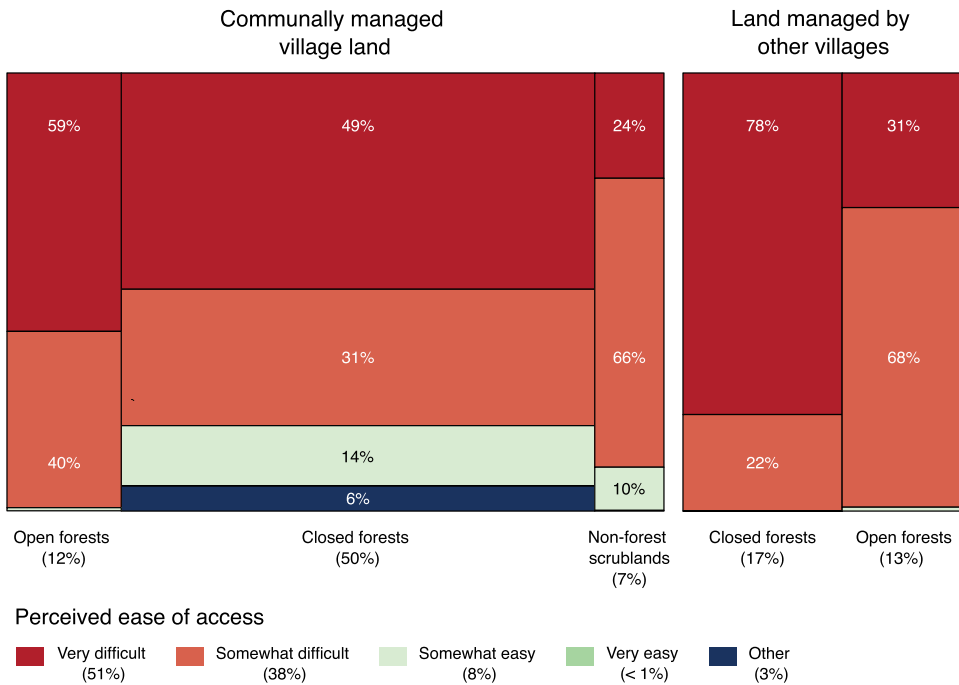


Figure 4. Perceived ease of access to communally managed village land, and land managed by other villages. The figure shows the sample’s perceived ease of access to relative income shares from different types of communally managed village land and land managed by other villages. Percentage values on the chart are relative shares of the sample’s aggregate income from respective land categories. Percentage values in brackets are relative shares of the sample’s total income from communally managed village land and land managed by other villages. Not shown is income from non-forest scrubland areas managed by other villages, as this land category accounted for < 1% of all income from communally managed or other villages’ land.

Table 2. Area share and characteristics of the sample’s privately controlled land.

Land-cover category	Type of land as share of total privately controlled land area (%)†	Share of households with private access to land type (%)	Size of this type of plot (ha)‡		Value of this type of plot (2016 Int’l\$ x 10 ³ /ha)§	
			Mdn¶	IQR#	Mdn	IQR
Closed forests	8	19	0.6	0.4–1.2	1.9	0.7–3.8
Open forests	21	37	0.6	0.4–0.8	1.6	0.5–3.1
Non-forest scrublands	34	49	0.4	0.4–0.8	0.9	0.5–2.2
Plantations	2	4	0.6	0.5–1.3	12.5	10.6–34.4
Current swidden fields	21	72	0.4	0.2–0.8	2.1	0.9–4.7
Homegardens	8	93	0.2	0.2–0.2	9.4	2.3–30.5
Paddy fields	4	16	0.4	0.2–0.6	8	2.7–28.1
Semi-permanent gardens	3	13	0.4	0.3–0.4	4.7	1.9–9.4

† Percentages do not sum to 100% due to rounding. ‡ 1 hectare (ha) = 2.5 acre. § 1 2016 international dollar = 263.3 MMK. ¶ Mdn stands for median. # IQR stands for interquartile range.

farming, left fallow or actively managed as a source of fuel and timber (Table 2). Area shares of more intensively used land (i.e. paddy fields, semi-permanent gardens, homegardens) and teak plantations were smaller, but such plots were more valuable on a per ha basis.

Although customary rules enabled private-land access for most households, this access was skewed (Appendix E). 20% of the sampled population (measured in AEU) held use rights to half of all customary

private land. Access to swidden fields and homegardens was most equally shared, but even the access-distribution for these land types was skewed, with Gini coefficients of 0.49 and 0.42, respectively.

Tenants – rather than customary owners – used 25%, 9% and 3% of current swidden, semi-permanent garden and homegarden land, respectively (Appendix D). Customary practices thus ensured increased access to private land for a third of all households, as well as private land access for 3% of households, who did not own any ancestral land. Continued legitimacy of local customs meant that tenants acquired time limited usufruct rights to 87% of leased plots, whereas only few were used in exchange for a cash payment or through sharecropping arrangements.

Structural access mechanisms

Households' access to extension services, agricultural technology and commercial crop markets is limited. Most private plots were neither irrigated nor terraced and agroindustrial inputs were rarely used. Households cannot invest in better means of transport to reach remote fields and markets or to establish tree plantations and livestock fences, because they lack financial capital for this purpose. Most households solely relied on family labour to generate land-derived benefits. Use of hired labour was rare and several households perceived labour shortages – as younger family members engaged in off-farm employment, locally or abroad.

Discussion

Our empirical work combined access theory with income accounting methods to assess northern Chin households' access to land. Here, we discuss our findings in light of (i) prior research on customary land-access in Chin State, and (ii) concerns about aggravating land-access insecurities in upland Myanmar – to highlight which risks arise for rural households, in the country's dynamic land-policy context.

Contemporary access patterns, inequalities & barriers to intensification

Swidden fields and homegardens matter most for households' income

Our results support earlier qualitative analyses, identifying swidden farming as the continued 'basis of the Chin agricultural system' (Boutry et al., 2018, p. XXIX). Among all land uses, swidden fields and homegardens contributed most to households' land-derived income, and active swidden fields were the most expansive private cropland category. Households near Tedim cultivate a median 0.4 hectare of swidden land, which is at the lower end of the 0.4–0.8 ha range observed near Hakha (Boutry et al., 2018).

Homegardens occupied just 8% of private land, but contributed substantially to communities' land-derived income, harboured diverse species and were the land-type that most households privately controlled. These findings differ from results of homegarden research in southern Chin State (Pritchard et al., 2018), which found that less than 30% of households maintain homegardens, and that households grow less than three crops per homegarden on average (Pritchard et al., 2018). Our results suggest 3–4 times this diversity – households with homegardens in our study got various farm-tree products, seven summer and three winter crops from this type of land, on average.

This discrepancy could indicate true differences in land-use practices across Chin State or may arise from differing research approaches. Agroecological conditions in northern Chin State are challenging and respondents perceived the steep terrain, livestock pressure and limited irrigation infrastructure as hindrances to vegetable production, though primarily with a view to swidden fields and semi-permanent gardens – not homegardens – as experienced by southern Chin households (Pritchard et al., 2018). Access to food markets remains limited and homegardens are a secure source of nutritious food, so that pursuit of this land-use may indeed be more important near Tedim, than in southern Chin State, where residents increasingly purchase food (Pritchard et al., 2018). The great

diversity of homegarden products captured in our study can, however, also be explained by inclusion of detailed prompts for annual crops and farm-tree products in our survey, exemplifying the importance of such design features in household budget assessments (Bakkegaard et al., 2016; Center for International Forestry Research, 2007).

Access to permanent farmland remains a privilege

Permanent cultivation for subsistence and commodity crop production, e.g., of rice and horticultural crops on irrigated terraces, has been promoted as an alternative to swidden farming and expands in Chin State's urbanising areas (Boutry et al., 2018). Our results show, however, that access to permanent farmland remains a privilege, rather than the norm. This supports Boutry et al.'s (2018, p. 65) interpretation of permanent farmland as a 'marker' of social differentiation. The observed land-access inequalities can be partially explained with our findings on relational access mechanisms, i.e. households' need for social capital to secure land for permanent farming. Technical constraints, labour shortages and lack of investment capital further hamper land-use intensification. Respondents' accounts of widespread terrace destruction during extreme weather events and terrace abandonment, where irrigation is currently infeasible, indicate that intensified crop production is unlikely to expand in this region unless structural change occurs, e.g., driven by remittances, market integration or rural development initiatives.

Limited teak adoption exemplifies intensification barriers

Our findings on teak plantations exemplify how the interplay of social, economic and biophysical factors locally manifests in barriers for transitions to high-value crop production. Only a small minority of sampled households had recently established teak stands, as this land-use change – despite state authorities' facilitation – was only feasible for wealthier households able to muster high upfront investments.

Further, respondents expressed doubt about the viability of teak stands, unless options to expand local irrigation capacities could be identified. Still, teak stands had the greatest per ha value captured in our study, despite the fact that plantation owners did not yet realise any associated profits. This likely indicates expectations that teak management may become a profitable land-use option for Chin households. A view shared by forestry professionals, who regard community managed commercial timber enterprises as a promising land-use option in the Chin context (Ministry of Agriculture Livestock Forestry and Mine, 2016; The World Bank, 2019a).

Risks from land reform in Myanmar's dynamic land-policy context

Chin households face imminent risks from provisions in Myanmar's national law

Consistent with research near Tedim, Hakha and Mindat (Andersen, 2016a, 2016b; Aung & Pretzsch, 2017; Boutry et al., 2018; Pau, 2016), we found that households' customary land-rights were grounded in intricate, village-specific rules. This confirms that previously observed patterns of customary land governance also apply in far-northern Chin State.

Households' access claims to private land rely predominantly on customary rules, whereas official land records do not accurately reflect respondents' de-facto land-use patterns. This could be because households deem their land to be sufficiently protected by customary rules, but more likely they are unaware of legal requirements to obtain land certificates, find it difficult or reject to engage with state authorities, or cannot meet formal requirements to register their ancestral land (Soe & Par, 2019). Myanmar's authorities classify almost half of Tedim township's land area as unclassified forest (47%), with reserved and public protected forest (28%) and vacant land (19%) being other major land categories. Most land in our study villages therefor likely falls within the unclassified forest category. Such ungazetted forests 'have ambiguous tenure' and '[t]hose under customary community management lack any ways for statutory recognition' (The World Bank, 2019b, p. 27).

At least half of the sample's income would stem from illegal land-use activities, if the ambiguous VFVLM law (Republic of the Union of Myanmar, 2018b) was to be enforced to communities' disadvantage. This also holds for income made from commercial forest products, including wild animals and teak trees – as the forest law stipulates that '[f]orest produce [unless for personal use] may only be extracted after obtaining a permit'; and that any 'standing teak tree wherever situated in the State is owned by the State', unless its private ownership has been 'registered at the relevant Forest Department' (Republic of the Union of Myanmar, 2018a, pp. 5, 9).

This juxtaposition of our empirical work with Myanmar's national law shows what is at stake for Chin households, due to the discord of statutory law and customary land-use practices. Our findings accentuate that legislative and practical interventions are urgently needed to secure rural people's access to land and resolve land-tenure conflicts in upland Myanmar. Official land records should further reflect local land-use realities, to provide a sound basis for authorities' operational planning.

Stakeholders need to mind existing access inequalities & formalisation pitfalls

Proposals for a codification of customary tenure in Myanmar (Springate-Baginski, 2019) and the specific Chin context already exists (Andersen, 2016a; Boutry et al., 2018). They emphasize a need for careful navigation of formalisation pitfalls that arise from communities' complex tenure rules and call for laws that accommodate the rotational, multi-functional and often collective character of households' swidden practices (Boutry et al., 2018).

Legislators can build on these suggestions, to address the mismatch of customary and statutory tenure rules, which Tedim's township authorities recognise as a development obstacle (Technical Team of TRDSP Tedim, 2017). Any tenure formalisation process in Chin State will, nonetheless, require diverse forms of stakeholder deliberation. Not only to document individual and communal land claims, but also to mitigate conflicts that could arise, if formalisation undermines the legitimacy of customary institutions, codifies existing intra-community land-access inequalities, or due to inherent trade-offs that households experience through their engagement in land development schemes.

Acceptance of customary land claims among southern Chin households has declined (Pyi Soe Aung & Pretzsch, 2017) and anecdotal evidence from our own work suggests that the driving forces of this process are similar across our study villages. Respondents' spoke about emerging land markets for semi-permanent gardens and residential plots near Tedim road, and some aspired to abandon swidden farming in favour of horticultural land-uses. Customary practices that prevent land deals with outsiders and enable low-cost, intra-community tenancy arrangements that currently mitigate land-access inequalities between households, could thus gradually lose their regulatory function and legitimacy (i.e. power to counteract exclusion processes) (Hall et al., 2011).

Similar to Boutry et al. (2018), we found that some households' establishment of perennial (tree-) crops not only came down to decisions about land change on private plots, but also appropriation of formerly communal swidden land through individuals. Households' with insufficient funds to establish perennials or lacking social capital to benefit from relational land-access mechanisms may well lose access to land for staple production, if such processes of 'intimate exclusion' continue (Hall et al., 2011, p. 145).

Externally driven land-development schemes – e.g., the teak establishment or initiation of community forestry that we observed – could benefit participants, if they open avenues for income generation and enable land-poor households to gain statutory land rights. The flipside, however, is that to benefit from such schemes, households currently enter into 30-year lease agreements with state authorities for land hitherto controlled through customary rules (Myanmar CSOs, 2018). This is what Sikor and Lund (2009, p. 3) refer to when they argue that 'institutional authority and property rights are recursively constituted'. That is, households secure access to land and resources via a process through which they de facto acknowledge the state's authority to govern property and land-use decisions that were previously in the realm of customary authorities. Our case also mirrors the pattern of 'compensated exclusion' that Sikor et al. (2017, p. 346) describe, where households

engaging in land-development schemes gain access to resource benefits, but 'remain excluded from exercise of control and authoritative rights' (Sikor et al., 2017, p. 346) to land that they previously controlled.

Households skewed access to private land – which fits with an established pattern of high and increasing Gini indices for smallholder landholdings in the Mekong region, but not with accounts of low access inequality in Chin State (Ingalls et al., 2018) – could also cause conflict, if it remains unaddressed. We thus see merit in Boutry et al.'s (2018, p. 131) proposals to secure access to '[r]esources of greater economic value (timber, firewood and stone for mining)' within a 'framework that both guarantees that benefits are shared equally among all members of the community, and protects an already damaged landscape'.

Such a formalisation may steer Chin livelihood and land-change trajectories away from archetypal land-appropriation processes – which resonate all too much with the above described constellation of risk factors – and thereby protect households against adverse outcomes of commonly observed asset enclosure dynamics (Oberlack et al., 2016). Myanmar's community forestry instructions provide one umbrella under which township-level initiatives could be initiated to this effect (Prescott et al., 2017; The World Bank, 2019a). This seems particularly relevant, as many households in our study relied on communal forests, but perceived difficulties in gaining access to such land. Research in Thaninthary region supports such an approach, as it suggests that community forests can ameliorate hardship, if land change processes cause loss of land-derived benefits (Schneider et al., 2020). Yet, Chomba et al. (2015, p. 45) caution about 'wealth siphoning' from community forests through institutional elite capture. This risk could be reduced, if communal resource management in Chin State is formalised with due attention to pre-existing land-access disparities and community members can hold leaders of newly established governance institutions accountable (Chomba et al., 2015).

Conclusion

The aim of our empirical research was to advance knowledge about the interplay of governance shifts, land dependence, and land-use changes in Myanmar. We have demonstrated Chin communities' strong reliance on three types of land: swidden fields, homegardens and forests. Continued access to these resources, which are used to meet domestic food, fuel and timber needs, is vital for households' welfare. A resolution of land-law ambiguities and the recognition of households' customary land claims are thus central to protect Myanmar's upland communities against elite capture and resource appropriation processes.

Three insights to inform such work – and broader development programming – emerge from our study: First, a codification of customary tenure practices, alone, could amplify rather than resolve pre-existing land-access inequalities in the studied villages. Development stakeholders should consequently account for existing inequalities, e.g., through activities that enhance benefit flows from village commons or target households with limited private land access. Extension workers should recognise households' continued dependence on swidden farming and that homegardens are more than a niche practice, at least, if these actors intent to reach the greatest applicable number of land-dependant households.

Second, tenure formalisation could work in favour of marginalised households, if this secures equitable access to village commons for all residents, e.g., through community forestry schemes. Wealthier households could benefit, if land-use certificates enable land-investments with own or external resources. Conflict may arise, if formalisation exacerbates inequalities or households lack awareness about the legal implications of their engagement in land-development schemes. Practitioners, encouraging communities to officially register customary land claims, or facilitating land-changes that render previously common land subject to national law, should therefore ensure that their actions comply with the principle of free, prior and informed consent.

Finally, we see need for stakeholder deliberations and research beyond land-rights concerns, and for initiatives that bring access considerations and futures thinking together. The former to overcome structural barriers to locally desired land-change; the latter to envision desirable development trajectories, as livelihood needs, and options in upland Myanmar and across the world's marginalised rural areas continue to change.

Acknowledgments

We thank Ar Yone Oo Social Development Association for logistic support during the field campaign and introductions to the study communities. Our field assistants Ngaih Sian Hoih and Khup Lal Thang contributed significantly to the development and translation of the survey instrument, data collection and logistical realisation of the field campaign for this study. The study would not have been feasible without the trust and collaboration of our research participants from Lailo, Tuilangh, Tualzang and Tungzang villages. Thank you. Finally, we would like to thank the two anonymous reviewers, who provided thoughtful suggestions towards improving our manuscript. Funding was provided by Göteborgs Handelskompanis deposition.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

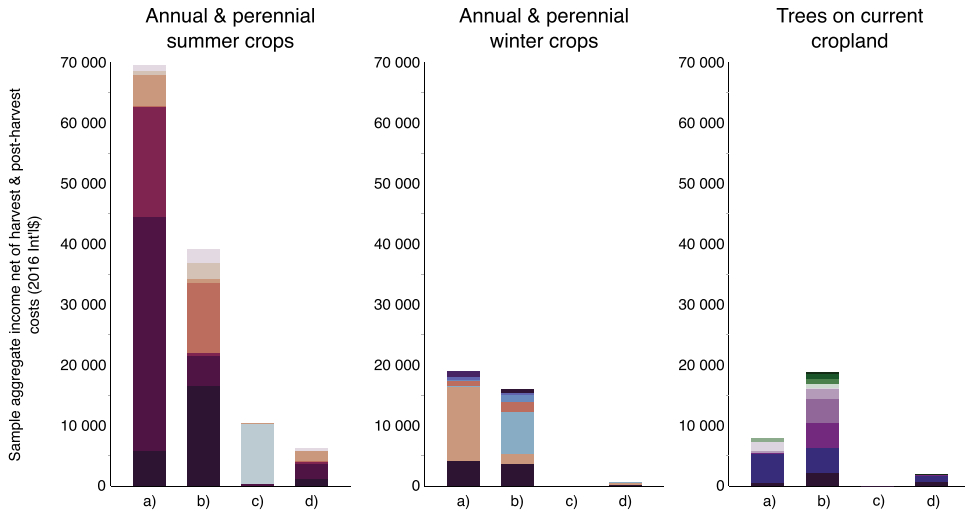
- Andersen, K.E. (2016a, March 14–18). Institutional Models for a Future Recognition and Registration of Customary (Communal) Tenure in Myanmar. In *2016 World Bank Conference on Land and Poverty*. The World Bank.
- Andersen, K.E. (2016b). *The Recognition of Customary Tenure in Myanmar*. Mekong Region Land Governance. <https://www.mrlg.org/publications/the-recognition-of-customary-tenure-in-myanmar/>
- Aung, P.S., & Pretzsch, J. (2017, September 20–22). Changes in local land tenure systems in response to Swidden transformation in Southern Chin State, Myanmar. In *Conference on International Research on Food Security*. Natural Resource Management and Rural Development.
- Bächtold, S., Bastide, J., & Lundsgaard-Hansen, L. (2020). Assembling Drones, activists and oil palms: Implications of a multi-stakeholder land platform for state formation in Myanmar. *The European Journal of Development Research*, 32(2), 359–378. <https://doi.org/10.1057/s41287-020-00267-y>
- Bakkegaard, R.K., Agrawal, A., Animon, I., Hogarth, N.J., Daniel, M., Persha, L., Rametsteiner, E., Wunder, S., & Zezza, A. (2016). National socio-economic survey in forestry. Guidance and survey modules for measuring the multiple roles of forests in household welfare and livelihoods. In Food and Agriculture Organisation of the United Nations Series Ed., *FAO Forestry Paper* (179 ed.). Food and Agriculture Organisation of the United Nations.
- Boutry, M., Allaverdian, C., Win, T.M., & Sone, K.P. (2018). *Persistence and Change in Hakha Chin Land. A Study on Land Dynamics in the Periphery of Hakha*. GRET Professionals for Fair Development. <https://www.gret.org/publication/persistence-and-change-in-hakha-chin-land-and-resource-tenure/?lang=en>
- Cavendish, W. (2002). Quantitative methods for estimating the economic value of resource use to rural households. In B. M. Campbell & M. Luckert (Eds.), *Uncovering the hidden harvest: Valuation methods for woodlands & forest resources* (pp. 17–65). Earthscan.
- Center for International Forestry Research. (2007). *PEN Technical Guidelines Version 4*. <https://www2.cifor.org/pen/the-pen-technical-guidelines/>
- Central Statistical Organisation, United Nations Development Programme, & World Bank Group. (2020). *Myanmar Living Conditions Survey 2017. Socio-Economic Report*.
- Chomba, S., Treue, T., & Sinclair, F. (2015). The political economy of forest entitlements: Can community based forest management reduce vulnerability at the forest margin? *Forest Policy and Economics*, 58, 37–46. <https://doi.org/10.1016/j.forpol.2014.11.011>
- Davis, J. (1960). *The Forests of Burma*. University of Mandalay & University of Florida.

- Dressler, W.H., Wilson, D., Clendenning, J., Cramb, R., Keenan, R., Mahanty, S., Bruun, T.B., Mertz, O., & Lasco, R.D. (2017). The impact of swidden decline on livelihoods and ecosystem services in Southeast Asia: A review of the evidence from 1990 to 2015. *Ambio*, 46(3), 291–310. <https://doi.org/10.1007/s13280-016-0836-z>
- Faxon, H.O. (2017). In the law & on the land: Finding the female farmer in Myanmar's National Land Use Policy. *The Journal of Peasant Studies*, 44(6), 1197–1214. <https://doi.org/10.1080/03066150.2017.1324424>
- Feurer, M., Heinimann, A., Schneider, F., Jurt, C., Myint, W., & Zaehring, J.G. (2019). Local perspectives on ecosystem service trade-offs in a forest frontier landscape in Myanmar. *Land*, 8(3), 45. <https://doi.org/10.3390/land8030045>
- Feyertag, J., Childress, M., Flynn, R., Langdown, I., Locke, A., & Nizalov, D. (2020). *Prindex comparative report. A global Assessment of perceived tenure security from 140 countries*. Overseas Development Institute & Global Land Alliance.
- Food and Agriculture Organisation of the United Nations. (2019). *The State of food security and nutrition in the world 2019. Safeguarding against economic slowdowns and downturns*.
- Food and Agriculture Organisation of the United Nations, & Mekong Region Land Governance. (2019). *Challenges and opportunities of recognizing and protecting customary tenure systems in Myanmar*.
- Hall, D., Hirsch, P., & Murray, T. (2011). *Powers of exclusion: Land Dilemmas in Southeast Asia*. NUS Press.
- Ingalls, M.L., Diepart, J.-C., Truong, N., Hayward, D., Neil, T., Phomphakdy, C., Bernhard, R., Fogarizzo, S., Epprecht, M., Nanthavong, V., Vo, D.H., Nguyen, D., Nguyen, P.A., Saphangthong, T., Inthavong, C., Hett, C., & Tagliarino, N. (2018). *State of Land in the Mekong Region*. Bern Open Publishing.
- Ivars, B., & Venot, J.-P. (2020). Claiming and re-claiming the Ayeyarwady Delta, time and again: The case of Nyaungdone Island, Myanmar. *Journal of Political Ecology*, 27(1), 517–538. <https://doi.org/10.2458/v27i1.23675>
- Kelly, A.B., & Peluso, N.L. (2015). Frontiers of commodification: State lands and their formalization. *Society & Natural Resources*, 28(5), 473–495. <https://doi.org/10.1080/08941920.2015.1014602>
- Khonumthung News. (2019, July 10). Chin Farmers Network: We May Lose Our Inherited Land. *Burma News International*. <https://www.bnionline.net/en/news/chin-farmers-network-we-may-lose-our-inherited-land>
- Kmoch, L., Palm, M., Persson, U., & Rudbeck Jepsen, M. (2018). Upland livelihoods between local land and global labour market dependencies: Evidence from Northern Chin State, Myanmar. *Sustainability*, 10(10), 3707. <https://doi.org/10.3390/su10103707>
- Mark, S. (2016). Are the odds of justice “stacked” against them? Challenges and opportunities for securing land claims by smallholder farmers in Myanmar. *Critical Asian Studies*, 48(3), 443–460. <https://doi.org/10.1080/14672715.2016.1196888>
- Mark, S., & Belton, B. (2020). Breaking with the past? The politics of land restitution and the limits to restitutive justice in Myanmar. *Land Use Policy*, 94, 104503. <https://doi.org/10.1016/j.landusepol.2020.104503>
- Meyfroidt, P., Roy Chowdhury, R., de Bremond, A., Ellis, E.C., Erb, K.H., Filatova, T., Garrett, R.D., Grove, J.M., Heinimann, A., Kuemmerle, T., Kull, C.A., Lambin, E.F., Landon, Y., le Polain de Waroux, Y., Messerli, P., Müller, D., Nielsen, J.Ø., Peterson, G.D., Rodriguez García, V., Schlüter, M., ... Verburg, P.H. (2018). Middle-range theories of land system change. *Global Environmental Change*, 53, 52–67. <https://doi.org/10.1016/j.gloenvcha.2018.08.006>
- Ministry of Agriculture Livestock Forestry and Mine. (2016). *Forestry Sector Development. Strategic Plan (2017-2018 to 2020-2021)*. Government of the Chin State of the Republic of the Union of Myanmar.
- Mousseau, F., Currier, A., Fraser, E., & Green, J. (2020). *Driving dispossession. The global push to “unlock the economic potential of land”*. The Oakland Institute.
- Myanmar CSOs. (2018). *Letter of concern regarding implementation of the Vacant, Fallow and Virgin Lands Management Law (2012) as Amended by The Law Amending the Vacant, Fallow and Virgin Lands Management Law (2018)*.
- Oberlack, C., Tejada, L., Messerli, P., Rist, S., & Giger, M. (2016). Sustainable livelihoods in the global land rush? Archetypes of livelihood vulnerability and sustainability potentials. *Global Environmental Change*, 41, 153–171. <https://doi.org/10.1016/j.gloenvcha.2016.10.001>
- Pau, J. (2016). Linking resources to livelihoods: A comparative study of two villages in the Chin State of Myanmar. *ASEAN-Canada Research Partnership Working Paper Series, Working Paper No. 4*.
- Peluso, N.L., & Ribot, J. (2020). Postscript: A theory of access revisited. *Society & Natural Resources*, 33(2), 300–306. <https://doi.org/10.1080/08941920.2019.1709929>
- Prescott, G.W., Sutherland, W.J., Aguirre, D., Baird, M., Bowman, V., Brunner, J., Connette, G.M., Cosier, M., Dapice, D., De Alban, J.D.T., Diment, A., Fogerite, J., Fox, J., Hlaing, W., Htun, S., Hurd, J., LaJeunesse Connette, K., Lasmana, F., Lim, C. L., Lynam, A., ... Webb, E.L. (2017). Political transition and emergent forest-conservation issues in Myanmar. *Conservation Biology: The Journal of the Society for Conservation Biology*, 31(6), 1257–1270. <https://doi.org/10.1111/cobi.13021>
- Pritchard, B., Vicol, M., Rammohan, A., & Welch, E. (2018). Studying home gardens as if people mattered: Why don't food-insecure households in rural Myanmar cultivate home gardens? *The Journal of Peasant Studies*, 46(5), 1–21. <https://doi.org/10.1080/03066150.2018.1431623>
- Rasmussen, L.V., Coolsaet, B., Martin, A., Mertz, O., Pascual, U., Corbera, E., Dawson, N., Fisher, J.A., Franks, P., & Ryan, C.M. (2018). Social-ecological outcomes of agricultural intensification. *Nature Sustainability*, 1(6), 275–282. <https://doi.org/10.1038/s41893-018-0070-8>
- Rasmussen, M.B., & Lund, C. (2018). Reconfiguring frontier spaces: The territorialization of resource control. *World Development*, 101, 388–399. <https://doi.org/10.1016/j.worlddev.2017.01.018>

- Republic of the Union of Myanmar. (2018a). *The forest law*.
- Republic of the Union of Myanmar. (2018b). *The Vacant, Fallow and Virgin Lands Management Law (2012) as amended by the law amending the vacant, fallow and Virgin Lands management law (2018)*.
- Ribot, J., & Peluso, N.L. (2003). A theory of access. *Rural Sociology*, 68(2), 153–181. <https://doi.org/10.1111/j.1549-0831.2003.tb00133.x>
- Schlager, E., & Ostrom, E. (1992). Property-rights regimes and natural resources. A conceptual analysis. *Land Economics*, 68(3), 249–262. <https://doi.org/10.2307/3146375>
- Schneider, F., Feurer, M., Lundsgaard-Hansen, L.M., Win, M., Cing Don, N., Nydegger, K., Oberlack, C., Nwe Nwe, T., Zähringer, J.G., Aung Myin, T., & Messerli, P. (2020). Sustainable development under competing claims on land: Three pathways between land-use changes, ecosystem services and human well-being. *The European Journal of Development Research*, 32(2), 316–337. <https://doi.org/10.1057/s41287-020-00268-x>
- Sikor, T., He, J., & Lestrelin, G. (2017). Property rights regimes and natural resources: A conceptual analysis revisited. *World Development*, 93, 337–349. <https://doi.org/10.1016/j.worlddev.2016.12.032>
- Sikor, T., & Lund, C. (2009). Access and property: A question of power and authority. *Development and Change*, 40(1), 1–22. <https://doi.org/org/10.1111/j.1467-7660.2009.01503.x>
- Soe, N.N., & Par, S.C. (2019). *Most farmers do not know about the vacant, fallow and virgin land management law as the grace period to register closes. New data from a survey of 290 farmers who depend on land classified as Vacant, Fallow and Virgin Land*. N. I. I. L. Empowerment. <https://namati.org/resources/most-farmers-do-not-know-about-the-vacant-fallow-and-virgin-land-management-law-as-the-grace-period-to-register-closes/>
- Springate-Baginski, O. (2018). *Decriminalise Agro-Forestry!* Transnational Institute. <https://www.tni.org/en/publication/decriminalise-agro-forestry>
- Springate-Baginski, O. (2019). *There is no Vacant Land'. A primer on defending Myanmar's customary tenure systems*. Transnational Institute. https://www.tni.org/files/publication-downloads/tni_p_customary_land_online_060319_0.pdf
- Technical Team of TRDSP Tedim. (2017). *Township Rural Development Strategies and Programmes, Tedim Township*. Department of Rural Development, Ministry of Agriculture, Livestock and Irrigation, Naypyitaw.
- Thein, M. (n.d.). *Guidance Note on Land Issues Myanmar*. United Nations Human Settlements Programme & United Nations High Commissioner for Refugees.
- Thia Ko Ko. (2019, August 20). *Efforts to draw Chin investments yield positive results*. *Myanmar Times (English edition)*. <https://www.mmtimes.com/news/efforts-draw-chin-investments-yield-positive-results.html>
- The United Nations. (2015). *Transforming our World: The 2030 Agenda for Sustainable Development*. <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
- University of Forestry and Environmental Science Yezin. (2018). *A comparative study on land use and land tenure change in Myanmar: Three regions where land tenure is of critical concern*. Land Core Group.
- Von der Mühlen, M. (2018). *The fate of customary tenure systems of ethnic minority groups in upland Myanmar. An analysis of the legal framework of land governance*. Eidgenössische Technische Hochschule Zürich. https://www.ethz.ch/content/dam/ethz/special-interest/gess/nadel-dam/documents/mas/mas-essays/MAS%20Cycle%202006%20-%202018/vdM_NADEL_Final_Paper_Final_Version.pdf
- Woods, K. (2019). *Natural resource governance reform and the peace process in Myanmar*. Forest Trends. https://www.forest-trends.org/wp-content/uploads/2019/10/Forest-Trends_NRG_Peace_Myanmar_Final.pdf
- The World Bank. (2019a). *Myanmar country analysis sustainability, peace, and prosperity: Forests, fisheries, and environmental management. Assessing the opportunities for scaling up community forestry and community forestry enterprises in Myanmar*.
- The World Bank. (2019b). *Myanmar country analysis. Sustainability, Peace, and Prosperity: Forests, Fisheries, and Environmental Management*. Forest Resources Sector Report.

Appendices

Appendix A.



Land categories

a) Current swidden fields b) Homegardens c) Paddy fields d) Semi-permanent gardens

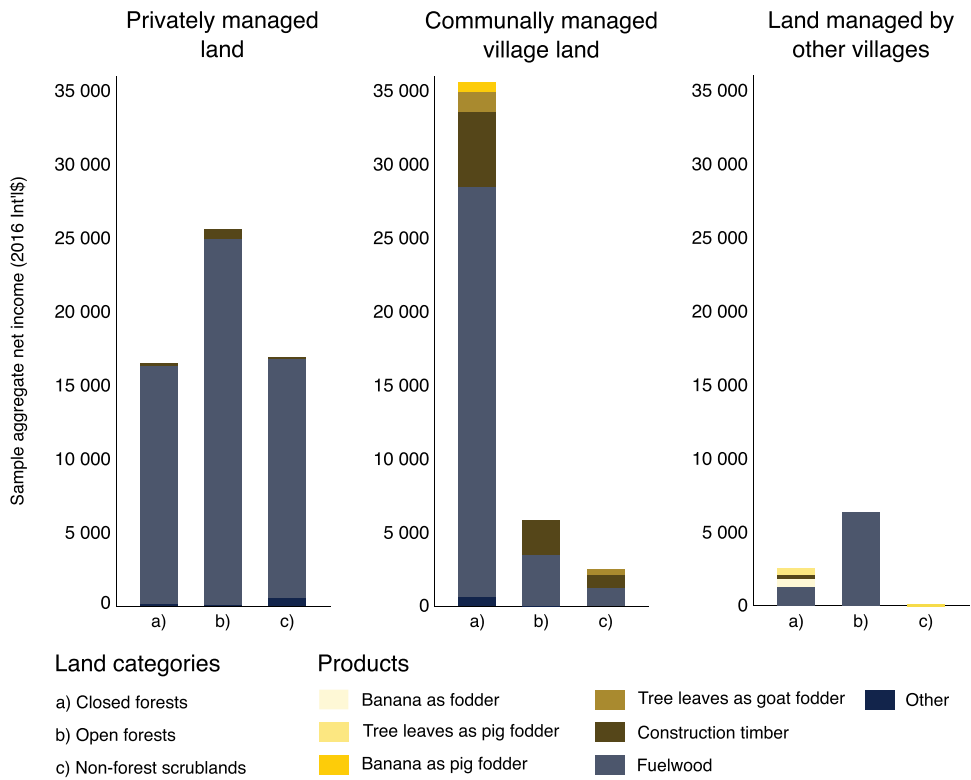
Crops

- Big beans (bepi)
- Garden pea
- Taro
- Long beans
- White cabbage
- Paddy
- Pumpkin
- Chilli
- Black beans (beli & belawi)
- Leave mustard
- Peanuts
- Maize
- Other

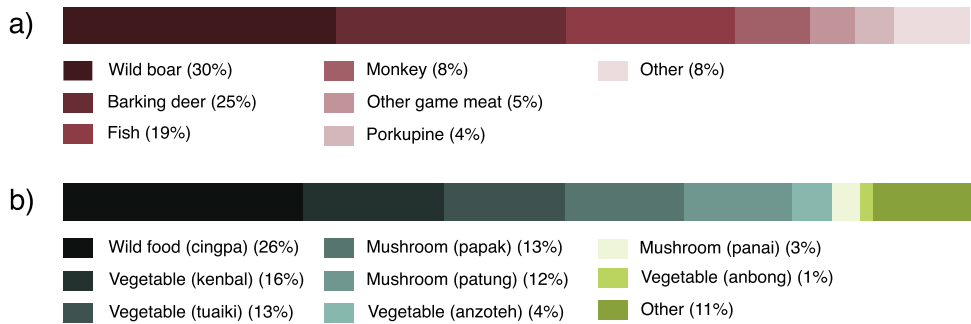
Tree products

- Lime
- Peach
- Papaya
- Timber tree (tak vong cilan)
- Type of citrus (sahawk)
- Firewood
- Mango
- Bitter bean
- Bamboo
- Banana
- Other

Appendix B.



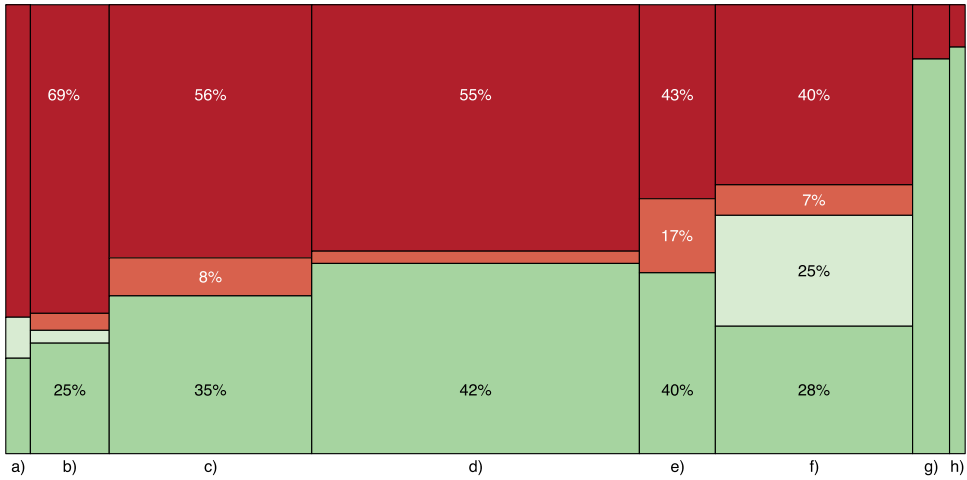
Appendix C.



Appendix D.

Statutory tenure states

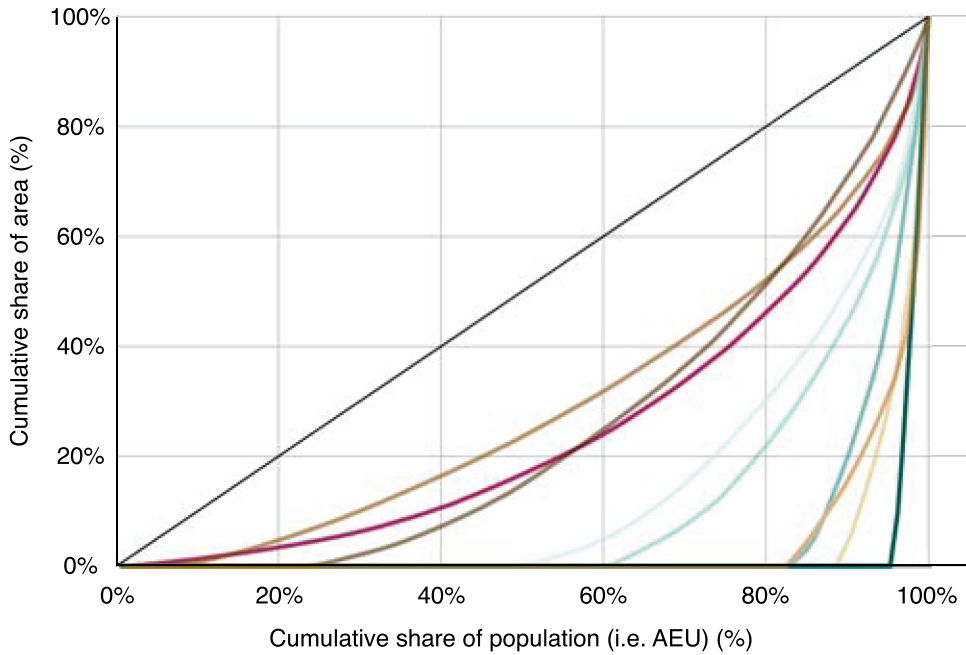
- Without statutory registration (50%)
- Tenure state unknown to user – land was leased (6%)
- Tenure state unknown to customary owner (6%)
- With some form of statutory registration (38%)












Land categories

- a) Semi-permanent gardens (3%)
- b) Homegardens (8%)
- c) Open forests (21%)
- d) Non-forest scrublands (34%)
- e) Closed forests (8%)
- f) Current swidden fields (21%)
- g) Paddy fields (4%)
- h) Plantations (2%)

Appendix E.



Land categories

 All plots (0.50)	 Current swidden fields (0.49)
 Plantations (0.96)	 Homegardens (0.42)
 Closed forests (0.89)	 Paddy fields (0.92)
 Open forests (0.77)	 Semi-permanent gardens (0.93)
 Non-forest scrublands (0.72)	