Status of

Shifting Cultivation and REDD+ in MYANMAR

The government of Myanmar is currently developing a national REDD+ program. REDD+, or Reduced Emissions from Deforestation and forest Degradation, refers to the international efforts to reduce greenhouse gas emissions caused by deforestation.

Large-scale agribusiness and monoculture plantations are major drivers of deforestation and environmental degradation in Myanmar and across Southeast Asia. Shifting cultivation, in contrast, does not cause deforestation and maintains relatively high carbon stocks compared to these other types of agriculture. Supporting sustainable shifting cultivation by recognizing customary land tenure would reduce carbon emissions as part of an equitable and effective REDD+ national strategy. Tenure security for shifting cultivation will reduce emissions from deforestation and forest degradation in two ways:

- Secure tenure will prevent carbon emissions by protecting shifting cultivation from conversion to monoculture agribusiness and unsustainable logging.
- Tenure insecurity of shifting cultivation reduces the land available for shifting cultivation and makes it more difficult to maintain long fallow periods. Securing tenure is will help to maintain shifting cultivation as a sustainable, diverse, carbon-rich, and productive agricultural system.

Supporting the sustainability of shifting cultivation would have benefits not just for carbon emissions but also for livelihoods, the environment, cultural traditions, and public health.

Shifting Cultivation in Myanmar

Shifting cultivation, called "shwe pyaung taung ya," is the dominant agricultural system in Myanmar's upland areas. In English, the terms shifting cultivation, swidden, and rotational agriculture are all used to refer to this cultivation method.

> Sustainable shifting cultivation can help to mitigate greenhouse gas emissions from land use change, adapt crops to a changing climate, improve public health, use land productively, reduce economic risk, and conserve biodiversity.

In shifting cultivation systems, farmers clear land and plant a variety of subsistence and commercial crops for 1 or 2 years. The cleared plot is then left fallow for vegetation to regrow and soil to regenerate. Fallows may be actively managed with cover crops, enrichment planting, and pollarding, or they may be left to regenerate naturally, depending on local practices. Fallow periods in Myanmar tend to range from around 5 years to over 20 years. After the fallow period, the same areas are cleared again for cultivation.

Shifting cultivation is one component of customary land tenure systems, which also include permanent agriculture gardens, orchards, and forests, including protected watershed forests and riparian areas. These customary systems designate specific areas for shifting cultivation and for forests. Shifting cultivation, when managed within a customary system, does not cause significant deforestation, and forests are protected from agricultural encroachment. [i]

Customary tenure systems with developed rules to manage shifting cultivation and protect forests have been documented across the country, from Kachin and Naga systems in the north, to Chin in the west, Ta'ang and Pa-Oh systems in the east, and Kayah and Karen systems in the south[1]. These complex agricultural systems produce a variety of subsistence and commercial crop, while maintaining soil fertility and generating agricultural and biological diversity [ii].

The Benefits of Shifting Cultivation

Deforestation is caused by conversion of forests to other uses, most commonly agriculture, logging, and mining.[iii] Forest degradation is caused by forest use, often fuelwood and timber extraction. Decisions about where to focus national efforts on reducing deforestation should take the benefits of these land uses into account. Land uses that benefit smallholder farmers, the backbone of Myanmar's agricultural system, should not be given the same weight as drivers of deforestation that benefit a wealthy few.

A review of the benefits of shifting cultivation aside from carbon sequestering is therefore useful. While there is no recent, reliable estimate of the area of land under shifting cultivation in Myanmar, it is possible to say that most people living in rural upland areas practice shifting cultivation and that it has an enormous importance for their food security and livelihoods.

[1] see reports by ECDF, MRLG partner case studies, RRtIP, LCG, POINT, and TRIP NET, among others

Shifting cultivation fields and fallows maintain the bulk of the world's agricultural biodiversity, an enormous wealth of crop varieties that may be critical for adapting to changing climates. The many types of crops planted in shifting cultivation, sometimes over 40 or even 90 varieties, are an essential component of a family's diverse, nutritious diet. This dietary diversity is easily lost if households switch their farmland to grow only commodity monocultures, which is often the effect of programs to sedentarize shifting cultivation or privatize tenure.[iv]

Fallow periods are a key aspect of modern, sustainable farming systems. Rotational farming uses fallow periods to control pests, maintain soil fertility, reduce erosion, and provide habitat for wildlife. Fallow periods and controlled burns reduce the need for chemical pesticides, fungicides, and herbicides. Using fewer (or no) agrochemicals protects the health of farmers who grow the crops and of residents of towns and cities that eat them.[v]

Using legumes, nitrogen-fixing trees, and organic fertilizer protects streams, lakes, and rivers from eutrophication caused by run-off of chemical fertilizers. Even when fallow periods are reduced to a few years, these methods can maintain soil fertility [vi] [2].

"Common but differentiated responsibilities"

The UN Framework Convention on Climate Change (UNFCCC) acknowledges that developed countries with a greater historical contribution to climate change also have a greater responsibility to mitigate climate change now. If this concept is also applied within countries, it becomes clear that rural shifting cultivators, who have had a negligible historical contribution to carbon emissions, should not be required to change their livelihoods to meet national emissions targets.

Fields and fallows create a biodiverse habitat that is home to the insects, bats, and birds that help to control pests. Wildlife live and forage in secondary forest fallows, and these fallows help wildlife move between patches of protected forest.[vii]

Ceremonies, festivals, and religious beliefs are closely tied to shifting cultivation. In interviews, farmers have said that even if other sources of livelihood became accessible, they would still use some land for shifting cultivation area in order to maintain their cultural traditions[3].

Understanding the impact of shifting cultivation on climate change

Shifting cultivation, deforestation, and carbon stocks

REDD+ programs use deforestation as a simpler way to talk about a more complex issue: carbon stocks and carbon emissions. Carbon is stored in trees, plants, and soil. Deforestation causes a reduction in the amount of carbon stored in a plot of land, and growing trees increases the amount of carbon. So

[2] For example, Cairns and Brookfield 2011 document a shifting cultivation system in Nagaland, Northeastern India, that uses nitrogen-fixing A. nepalensis trees to maintain soil fertility in rotations of two years cropping, two years fallow.

[3] RRtIP and POINT case study interviews, unpublished

when REDD+ programs talk about reducing emissions from deforestation, they are talking about keeping the carbon stored in forests from being released into the atmosphere, where they would increase the effects of climate change.

When an undisturbed primary forest is cut down and turned into a field of rice or maize or cassava, this is a clear case of land use change causing carbon emissions. The changes in carbon stocks when converting from one type of agriculture or plantation to another type, though, is more complicated to measure. Different studies document a wide range of carbon stocks, and significant uncertainty of the links between land use change and carbon emissions persists.[viii]

Comparisons of carbon budgets for different land use types, especially belowground biomass and soil carbon stocks, are difficult as measurements vary widely for each land use type. However, the current available data indicates that shifting cultivation systems with long fallow periods is relatively carbon-rich and sequester significantly more carbon than continuous annual cropping and some types of monoculture plantations [ix].

Does clearing land in a shifting cultivation system cause carbon emissions?

Shifting cultivation systems release carbon when fallows are cleared and burned, which sometimes leads to the mistaken assumption that this practice causes carbon emissions. However, carbon is later sequestered during the fallow period as the forest regenerates.

What is REDD+?

While many parts of REDD+ are still being negotiated at international conventions, the basic concept is that REDD+ generates money that will be used to reduce emissions from deforestation. The money could be granted as a fund that one government pays to another government. Money could also be generated through market mechanisms like carbon trading or as carbon offsets.

REDD+ money can generally be used in two different ways. The first is to fund the development and implementation of policies designed to reduce deforestation. The second is to directly pay people for sustainably managing and protecting forests. The idea behind direct payments is to create a cash benefit for keeping forests standing and sequestering carbon, to counteract the benefits of cutting down forests and converting the land to another use.

Myanmar's REDD+ program must be developed through a transparent process and based on accurate data about the drivers of deforestation and carbon emissions. A successful REDD+ program is one that is effective, efficient, and equitable according to the national situation.

Does shifting cultivation cause deforestation?

Forests are threatened by conversion to agricultural concessions, from banana plantations in Kachin State, oil palm in Tanintharyi Region, and rubber and other crops all around the country. Unsustainable legal and illegal logging have also caused significant deforestation, and many forests are logged out [x]. While forest is cleared for shifting cultivation each year, this is typically secondary forest as part of a historical, ongoing process of clearing and regeneration in the same area of land, not new clearing of primary forest[4]. Land is cleared only in specific areas, most of which have been under cultivation for decades. Communities meet together to agree on what land should be cleared each year.

Community forest areas are protected from agricultural encroachment within customary systems. Watershed forests are protected to maintain water quality, and forests are managed for local use of timber, rattan, food, and medicinal plants [xi].

Does shifting cultivation cause forest degradation?

Shifting cultivation could only be considered to cause forest degradation if it were considered a forest, rather than a diverse rotational agricultural or agroforestry system. For the purpose of REDD+ assessments, shifting cultivation areas should not be compared to primary forest and declared "degraded" but instead should be considered a diverse agricultural system with many trees.

Shifting cultivation does entail the conversion of primary forest to secondary forest at some point in history, and this conversion would have reduced the carbon stocks of the land. In this sense, secondary forest fallows might be unfavorably compared to primary forest. Conversion of primary forest to shifting cultivation decades ago should be given the same weight when considering carbon emissions as would the conversion of primary forest to rice paddy or rubber at the same point in history.

How does change from shifting cultivation to other land uses change carbon stocks?

There are substantial uncertainties in comparing carbon stocks of one land use to another, and differences in the local environment and in management practices add to this variation.

Swidden with long fallow periods store a relatively high amount of carbon compared to permanent agriculture and is comparable to some agroforestry and plantations systems.[xii] Carbon stocks at each step of the rotation are averaged over time to estimate the overall carbon stocks of the system across the landscape.

A meta-analysis of carbon studies across the tropics indicates that when shifting cultivation is converted to continuous annual cultivation, over 95-99% of aboveground carbon is lost. When shifting cultivation is converted to oil palm, about 60% of aboveground carbon is lost. Conversion of shifting cultivation to annual cropping, oil palm, or rubber plantation also cause losses of soil organic carbon of up to 40% [xiii].

[4] A forthcoming report by RRtIP on Naga customary land tenure systems has combined digitized scale maps of community land use types with forest cover change remote sensing data to show clearly that over the last decade, communities have only cleared land within the shifting cultivation area, and have not cleared land in the designated as community protected forest.

When fallow periods shorten, in one study to around 4 years, shifting cultivation will sequester relatively less carbon and may be comparable to continuous agriculture.[xiv]

What are the landscape-level effects of shifting cultivation on carbon stocks?

Measuring either the land under shifting cultivation or the number of people practicing shifting cultivation is notoriously difficult to measure because of the diversity and complexity of the practice [xv]. For Myanmar, the most commonly cited figure is from 1993, when the Forest Department estimated that approximately 22.8% of the country's total land area is under shifting cultivation. Recognizing this lack of data, the national agricultural policy calls for the area under shifting cultivation nationwide to be mapped. This will require remote sensing analysis tailored to detecting the rotational aspects of shifting cultivation, so that conversion of fallows is not misinterpreted as new forest clearing[5].

Programs designed to reduce carbon emissions by intensifying agriculture assume that land will be left to regenerate into forests. This is often not the case. A meta-analysis of 250 studies concludes that there is no evidence that policies designed to "sedentarize" shifting cultivation will increase ecosystem-level carbon stocks, and may in fact incentivize forest conversion by intensive agriculture [xvi].

Transition from shifting cultivation has other downsides, too. A global review found that transfer to more intensified agriculture often contributes to permanent deforestation, loss of biodiversity, increased weed infestations, declines in soil fertility, and accelerated soil erosion [xvii].

Challenges to maintaining sustainable shifting cultivation

Shifting cultivation can be managed sustainably with different fallow lengths by adapting new management methods. Shorter fallow periods will need more intensive soil management to maintain fertility, for example from nitrogen-fixing plants and organic fertilizer. Fallows can also be managed more intensively to with enrichment planting of useful trees.

If a management goal is to sequester carbon, fallow periods should remain relatively long, though the relationship between fallow length and carbon stock is highly variable. Some studies record relatively high carbon stocks with 7 year rotations, while others record high stocks with 10 or even 20 year rotations. This depends on differences in land management and on local environmental variables like soil fertility.[xviii]

Shorter fallow periods are not an inevitable result of "overpopulation," but are instead a result of policies and laws that create tenure insecurity and reduce land availability for shifting cultivation. Socioeconomic factors also contribute to changes in cultivation methods, including migration and increased interest in planting commercial crops[xix].

[5] One method of analysis tailored to shifting cultivation has been developed as described in Htet et al. 2012 and has been applied in Laos

Tenure insecurity has reduced the land available for shifting cultivation, as some areas are designated to logging, some to protected forest, and others to agribusiness and plantations. This reduced land availability directly undermines the sustainability of shifting cultivation and the maintenance of long fallow rotations.

Migration can either increase or decrease population pressure in upland areas. Many young people have left upland areas because of conflict and to find new economic opportunities, moving elsewhere in Myanmar or to other countries. In other areas, extractive industries, agribusiness, and logging attract people to work and then settle in rural areas. In some upland areas, populations have become more concentrated as people have either been forced to move from upland areas because of conflict or land grabs. Households may also choose to move closer to move closer to roads and schools, increasing the number of people in a village who wish to cultivate land.

Case studies document how communities respond and adapt to both tenure insecurity and new market opportunities in a systematic and controlled way. In two communities in Chin State and Shan State, for example, communities decided to convert part of their shifting cultivation land, which is claimed by the whole community, into orchard land which is claimed by households. This decision was prompted by increased interest in planting orchards and commercial crops like tea. The communities then divided up the shifting cultivation land into parcels, and distributed cultivation rights to households based on a lottery. In another area, a Naga community was concerned about maintaining a supply of pine wood for building houses, so they decided together to stop clearing shifting cultivation area on plots of land that had more than 10 pine trees[6].

Implications for REDD+ in Myanmar

Tenure insecurity has consistently been identified as an underlying driver of deforestation in Myanmar.[7] Recognition of customary tenure, over fields, fallows, and forests, is an essential step for REDD+ to be implemented effectively and equitably.

Tenure security is essential to fulfill REDD+ safeguards as recognized in the Cancun Agreement. Without first establishing ownership of forests and forest carbon stocks, REDD+ payments could create an incentive for land grabs by carbon speculators. Tenure security is also necessary so that direct payments for forest conservation and management can be received by the legitimate owners of the forest.

The National Land Use Policy recognizes customary tenure and specifically land under shifting cultivation. REDD+ could help to implement this policy by recognizing tenure over shifting cultivation fields and fallows. Securing tenure of shifting cultivation would reduce emissions by allowing farmers to protect this land from conversion and to maintain relatively carbon-rich long fallow rotations.

6 Unpublished data from RRtIP, POINT, and MRLG research

7 Including by FAO's draft report on drivers of deforestation and forest degradation for REDD+

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