Concept Paper

Strategy Workshop on Rotational Farming/Shifting Cultivation and Climate Change

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1. What is Rotational Farming/Shifting Cultivation?

Rotational Farming/Shifting Cultivation (RF/SC) is a cultural and physical integration of forest and agriculture; it is indigenous agriculture. It is one type of agro-forestry which stresses the connection between the agricultural system and the ecosystem. RF incorporates the dynamics of management and continuous adaptation required by the ecosystem. The fields become fallow, allowing for the regeneration of the soil and land. The fallow land then begins another cycle of farming, the fallow period promoting rich nutrients and balancing the land, water and forest to provide for a continuing system of agriculture. The cycle aids the regeneration of fauna, flora and consequent biodiversity, conserving both animals and plants. Thus, Indigenous communities in Thailand are able to make use of more than 200 plant species due to the 6 to 10years of fallow (Anan et al, 2004). Moreover, RF is not a stand-alone system, but is integrated with other systems in the community, such as terraced paddy fields, kitchen gardens, animal husbandry, hunting and gathering, and so on.

2. The Negative Image of RF vs. Indigenous Perspectives and Realities

The continuing prejudice against shifting cultivation/rotational farming by some academics, governments and other authorities has created a negative image of RF among the public. At the same time, the prejudice against indigenous peoples for example in Thailand, has contributed to the definition of highland people as "the others". Furthermore, these understandings and feelings derive from a lack of accurate and/or rational information. They arise from the repetition of stereotypes which continues until people are conditioned to believe this to be the truth. Government policy on shifting cultivation/rotational farming stems from this prejudice.

For example, one popular misconception is that "RF is an out-of-date traditional tribal practice which will disappear soon." In fact, RF/SC is traditional cultivation, continually practiced for more than ten thousand years. The reason for this is because it is a good system, producing a variety of foods, and is appropriate to the sustainable management of the eco-system. Many farmers and communities, after following the mainstream cultivation of cash crops for market, have returned to RF, such as in Mae Lan Kham and Ban Klang Villages in Chiang Mai, Thailand (ibid.). Other misconceptions include: "Highland ethnic groups destroy the forest, use low technology, produce poor crops, gain no income and use resources extravagantly," "Highlanders have no clear rights over the land and destroy forests for new fields," "Population increase causes expanded forest destruction," "RF causes soil erosion," and "The government sees RF as easily transformed to cash crop production." All of the above are allegedly supported by scientific research and academics. All of the above can be contested by hundreds of years of

experience from indigenous peoples, whose work has revealed quite different results and findings.

It is necessary to deconstruct the myths of RF/SC, because many well-known researchers, including in the FAO, give support to shifting cultivation/rotational farming as one form of alternative agriculture. An example of this is Myers, who has given a critique of typical governmental misconceptions: "SC/RF causes deforestation, often of virgin forests through pioneer shifting cultivation – extremely rare in the present context. The clearing of secondary fallow forests also ensures the regeneration of forests. (Norman Myers, *Asia Pacific Forestry Week, Hanoi, Vietnam, 2008)*

…rather than collapse, swiddeners around the world are modifying their practices. Many shifting cultivators have developed cultivation cycles that more closely resemble crop rotation systems and agro-forestry operations than what has conventionally been called swidden, or they may have always done such things but it was overlooked by researchers who focused on the more dramatic "slash and burn" image (Padoch et.al. op.cit.: 30).

*In the finding of FAO, shifting cultivation is not deforestation – **Permanent** conversion of forest cover as well as a **permanent** change in land use. Degradation – Change in quality of forest cover with a **temporary** change in land use and a subsequent **reversion** to forests* (FAO, 1989).

Putting it another way, we can say that RF causes a *temporary* change in land use and land cover, where regenerating fallows subsequently ***revert*** the land use back to forests. RF may cause temporary degradation, but it definitely does ***not*** result in deforestation. In most of the studies, however, RF is not recognized as a form of *agricultural land use* or *agro-forestry;* it is always compared with forest. But for a fair assessment, we need to de-link RF from the original conversion of primary forests and compare it with other forms of agricultural land use or agro-forestry.

3. The Link between Rotational Farming and Legal Rights

Particularly important are the rights of access to natural resources, a key factor in the RF cultivation system. Forest and RF are different sides of the same coin, depending on the definition. This has been a chronic problem for examples in Thailand because the government through Royal Forestry Department manages natural resources in a linear or monolithic way; only government officers have rights to manage the forest (and its impact on RF). Local people are not allowed to mange or even co-manage their own resources. However, in the same highland areas, some highland projects working with cash crops in cool/cold climates enjoy full rights of access to the forest, supported by government policy. At the same time, local people are not allowed to farm their ancestral land and practice traditional RF because the policy excludes them. This amounts to discrimination against local/indigenous occupations and cultural rights,

and creates natural resource competition between those with traditional and those with legal/policy rights. The UNDRIP (2007) states: indigenous peoples have the right to participate in all decision-making directly relevant for their lands and territories.And strategically to recognizing indigenous peoples traditional land use practices also offer opportunities in seeking solutions for sustainable natural resource management and it is also the process of mitigation and adaptation of climate change. The indigenous people must negotiate their rights, based on the Constitution and national law, which accords such rights to communities previously managing their own forests for more than ten years. Even in Yellowstone National Park in the US, local residents now have the right to co-manage natural resources in the park. We can say that if resource management is to be democratic, then co-management of resources must be the method of choice.

The Forestry Department claims to manage natural resources for the security of the nation. However, the nation is defined by its "people", those who live in this nation state. Thus, if the security of the people in the "nation" is not supported, how can the Forestry Department claim to preserve the security of nation? The management of natural resources must be open to diverse and alternative solutions, solutions forthcoming through negotiation. In the social sciences, rights are derived through the negotiation process; they do not come without negotiation. This requires a variety of open forums and joint decision making.

4. In the present day the status of RF/SC is changing into a diverse alternative agricultural system.

Today the diverse cycles of fallow land differ from area to area, and involve different dynamics of practice, often affected by pressures from external forces and government policy.
RF has been forced to transform into other types of cultivation because of the many conditions imposed on the system.

In Thailand, for example, the research findings of Anan et al. (2004) in 11 highland villages in Northern Thailand show that over the past three decades of state enclosure, upland rotational farming communities altered their systems of agriculture in three directions. The first direction, termed "transformation with sustainability", such as in Sei Do Sa and Mae Um Phai Villages, is still based on a rotational cycle of 6-7 years. The second, "transformation with a combination of livelihood alternatives" as practiced in Hin Lad Nai and Mae Lan Kham Villages, maintains a cycle of 6-7 years, but some of the fallow area has been converted to agro-forestry. The third direction, "transformation with dependence on the market", such as in Khun Pae, Chiangmai Province, and Pang E Ka, Chiangrai Province, manage a fallow cycle of less than three years.

This shows that RF is not static but always dynamic (Anan, et al., 2004, and Pinkaew Lungaramsri, 2005) changing or transforming through the use of diverse alternative solutions such as those mentioned above. Most importantly, change or transformation should take place based on the needs of the farmers themselves, not on external requirements. Changes forced by external pressures create definite risks to long term sustainability.

The trend of RF in the future centers on the second adaptive solution – "transformation with a combination of livelihood alternatives" – and this may answer the questions raised about population increase, climate change/global warming, and other questions already mentioned above. However, we need to know what the external conditions, those not controlled by the communities, are. What will be the dynamics of RF under different conditions? How does RF relate to alternative solutions, and what are those solutions? And what are the impacts of those solutions?

5. The World Crisis and the Role of RF in Saving IPs and Food Production

Rotational/Shifting cultivators, such as Karen farmers in Thailand, now find cash crop farming untenable or impossible as the chemical inputs they need to buy have become very expensive or unobtainable, including diesel fuel, fertilizers, pesticides, plastic sheeting, and so on. At the same time, it has become progressively more expensive to transport produce to market due to high diesel/gasoline prices. While the prices farmers obtain for their produce will probably not rise much in Thailand, the price of the rice they buy after the sale of their produce will definitely rise. Therefore, what is the point of cash crop farming for the Karen? The answer is "none". In essence, the world energy and food crisis and government promotion of cash crop farming among highland ethnic groups is no longer viable.

As a result**,** the Karen have no option but to carry out rotational farming in order to grow their own rice and vegetables to survive. This means that in villages like the communities in Northern Thailand RF cultivation must return to a 7-year rotation (or more) in order to provide for decent and sustainable livelihoods. All highland villages need to do this, but it will not be possible until governments wake up to the real seriousness and long-term meaning of the current world "energy and food crisis."

A further example has occurred in Vietnam, where seed-harvest ratios (number of seeds harvested to number of seeds planted) have declined from about 60:1 to 20:1, making RF much less productive and having serious impacts on villagers' lives. The reasons for this are complex, but the main cause is external (especially government) policy and interference (chiefly in forcing villagers to grow cash crops on permanent fields that were once RF fields.) Although this research finding is from Vietnam, RF practitioners everywhere, including in Thailand, generally recognize this to be the case in all areas where RF has been impacted by external (government) policy and interference. It is important to endeavor to revive and improve the RF system in order to return to high harvest ratios. Governments must understand that with the continuing energy crisis the only sustainable management of highland areas requires indigenous peoples to return to more traditional systems of natural resource management, including RF.

6. How Does Rotational Farming Link to Climate Change?

In current discourse concerning climate change, prejudice against rotational farming is increasing because people simplistically blame RF as being the cause of carbon emissions. Some NGO papers, for example, FPP and FERN, mention that 8 or 9 governments in REDD understand "traditional agriculture," or "shifting cultivation/rotational farming," as the main cause of deforestation and environmental destruction and, as such, these systems must be replaced. UN-REDD also mention that in many developing countries the majority of carbon dioxide emissions are created as a result of deforestation, forest degradation, forest fires and slash-and-burn practices.

The Opportunities in RF Adaptation to Climate Change are really linked to the fallow system, because fallows are essential to shifting/rotational cultivation – without regenerating forests through correct fallowing practices, productivity (harvest ratios) in shifting cultivation cannot be assured. Shifting cultivators, therefore, *nurture the forests* into their fallows even during the cultivation phase. Fallow forests are the ***backbone*** of rotational/shifting cultivation.

According to the findings of the research on Shifting Cultivation in Indonesia, if fallow periods are long enough, rotational/shifting cultivation is a stable system in which soil fertility is maintained. Thus, rotational/shifting cultivation can be expected to be *carbon neutral.* The biomass accumulation in RF is lowest after two cycles (cycles being at least six years), highest after one or four cycles, and intermediate after six to ten cycles.

This means that RF "could substantially alter the carbon-sequestration value of secondary tropical forests as they enter their second century of persistent human disturbances." Even with decreased growth rates, more carbon sequestration is seen in shifting cultivation than under other forms of land use. Carbon sequestration in traditional long-fallow shifting cultivation systems is superior to other forms of land use. However, this is seen only when sufficiently long fallow periods are allowed.

Research findings from North East India show that high crop diversity – 40-plus crops in a shifting cultivation landscape, and diversity within crops (landraces, which are the 'building blocks' for tomorrow's climate-stress tolerant seeds) – is fundamental to building resilience and ensuring adaptation. At the landscape level, shifting cultivation keeps forests young and growing, thus giving rise to a landscape level 'carbon bank.' Shifting cultivation results in a ***mosiac*** of differently aged, growing forests. A shifting cultivation landscape will have a higher probability of being a 'carbon sink' – a landscape level 'carbon bank,' compared to mature forest landscapes. *Thus, shifting cultivation **does** offer opportunities for mitigation approaches.*

And research finding from Thailand regarding the question of how Rotational Farming/Shifting Cultivation reduces Greenhouse Gas (GHG) emissions, both Dr. Jorgen Blaser, an international expert on forestry and Dr. Somsak Sukkhawong, a Thai expert on forestry, have given the explanation that forest which is recovering naturally has a high capacity to absorb carbon, since

that is necessary for forest growth. Rotational farming fallow lands, which are left to recover for periods up to 8 years, have a greater potential to absorb carbon than the natural forest. Dr. Somsak's research has found that rotation fallow fields have capacity to absorb about 6 tons of carbon/ha/year (2009).

Regarding greenhouse gas emissions from rotational farming fields, particularly in the process of burning the fields, some believe that this is a major cause of smog problems in the North of Thailand and of climate chang[i]. The issue of the burning of rotation farming fields has been a controversial issue in Thailand for decades. Dr. Prasert Trakarnsuphakon et al. (2009), argues that burning rotation fields is not a cause of climate change and smog problems as the fields will be burned only once a year over a period of only 2-3 days, with a burning period of about 1-2 hours per day. Furthermore, firebreaks are constructed before burning to prevent fire spreading unnecessarily. Together with the recovering rotation farming fields, which are in fallow stages of from 1-8 years, there is ample potential for the absorption of carbon arising from the burning fields. A similar research finding study by Prayong Doclamyai et al., (2010), Forestry Agriculture and Community Forest and its Roles to Enhance Food Security and Reducing Green House Gases, examined carbon storage in the community forest at Huay Hin Lad Nai, Chiangrai Province. Concerning rotational farming fields (in fallow stages of from 1 to 10 years), covering 1,476 Rai (236.16 ha), net carbon storage from this kind of farming system accounted for 17,348 tons, while carbon dioxide emissions from the burning of rotational fields was only 480 tons. Therefore, there are rarely any excess greenhouse gas emissions arising from the rotational farming system.

This shows clearly that rotational farming/shifting cultivation is an institutionalized, resource management practice at the landscape level and therefore communities practicing shifting cultivation are landscape-level natural resource managers ***who can contribute to mitigation measures!*** Hence, recognition for indigenous peoples' land use practices also offers opportunities to seek solutions for climate change mitigation.

The recognition and acceptance of the landscape management principles inherent in shifting cultivation will encourage and strengthen the fallow management approaches for the conservation of fallow forests resulting from shifting cultivation. Finally, it should be formally recognized that the traditional land management practices of IPs can facilitate adaptation and mitigation to climate change.

In recent times, more often than simple repetition each year of the RF/SC system, shifting cultivation is evolving into new forms of agro-forestry; diverse systems that may combine the production of subsistence crops with cash crops: a "composite economy" with e.g. rubber, coffee, and so on, grown with swidden rice. We are thus working simultaneously with traditional knowledge and innovations, and supporting the local mitigation and adaptation strategies is a critical and invaluable requirement in the movement towards adequate holistic solutions to climate change[ii].

As such, local strategies and priorities must be reflected in National Adaptation and Mitigation Action and National Adaptation Plans and Action Strategies, with indigenous peoples participating fully and effectively in their development and implementation.

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[i] Regarding to the problems of atmospheric smog in North Thailand are thought not to be associated with smoke or carbon dioxide emissions at all, but to be the result of photochemical smog (the chemical reaction of sunlight, nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the atmosphere, which leaves airborne particles (called particulate matter) and ground-level ozone), possibly moving south from areas of intense industrial activity in China. (Http://search.japantimes.co.jp/cgi-bin/nn20071128f1.html)

[ii] I would like to give credit for these concept notes to our indigenous experts and other specialists, most notably Dr. Dhrupad Choudhury (ICIMOD), Dr. Chris Erni (IWGIA), Dr. Vincent Darlong (IFAD-India), Mr. Amba Jamir (TML-India) and Dr. Anan Ganjanapan (Social Science CMU, Thailand), who presented papers at our Bangkok events on October 2nd and 3rd 2009.