

POLICY BRIEF

Quantifying the extent of shifting cultivation

An urgent need to revisit and revise landuse and land cover classifications

KEY ISSUE

Present landuse classifications fail to capture the diverse stages of shifting cultivation, particularly the dynamic stages in its fallow phase. This results in such landuse being incorrectly delegated to wasteland and forest classes as well as landcover categories that are not obviously linked to shifting cultivation. Such classifications and landcover categorizations based on incorrect choices of class definitions make certain types of landuse invisible while magnifying others, leading to inaccurate and incorrect landuse estimates. Such inaccuracies in methodological approaches plague landuse and landcover estimations in the context of shifting cultivation and hamper arriving at accurate, updated estimates of its extent, which carry, in turn, serious ramifications for climate change mitigation and poverty alleviation efforts. Furthermore, they seriously undermine efforts to achieve SDGs and Agenda 2030 objectives. Therefore, landuse and landcover classification need to be urgently revised and the process should be set in motion immediately.

This is the last in the series of briefs highlighting policy approaches required to address second-generation issues arising from the transition from shifting cultivationⁱ to settled agriculture^{ii, iii}. It highlights the paucity of accurate, updated data and information on the extent of shifting cultivation and discusses the reasons for it. The brief advocates revisiting and revising landuse and landcover classifications urgently to improve quantification approaches and argues that this is central to effectively manage change in shifting cultivation ensuring, thereby, inclusive rural transformation. This is imperative for the successful management of shifting cultivation and for bringing shifting cultivators within the fold of inclusive development. It would strengthen, in turn, global efforts to achieve the Sustainable Development Goals (SDGs), particularly SDGs 1 and 2, and contribute to fulfilling the fundamental objective of Agenda 2030 of 'leaving no one behind'.

Introduction

Shifting cultivation is commonly perceived as a primitive agricultural practice that is economically unviable and a cause of deforestation and environmental degradation. Policy actions to replace shifting cultivation have been formulated based on this perception. However, despite concerted efforts and substantial financial outlays – and consistent claims by governments to have 'controlled' shifting cultivation – the practice is widespread across much of the tropics, particularly in the uplands of South and Southeast Asia^{iv}. Ironically, accurate figures on the extent of shifting cultivation – the area

ⁱShifting cultivation discussed here refers to the practice where farmers return to a previously cultivated plot after the fallow period, which may, with a sufficiently long fallow period, have regenerated into secondary forest. It does not refer to pioneering shifting cultivation that requires the clearing of primary forests for cultivation.

under shifting cultivation and the total number of households continuing with the practice – are hard to come by and no official statistics can provide exact, updated figures on the practice. Even when figures are put forward by different government agencies, discrepancies and contradictions abound, raising serious concerns regarding the accuracy and veracity of the figures provided. The lack of information on the total area under shifting cultivation and the number of households presently practicing shifting cultivation constitutes a major information gap. This compromises serious appraisals of the magnitude of the issue^v and hampers effective action. International agencies, dependent on statistics generated by national agencies, are also unable to provide exact estimates on the extent of shifting cultivation, making it difficult to assess the magnitude of the practice globally and the implications it may have, if left unaddressed, for meeting the Agenda 2030 objectives. There is a danger, too, that, as a result, governments and development agencies could be underestimating its scale and failing to accord the necessary priority and attention it deserves. This would hinder the formulation and development of meaningful programmes to address the issue while avoiding the pitfalls of second-generation issues. Such a situation calls for immediate examination of the reasons underlying the challenges posed in generating authentic data and reliable estimates in the context of shifting cultivation, and initiating corrective action as required.

Why is updated, accurate data on shifting cultivation difficult to generate? Does the answer lie in the uniqueness of shifting cultivation?

The landuse classification of a particular plot of land is based on the landcover it has at the time a land survey is conducted. If a plot of land is under cultivation, it would be classified as agricultural land; if it is uncultivated but the landcover shows scrub vegetation, it would be classified as scrubland; if it is dominated by trees, it would be classified as forests. Often, if a plot of land shows no cultivation, has negligible vegetation, or is under scrub, it could also be perceived as wasteland. In the absence of physical verification and ground truthing, landuse quantification using remote-sensing methodologies is dependent on the interpretation of landcover by the technical staff conducting the quantification. Hence, if these personnel are not familiar with the local nuances relating to landuse and landcover, errors, inaccuracies and discrepancies can creep in. Such errors have been rife in the quantification of landuse and landcover in shifting cultivation landscapes^{vi, vii, viii}. These inaccuracies in land classification and quantification arise from the lack of familiarity or ignorance of a majority of those involved

in it about the nuances of the practice of shifting cultivation and the resultant complexities in landcover during its different phases. Shifting cultivation is an inherently complex and dynamic landuse but researchers 'have difficulty in seeing and defining, much less in measuring and quantifying,^{ix} it. Their incorrect choices of class definitions can make certain types of landuse invisible while magnifying others.

Why is shifting cultivation a diverse, dynamic, and complex landuse? Shifting cultivation involves the clearing of vegetation, usually from a regenerating patch of fallow land, for the cultivation of crops. The fields are not monocultures and enable mixed cropping and sequential harvesting. Farmers cultivate a multitude of crops for one or two years before moving on to the next patch leaving the previous fields fallow to rejuvenate and regenerate into mature secondary forests given a sufficiently long fallow period. The fallow period is dependent on the size of the village (i.e., the number of households) and the extent of land at its disposal. Although the fallow period has been known to stretch to over 25 years in the past, it has reduced drastically to between 7 to 10 years in recent times in most areas due to gradual transition to settled agriculture and the increased land use pressure. Fueled by policies to replace shifting cultivation as well as market interest, settled agricultural options, particularly plantations, have expanded rapidly encroaching on fallows resulting in a distortion of the practice leading to shortened cycles, an increase in competing landuse pressure, and a resultant depletion in forest cover.

Shifting cultivation involves two distinct landuses – agriculture and forestry – that alternate sequentially in time on the same plot of land. The uniqueness of shifting cultivation lies in the fact that it is not just an agricultural practice but also involves forest management as an integral part of the practice. Shifting cultivation, therefore, is a sequential agriculture and forest management practice, practised rotationally on the same piece of land at the landscape level. A shifting cultivation landscape is thus a mosaic of agricultural fields interspersed with regenerating fallows of different age all of which mature into secondary forests given a sufficiently long fallow period. Unlike settled agriculture, which results in a permanent change in landuse and landcover, shifting cultivation allows the reappearance of forests on the same plot. As agricultural transitions take place, the complexity of landscapes where shifting agriculture is practised is further accentuated as settled agriculture options – plantations of perennial crops such as rubber, cashew, oil palm and timber – emerge side by side with cultivated fields, rejuvenating fallows, and fallow forests.



This dual characteristic of shifting cultivation – two distinct landuse types alternating temporally on the same piece of land – has been consistently overlooked during landuse surveys and landcover estimations and, therefore, never been considered when formulating landuse and landcover quantification methodologies. The end result has been the failure to capture this distinct landuse practice in its complexity^{x, xi}. Instead, shifting cultivation is perceived either as an agricultural practice and brought under the purview of agriculture or, as forests and, therefore, a subject coming under forest regulation and management. As a result, the same land might be classified as agricultural land or forests depending on what stage of transition the plot of land happens to be in at the time the survey is conducted. Indeed, the transitional phases of recently cultivated and young rejuvenating fallows have often been categorized as ‘abandoned wasteland’ or ‘scrub’. Ironically, this category owes its genesis to colonial rent-seeking arrangements where land that remained ‘idle’ and did not generate taxes were categorized as ‘wasteland’, a practice that was legalized through land reform legislation across the colonies.

Traditionally, arable land in the uplands of South and Southeast Asia has predominantly been under shifting cultivation operated within customary tenure arrangements, with temporary fields that shifted annually or every two years leaving the previously cultivated fields fallow for gradual regeneration into forests. Finding the upland agricultural

system complex and difficult to fit within the taxation framework designed for private property arrangements, colonial powers preferred to consider upland systems as wastelands and available for appropriation by the state for commercial plantations, forestry projects and colonial estates, which facilitated the securing of properties and estates by the colonialists and local elites. Land governance systems in the uplands, therefore, lacked a formal taxation and registration system unlike those in the lowlands and continued to be perceived as wastelands, subject to appropriation by the state. Wastelands as a land category continues to remain a central element of land management across South and Southeast Asian countries even today^{xii, xiii}.

Moreover, older fallows in a shifting cultivation landscape are perceived as forest land and never acknowledged as arable land undergoing fallowing. As a result, shifting cultivation landuse – in its diverse and dynamic phases, whether at the cultivation phase or as regenerating fallows – fails to enter landuse surveys as a distinct landuse category and is instead always clubbed under ‘other agricultural landuse’ categories or as ‘wasteland’ or ‘shrubland’ or ‘temporary unstocked land’, or ‘open-canopy forests’, or ‘unclassed state forests’. While government agencies relegate young shifting cultivation fallows to the category of ‘abandoned, or unused wasteland’,^{xiv} older regenerating fallows are relegated to the category of ‘open canopy forest or unclassed state forest’. This failure to grasp

the complexity of the shifting agriculture landscape by researchers and surveyors makes it difficult for them to map the diverse landuse and landcover dimensions of the practice. Instead, the landcovers associated with shifting cultivation are grouped into landuse and landcover categories that are not obviously perceived as linked to the practice^{xv}. The landuse and landcover classifications of the present approaches are, therefore, unable to adequately capture the dynamic mix of managed and natural landcovers of such mosaic landscapes^{xvi}. Consequently, statistics on the extent of shifting cultivation has always been difficult to capture and realistically generated, resulting in the failure to formulate effective policies or programmes to manage change in such systems^{xvii}.

A second level of challenges in estimating landuse and landcover information in the context of shifting cultivation arises at the stage of landuse data consolidation at meta levels – national, regional and global. As the process of standardizing landuse categories progresses, sub-categories and their variants come to be clubbed together resulting in the masking of distinct landuses. An example would be agricultural landuse, which includes both irrigated and non-irrigated cultivated land, with rainfed agriculture included under the latter. Although these landuse types would be discernible at the immediate sub-category level, distinct landuses such as agriculture on sloping land would become invisible when they get clubbed under rainfed agriculture and that, in turn, under unirrigated agricultural landuse. Unique agricultural landuses such as shifting cultivation, similarly, get buried under such standard sub-categories as data consolidation proceeds making it indistinct, rendering the practice difficult to quantify. In the process, newly fallowed shifting cultivation fields become part of ‘wastelands’ while regenerating fallows, particularly old-age fallows dominated by trees, get clubbed under forest landuse sub-categories such as ‘unstocked forest land’ or ‘open canopy forest’. As the dynamic mosaic of landcover gets truncated and classified into standard categories that may have little or no link to the practice for the purpose of facilitating meta-level data consolidation, shifting cultivation as a distinct landuse practice becomes invisible, rendering the estimation of the extent of shifting cultivation almost impossible at these meta levels.

Maintaining the status quo: The implications of no action

What are the implications of maintaining the status quo and continuing as usual? The most obvious, as discussed in preceding sections, is the inability to generate exact figures on the extent of shifting cultivation. This would, in turn, hamper efforts by national and international agencies to design

effective programmes for strengthening shifting cultivation or facilitating transitions that would ensure inclusive rural transformation. But this is not all. As mentioned by scholars^{xviii, xix, xx, xxi} the status quo can adversely affect both food and nutritional security as well as security of tenure for shifting cultivators. Furthermore, it can severely deplete the forest cover and ecosystem services which would lead to the further impoverishment of marginalized communities and persistence of poverty as well as impede efforts to combat climate change.

The classification of shifting cultivation fallows as ‘abandoned wasteland’ conveys a perception that such lands are vacant land free of tenurial encumbrances and open to conversion. Fallows, thus, become the first stop when it comes to transformation to permanent plantations and other settled agricultural pursuits, overlooking the fact that these are regenerating fallows that over time mature into secondary forests and are land that belong to communities with ancestral territorial rights. The immediate fallout of conversion to settled agriculture is the reduction in fallow cycles, leading to marginalization and distortion of shifting cultivation, yield declines and land degradation over time. Such changes also affect food availability and dietary diversity leading to malnourishment and ‘hidden hunger’ and, hence, overall nutritional security^{xxii}. Conversion of fallows to settled agriculture results in a permanent change in landuse and landcover, impeding the regeneration of fallows into forests. This is the reason for the depletion in forest cover in shifting cultivation areas. It has serious implications for sustenance of ecosystem services, particularly hydrological cycles and carbon sequestration, negating their ability to combat global warming.^{xxiii}

Tenure security is, however, the aspect to shifting cultivation that is most seriously impacted by such inaccurate classifications. The classification of shifting cultivation fallows as ‘abandoned, vacant land’ has led to perceptions that they are free of tenurial encumbrances and open to appropriation by the state for reallocation to corporates and other agencies for agricultural and other landuse. Such state appropriation has led to deprivation of ancestral rights of indigenous communities practicing shifting cultivation, making such communities illegal occupants on their ancestral land as seen in Myanmar^{xxiv}. The status quo in land classification, which is rife with inaccuracies, can seriously compromise efforts at inclusive development and poverty alleviation, thus negating efforts – and global intentions – for attaining the SDGs. It can thereby contravene the UN Declaration on the Rights of Indigenous Peoples adopted by the United Nations General Assembly in September 2007. Efforts must be made, therefore, to revisit and revise landuse

and landcover classifications if management of shifting cultivation is to be successful and if shifting cultivators are to be brought within the fold of inclusive development. Such revisions would strengthen global efforts for achieving SDG goals and fulfilling the fundamental objective of Agenda 2030, which is 'leaving no one behind'.

What is the way forward? How can the lacuna be possibly addressed?

Close examination of the issue suggests that the fundamental problem lies with the way shifting cultivation fallows are perceived post cultivation. Unaware of the dual landuse character of the practice and the diverse, dynamic and complex character of shifting cultivation landscapes, landuse and landcover surveyors have fail to associate fallows with shifting cultivation, relegating such land to 'vacant, unused wastelands' or to forest landuse/landcover categories ('temporary unstocked', 'open canopy forest' or 'unclassified state forest'). The obvious first step that needs to be taken in changing the status-quo is recognition of the dual landuse character of shifting cultivation. The second step is to grant legal recognition to shifting cultivation fallows as arable land which may, if given sufficient time, regenerate into secondary forests. They should thus be given a suitable label such as 'regenerating fallows' which describes and confirms their agricultural landuse status irrespective of the wooded vegetation that may arise with long fallowing.

This label could be further refined to distinguish fallows according to age, i.e., recent or young fallows labeled as 'recent regenerating fallows', more mature, older fallows as 'old regenerating fallows' and those that have matured into secondary forests as 'fallow forest'. Such an approach would encompass much of the landuse diversity and dynamism seen in the mosaic landscapes of shifting cultivation areas. Together, these would constitute landuse sub-categories under shifting cultivation, the latter categorized at meta-levels under 'rainfed agriculture', 'unirrigated agriculture' or even 'upland, rainfed agriculture' depending on the classification in use in a particular country. Concurrently, a reappraisal of landcover categories must also be initiated to support the above landuse reclassification and efforts made to ensure a higher degree of accuracy in classifying landcover in shifting cultivation landscapes. Fortunately, awareness of the issue is on the rise among researchers and already several methodological approaches have been proposed to more carefully describe the various landcover categories found in such landscapes. This is undoubtedly a step in the right direction^{xxv, xxvi}.

Moreover, the practice of shifting cultivation, in most countries, is not extensive across the country but is instead confined to particular provinces or sub-regions (for e.g., the northeastern states in India, the upland region in Myanmar, the Chattogram hill areas in Bangladesh, the northern upland provinces in Laos PDR). Hence, landuse surveyors in such provinces or sub-regions must revisit their landuse classifications and take steps to introduce the revised landuse classes suggested above to improve quantification of landuse, thus providing more up-to-date, accurate and realistic information on landuse in general and the extent of shifting cultivation in particular for policy makers, programme designers and development agencies interested in stabilizing or transforming the practice. While shifting cultivation may continue to be clubbed and merged with classifications such as 'rainfed agriculture' or 'unirrigated agriculture' at the national level, the reclassification proposed above would still make it possible to quantify the extent of shifting cultivation by scrutinizing the sub-categories of landuse classes deployed for classification in the areas where it is prevalent. It is imperative that these suggestions which are pragmatic and actionable must be taken up if accurate estimates of the area under shifting cultivation are to be generated and the existing gap in knowledge as regards the practice is to be removed. It would, moreover, enable more realistic quantification of the actual area under shifting cultivation. The cost of inaction, which effectively means maintaining the status quo, is high and, as pointed out in preceding sections, can result in adverse impacts on food and nutritional security, forest cover and ecosystem services, tenurial security, status of marginalized communities and levels of poverty. Action to usher in the changes required is therefore a must.

Policy recommendations

1. Recognising shifting cultivation as a rotational agro-forestry practice, undertaken sequentially on the same land, involving a short cultivation phase and a longer fallow phase which, with a sufficiently long regeneration period, will culminate in fallow forests.
2. Recognising shifting cultivation fallows, in their diverse and dynamic stages, as arable land, which range from recently fallowed fields with sparse vegetation to old-age regenerating fallows dominated by a tree cover and perennial vegetation, and re-designating such land as 'regenerating fallows'.
3. Refraining from classifying such land as 'abandoned' or 'unused, vacant wasteland' or as 'temporary unstocked land', 'open canopy forest' or 'unclassified state forest' and introducing instead 'young regenerating fallows' and 'old-aged fallows'.
4. Revising the prevailing definition of wastelands, which has its genesis in colonial practices of rent and taxation, in order to accommodate conceptual advances regarding the value of land as providers of ecosystem services. Such a revision would allow that a land which is fallow but regenerating provides valuable provisional and regulatory services and, hence, cannot be considered as 'wasteland'. Instead, the categorization of land as wasteland should be restricted to severely degraded land incapable of rendering any ecosystem services.
5. Revisiting landuse classifications and revising landuse classes by adopting the categories suggested above.
6. Taking immediate steps to improve understanding among researchers and surveyors of landuse and landcover on the diverse and dynamic vegetation stages of shifting cultivation fallows for the purpose of improving landuse and landcover classifications and removing existing inaccuracies in quantifying landuse and landcover estimations in shifting cultivation areas.
7. Increasing research funding for landcover estimations in shifting cultivation areas using Earth Observation approaches such as remote sensing in order to improve quantification methodologies and interpretation of landcover images so as to be able to make more accurate and up to date estimations on the extent of shifting cultivation.
8. Supporting efforts by communities and civil society for advocacy engagement with policy makers to revise landuse classifications in the context of shifting cultivation.
9. Ensuring proper landuse classification through the adoption of the revised landuse classes in order to capture the diverse and dynamic stages of shifting cultivation at the provincial and sub-regional scales where shifting cultivation is a predominant agricultural landuse and ensuring that such classification data and information remain traceable at the sub-category levels even after data consolidation at meta levels – national, regional and global.

Notes

ⁱICIMOD (2021). *Ensuring seasonal food availability and dietary diversity during and after transition of shifting cultivation to settled agriculture*. Policy brief. ICIMOD, Kathmandu.

ⁱⁱICIMOD (2021). *Shifting cultivation landscapes in transition: Where are the forests? Safeguarding forest cover and ecosystem services while transitioning shifting cultivation to resilient farming systems*. Policy brief. ICIMOD, Kathmandu.

ⁱⁱⁱICIMOD (2021). *Supporting Myanmar's land governance reforms*. Policy brief. ICIMOD, Kathmandu.

^{iv}Heinimann, A., Mertz, O., Frohling, S., Egelund

Christensen, A., Hurni, K., Sedano, F., Chini, L. P., Sahajpal, R., Hansen, M. and Hurtt, G. (2017). A global view of shifting cultivation: Recent, current and future extent. *Plos ONE*, 12(9), e0184479. <https://doi.org/10.1371/journal.pone.0184479>

^vNITI Aayog (2018). Report of Working Group III. Shifting Cultivation: Towards a Transformational Approach. NITI Aayog, Government of India, New Delhi.

^{vi}Kurien, A.J., Lele, S. C. and Nagendra, H. (2019). Farms or forests? Understanding and mapping shifting cultivation using West Garo Hills, India. *Land*, 8, 133. doi 10.3390/land/8090133

^{vii}Ibid ^{iv} above.

^{viii}Schmidt-Vogt, D., Leisz, S. J., Mertz, O., Heinemann, A., Thiha, T., Messerli, P., Epprecht, M., Van Cu, P., Vu K. C., Hardiono, M. and Dao, T. M. (2009). An assessment of trends in the extent of Swidden in Southeast Asia. *Human Ecology*, 37, 269-280. DOI 10.1007/s10745-009-9239-0

^{ix}Ibid iv above

^xIbid iv above

^{xi}Ibid viii above

^{xii}Ibid iii above

^{xiii}Choudhury, D, Bhuchar, S and Thomas S (2021). *Transitioning shifting cultivation to resilient farming systems in South and Southeast Asia: Guidelines for policy makers and development practitioners*. Resource book. ICIMOD, Kathmandu.

^{xiv}Ibid iv above

^{xv}Ibid iv above

^{xvi}Ibid iv above

^{xvii}Ibid viii above

^{xviii}Ibid i above

^{xix}Ibid i above

^{xx}Ibid ii above

^{xxi}Ibid xiv above

^{xxii}Choudhury, D. and Sundriyal, R. C. (2003). *Issues and options for improving livelihoods of marginal farmers in shifting cultivation areas of Northeast India*. *Outlook in Agriculture*, 32, 17-28.

^{xxiii}Ibid xvii above

^{xxiv}Ibid iii above

^{xxv}Ibid vi above

^{xxvi}Ibid iv above

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