



Policy Notes on Sustainable Land Use Management and Land Degradation in Myanmar

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Sustainable land management

Sustainable land use and protection of soils play a key role in food, climate, and human security. For this reason, the human management of soil resources will have wide-ranging consequences on human security for generations to come. The United Nations Convention to Combat Desertification (UNCCD) defines sustainable land management SLM as “land managed in such a way as to maintain or improve ecosystem services for human wellbeing, as negotiated by all stakeholders” (Winslow *et al.* 2011). According to the World Bank’s definition, sustainable land management (SLM) is a knowledge-based procedure that helps integrate land, water, biodiversity, and environmental management to meet rising food and fiber demands while sustaining ecosystem services and livelihoods (World Bank, 2006).

The United Nations have set 17 Sustainable Development Goals (SDGs) to guide the future global development agenda. One of the 17 targets aims to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss” (UNDP 2015). Thus, SDGs envision providing a global commitment to address land degradation and achieve a land and soil degradation-neutral world.

Sustainable Land Management (SLM) is crucial to minimizing land degradation, rehabilitating degraded areas and ensuring the optimal use of land resources for the benefit of present and future generations. SLM is based on four common principles: (1) land-user-driven and participatory approaches; (2) integrated use of natural resources at ecosystem and farming systems levels; (3) multilevel and multi-stakeholder involvement; and (4) targeted policy and institutional support, including development of incentive mechanisms for SLM adoption and income generation at the local level. SLM involves the activities of preserving and enhancing the productive capabilities of cropland, forestland, and grazing land (such as upland areas, down-slope areas, flatlands, and bottomlands), sustaining productive forest areas and potentially commercial and noncommercial forest reserves, maintaining the integrity of watersheds for water

supply and hydropower-generation needs and water conservation Zones, and maintaining the ability of aquifers to serve the needs of farm and other productive activities.

Land-use activities have transformed a large proportion of the land surface by clearing tropical forests, practicing subsistence agriculture, intensifying farmland production, or expanding urban centers. Although land-use practices vary greatly across the country, their ultimate outcome is to produce food and fiber and to acquire natural resources for immediate human needs.

Land degradation in Myanmar

The Constitution of the Republic of the Union of Myanmar adopted in 2008 sets a clear policy direction on environmental conservation. Article 45 of the Constitution states: “The Union shall protect and conserve the natural environment.” Also, article 196 states: “Every citizen has the duty to assist the Union in carrying out “Environmental Conservation”.

Myanmar is located in a region less vulnerable to desertification. Although there is no place which can be strictly defined as a sandy desert, some specific areas in the vast central zone of the country indicate the potential for land degradation due to the combined impacts of both the adverse climatic conditions and the stress resulted from human activities.

Land degradation (LD) in Myanmar is caused by water erosion, wind erosion, soil erosion, soil fertility depletion, salinization, alkalinization and water logging. Visible land degradation is recognizable in the central dry zone area of Myanmar and extends partially over the regions of Mandalay, Magway and Sagaing covering 17 % of the total area of the country. In these areas, soil erosion is intensive and rapid as a result of heavy rain showers and the low degree of rock compaction. Surface runoff has been estimated to be 30 %. Removal of the natural savanna vegetation quickly leads to erosion, which is most intensive at the start of the monsoon rains on bare soils. In the dry zone, where rainfall is already low, reduced infiltration means less effective utilization of precipitation. An increase of runoff also leads to the expansion of rill and gully erosion.

As Myanmar is endeavoring to maintain its natural resources, the Ministry of Natural Resource and Environmental Conservation strives to undertake the greening project throughout the country with the cooperation of all levels of the governmental sectors. The greening operation was started by planting trees in the 9 critical districts of the arid zone of central Myanmar and extended to 13 districts with the creation of new department namely the Dry Zone Greening Department (DZGD). This project also focuses on improving socioeconomic survival of rural people who live in the central dry zone and are badly affected by an acute shortage of fuelwood supply since the foremost fuelwood deficit areas are located in this dry zone. The Dry Zone Greening Department promoted utilization of wood fuel substitutes. The activities for the development of wood fuel substitutes include distribution of fuel-efficient stoves, promotion of fuel briquette production and utilization of agricultural residues.

The primary causes of desertification and land degradation apart from low rainfall and more frequent and prolonged drought is the destruction of the catchments of natural water sources leading to water shortages in this dry zone. It has been estimated that approximately 8,000 villages are facing water shortage. So, the Department of Irrigation and Water Resources Management under the Ministry of Agriculture, Livestock and Irrigation have been implementing drinking water supply and irrigation water supply program for food sufficiency and promotion of crop-productions in the dry zone. The Dry Zone is in danger due to the scanty rainfall, sparse vegetation and poor land use practices.

Widespread deforestation and unplanned land use change can harm the landscape. Forestlands are vulnerable to encroachment due to expansion of human settlements and the intensity is directly related to population of the expanded or newly located settlement. Ecosystem of wetland areas is expected to have a significant change due to expansion of human settlement. Inlay Lake ecosystem in the eastern part of the country is a significant example that shows water pollution and sedimentation in the water body is due to human settlement in uplands of the lake. It is rational that biological diversity in coastal areas would be adversely affected by the expansion of human settlement. These implications that would be experienced in any expansion of human settlement are given due consideration for minimizing the unintended consequences. Challenges facing integrated land management still remain and they include, among others, inadequate inputs, low capacity level of inter- and intra-agencies related with the utilization of land resources, the need for urgent economic returns and absence of comprehensive land use policy respected by all parties.

The Ministry of Natural Resource and Environmental Conservation and the Ministry of Agriculture, Livestock and Irrigation are the main agencies responsible to manage fragile ecosystems, combat desertification, including land degradation in all its forms, and mitigate drought. The Ministries concerned collaborate with the stakeholders at the local levels to implement programs and projects such as the greening programs and integrated land development projects being carried out in the dry zone area of Myanmar which is the area most affected by drought. Due to very low rainfall and deforestation the majority of rural population in the area has been facing the problem of soil erosion and land degradation. In order to address the problems, the governments are implementing programs, reforestation and afforestation, irrigation and water supply projects. Land degradation problems and the resulting rural poverty in the semi-arid regions in Myanmar are now being addressed by the governments through practicing sustainable agriculture and forestry management.

Desertification is intensifying in the Central Dry Zone and productivity of agricultural land is declining as a result. Dry Zone soils are generally sensitive to degradation due to a combination of low base fertility, high base salinity, low organic content, exposure to brief periods of intense rainfall, and low annual rainfall totals. The primary drivers of desertification are deforestation, erosion, and salinization. Increasing deforestation is largely attributed to demand for fuelwood and agricultural land. Soil erosion, particularly severe in upland areas, is largely as a result of high intensity rainfall and rapid surface runoff. Wind erosion is widespread throughout the Dry Zone, as evidenced by sandy soils, which are very common. All types of erosion are exacerbated by deforestation. Increased soil alkalinity in the Dry Zone is primarily caused by the use of saline groundwater for irrigation. Additional causes of reduced soil productivity include fertilizer and pesticide misuse, and over-cropping.

Just under 50% of the Myanmar's land area is forested and/or considered unsuitable for agriculture, including many Upland mountain areas and deforested hill slopes. Due primarily to deforestation and unsustainable agriculture practices, soil degradation in Upland Areas is widespread. Both soil erosion and nutrient depletion poses constraints to Upland agriculture production (LIFT, 2015).

Legal framework for sustainable management

Government of Myanmar prepared some of the Laws related to sustainable land management time to time which deems necessary (Table 1).

Table 1. Laws and government institutions administering sustainable land management

No.	Sustainable Land Management	Administering Institution
1	The Ports Act, 1908	Ministry of Transport
2	The Oil Fields Act, 1919	Ministry of Energy
3	The Factories Act, 1951	Ministry of Labour
4	The Motor Vehicles Law, 1964	Ministry of Rail and Transportation
5	Territorial Sea and Maritime Zone Law , 1977	Ministry of Natural Resources and Environmental Conservation
6	The Aquaculture Law, 1989	Ministry of Livestock and Fisheries
7	Fighting Rights of Foreign Vessel Law, 1989	Ministry of Livestock and Fisheries
8	The Myanmar Marine Fisheries Law, 1990	Ministry of Livestock and Fisheries
9	The City of Yangon Development Law, 1990	Yangon City Development Committee
10	Marine Fisheries Law, 1990	Ministry of Livestock and Fisheries
11	The Pesticide Law, 1990	Ministry of Agriculture and Irrigation
12	The Freshwater Fisheries Law, 1991	Ministry of Livestock and Fisheries
13	The Forest Law, 1992	Ministry of Forestry
14	The Development Committees Law, 1992	Ministry for Progress of Border Areas and National Races and Development Affairs
15	The Plant Pest Quarantine Law, 1993	Ministry of Agriculture and Irrigation
16	The Myanmar Mines Law, 1994	Ministry of Mines
17	The Protection of Wildlife and Wild Plant and Protection of Natural Areas Law, 1994	Ministry of Forestry
18	National Environmental Policy, 1994	Ministry of Forestry
19	Protection and Conservation of Cultural Heritage Areas Law, 1998	Ministry of Culture
20	The City of Mandalay Development Law, 2002	Mandalay City Development Committee
21	Environmental Conservation Law, 2012	Ministry of Natural Resources and Environmental Conservation
22	Prevention of Hazard from Chemical and Related Substances Law, 2013	Ministry of Industry

Sustainable development policy framework

The Government strengthened its sustainable development policy framework with the adoption of Myanmar's Agenda 21 in 1997, the Millennium Development Goals (MDGs) for Myanmar in 2006 and the National Sustainable Development Strategy (NSDS) in 2009. Myanmar's Agenda 21 was formulated to fulfill the national commitment to the Earth Summit to balance the three pillars of sustainable development – environmental, economic and social. It is a blueprint for promoting sustainable development in accordance with the Global Agenda 21 and the Rio Declaration on Environment and Development adopted at UNCED. The Global Agenda 21 calls on all nations to develop and implement strategies, plans and policies for national sustainable development. A comprehensive blueprint for global action for the 21st century, Agenda 21 marks a turning point for humanity with its commitment to forge a global partnership for sustainable development.

Myanmar's Agenda 21 is the expression of the Government's political commitment to sustainable development and grounded in national realities and aspirations, reflecting a shared national social vision. It recognizes the key role of government, business and civil society in promoting sustainable development. The national vision of sustainable development is attaining a harmonious integration of economic and ecological well-being, social cohesion and responsible governance. Myanmar's Agenda 21 has four main objectives:

1. To be a forum and context for a national debate on sustainable development and the articulation of a collective vision for the future;
2. To provide a framework for building a national consensus on sustainable development;
3. To help strengthen values, knowledge, technologies and institutions in support of sustainable development; and
4. To build organizational capacities for sustainable development.

Myanmar's Agenda 21 comprises four dimensions of sustainable development, namely social, economic and infrastructural, environmental and policy. The goals of Myanmar's Agenda 21 are:

1. Balancing population growth with the needs and capacities of development and environment;
2. Alleviating poverty and reducing inequality;
3. Preventing environmental pollution to improve public health;
4. Promoting safe housing and environmental sanitation;
5. Integrating environmental conservation with economic growth;
6. Promoting sustainable use natural resources; and
7. Conserving of cultural heritage.

Following up on the agreement by countries in the 2002 Johannesburg Plan of Implementation (JPOI) to formulate and start implementing a national sustainable development strategy (NSDS) by 2005, Myanmar adopted its NSDS in 2009 with the vision "Wellbeing and Happiness for Myanmar People". Its goals are sustainable management of natural resources, integrated economic development and sustainable social development.

Sustainable natural resource management in Myanmar covers the following areas: (i) Sustainable forest resources management, (ii) Biodiversity conservation, (iii) Sustainable freshwater resources management, (iv) Environmental quality management and enhancement, (v) Sustainable management of land resources, (vi) Sustainable management of coastal, marine and island ecosystems, (vii) Sustainable management of ecotourism, (viii) Sustainable management of mineral resources, (ix) Sustainable management of agriculture, livestock, and fisheries, (x) Sustainable energy production and consumption, and (xi) Sustainable industrial, transport and communications development.

Integrated economic development has the following themes: (i) Sound macroeconomic performance, (ii) Sustainable agricultural development, (iii) Sustainable livestock and fisheries development, (iv) Sustainable forest development, (v) Sustainable energy development, (vi) Sustainable mining sector development, (vii) Sustainable industrial development, (viii) Sustainable transport and communications development, and (ix) Sustainable tourism development

Sustainable social development covers the following areas: (i) Creating a knowledge-based society, (ii) Empowering vulnerable women, (iii) Improvement of public health, (iv) Conservation of culture, (v) Social development and tourism, and (vi) Strengthening development of border areas and national races.

Myanmar Sustainable Development Plan (MSDP) has been recently developed in 2018 and recognizes that the natural environment is the foundation upon which Myanmar's social, cultural and economic development may be sustained. Therefore, the Government of Myanmar is committed to a national development framework that enshrines the notion of environmental sustainability for future generations by systematically incorporating environmental considerations into the design and the implementation of its policies and projects. The MSDP is based on the idea that without sound environmental governance, rapid economic development risks further exacerbating existing environmental problems such as deforestation, mangrove loss, the illegal wildlife trade, unregulated mineral extraction, air and water pollution, increases in waste, and climate change.

Sustainable Land Management Implementation, Stakeholder Participation and Institutionalization in Myanmar

The local government programs as well as the international collaborated programs (Table 2) were funded annually by the respective sectors of regional or national budget of the government. Furthermore, there are international collaborated programs with FAO and World Bank in the agricultural sector and with ADB, KOICA, UNDP and UNCCD in the forestry sector.

The success and contributions of SLM programs were varied according to their nature of works. Thus, soil conservation (sustainable agriculture land technology, SALT), forest planting, landslide control, contour bunding, check-dam construction, improvement of soil fertility (gypsum, OM application and balance use of fertilizer & OM) programs were successful to some extent level due to their relative advantages and observable attributes. The international cooperation programs with ADB and KOICA (2013-15) were very successful projects for the Dry Zone Greening Department.

Table 2. International cooperation projects related to Sustainable Land Management in Myanmar (2014-2018)

Serial No.	Name	International organizations
1	Institutional strengthening (IS) project for the establishment of national ozone unit, phase III	United Nations Environment Programme (UNEP)
2	State of the environment report of Myanmar	UNEP and UN Human Settlement Programme (UN-HABITAT)
3	Preparation of second national communication under United Nations Framework Convention on Climate Change (UNFCCC)	UNEP
4	Poverty environment initiative	United Nations Development Programme (UNDP)
5	Building capacity for regionally harmonized national process for implementing convention on biological diversity (cbd) provisions on access to genetic resources and sharing of benefits	ASEAN Centre of Biodiversity (ACB)
6	Capacity building for implementing environment and social safeguards in Myanmar	Asian Development Bank (ADB)
7	Global Environment Facility (GEF) expedited enabling activity support to Myanmar for the revision of the NBSAPs and development of fifth national report to the CBD	UNEP

8	Sustainable livelihood and natural resources management in 5 townships of Northern Chin state	GRET
9	Restoring unproductive soil to get sustainable yield by green manuring & modified cropping system in dry zone (Magway)	Golden Plain Livelihood Development Services Co-operative Ltd
10	Agroforestry alternative to shifting cultivation in Myanmar (Chin)	ICRAF
11	A study of sustainable management of water to improve food security and livelihoods in the dry zone of Myanmar(Magway)	IWMI (International Water Management Institution)
12	Project for coastal livelihood and environmental assets Restoration in Rakhine (CLEARR) Rakhine	MERN (Mangrove and Environmental Rehabilitation Network)
13	Building resilient livelihoods in dry zone magway	Oxfam
14	Water for livelihoods & smallholder prosperity Shan (South)	PRIME
15	Understanding rural land issues to engage comprehensive policy dialogue in Myanmar	GRET
16	Water for livelihoods & smallholder prosperity hilly Shan (South)	PRIME
17	Strengthening Myanmar's national forest monitoring system-land use assessment and capacity building	FAO TCP/MYA/3501 -
18	Formulation and operationalization of a national action plan for poverty alleviation and rural development through agriculture (NAPA) to implement the national strategy for poverty alleviation and rural development (NSPARD) for Myanmar	FAO-UNJP/MYA/020/OPS
19	Strengthening capacity for regional coordination and implementation of ASEAN integrated food security framework and the strategic plan of action on food security	TCP/RAS/3410
20	Integrated coastal management for sustainable management of coastal fisheries and mangrove ecosystem (PIF formulation of GEF project proposal)	GCP/RAS/236/GFF
21	REDD + road map development process for Myanmar	FAO-UNJP/GLO/386/UNJ
22	Support to capacity building and implementation of international food safety standard in ASEAN countries	GCP/RAS/280/JPN

Economics Land Degradation (ELD) and Worldfish in collaboration with research team in Myanmar conducted SLM studies that the state/ region level was the major consultant institution and the district itself was in second position for participatory adopting SLM technology implementation. At the state/regional level, the consultation was made successively by the institutions from state/region, district and township levels in the agriculture sector. The relevant public departments, Civil Society Organizations (CSO) and NGO were also involved in the participatory process of the forestry sector. As the district level is proximity with the local farmers, farmers' involvement in participatory process was distinct at the district level compared with the regional level. Final decision of planning SLM program was largely made by the regional staffs for the district level. The regional and district levels coordinated for the final decision in implementing SLM programs at the regional level. According to the practices of government administration format, bureaucratic system was existent and participatory process was adopted in some cases.

Collaboration work is unavoidable to conduct the environmental conservation because of the requirement of the coordination and participation of the relevant institutions. In the state/regional level, collaboration with the national level head office among government institutions was mostly carried out in SLM implementation. The district level had worked the collaboration with the regional as well as national level government institutions simultaneously. The local level was commonly carried out collaboration within the different local government departments related to SLM. There was no satisfactory collaboration with CSOs and farmer groups at all implementing levels.

Policy implication

Myanmar has formulated its national action program to combat land degradation. Myanmar has been taking measures to respond to the various LD issues which are occurring in the Southern Shan State, highland and the central dry zone areas. The main causes of LD issues in the Southern Shan State were shifting cultivations, expansion of agricultural land, soil erosion caused by improper land preparation, nutrient depletion in soil due to heavy utilization of agrochemicals and deforestation. Soil erosion, soil salinity, soil infertility and adverse climate change in the dry zone were extensively found as the sources of LD.

The SLM programs were implemented with little budget allocation and consequently, budget provisions were not sufficient for properly conducted programs. Therefore, remedial and preventive measures have been carried out with ad hoc action in the prioritized areas only on small-scales and short-term plan due to financial and institutional constraints. Implementing the SLM programs at every institution level, the inter-agencies collaboration with the government departments was basically top-down approach. Moreover, collaborating with farmer groups, CSO, research & academic institutes were not found at satisfactory level. The national program should be fully integrated with national sustainable development program, long-term perspective plans and strategies.

The selection of SLM technology, SLM project site and beneficiaries in SLM implementation was found as partial participatory decision processes because the inadequate adoption of this process was found at both district and regional levels. Consequently, the organizational attributes in SLM programs were found to be positive and satisfied at 50% level. Role of SLM actions in local development plan, training opportunity, effective current coordination and leadership were relatively sound attributes of the organizations to SLM. However, provisions of budget and support to staff were weak in SLM implementation.

By examining HRD programs related to SLM, SLM training was comparatively low in the district level compared with the technician level. Half of the trainings for the district level were crop improvement technologies. Observing frequency of training received, the technician level received a lesser number of training compared with their senior level staff at the district level.

By summing up the findings of the research, the key issues in this research are: lack of farmers' participation, poor livelihood strategies and capacities of local people in the surrounding problematic areas, budgetary resources, inadequate technical staff, inter-agency collaboration, non-adoption of reliable laws and regulations, and control and transparent implementation.

Consequently, to accelerate the delivery of the SLM program in Myanmar, the following commitments and support are essential for improvement of the institutional capacities in the implementation of national SLM programs.

(1) Political leadership and support

Public awareness on the long-term effects of LD, sustainable land use and the effective of SLM are urgently needed to gear the awareness campaign at all levels from national, regional, district and township to villages. The existing policies, rules and regulations should be transparent and accessible not only to the concerned departments but also to all people especially related with environmental conservation.

Necessary rules and regulations should be formulated to reinforce the current conservation practices and management. Moreover, environmental education including climate change should be designed to teach in higher education level as well as in basic school for deeply understanding in the country as a whole. At present, ECD has a clear mandate on enhancing environmental awareness through training and research. Regional ECD staffs should be very active in area of providing environmental awareness in schools.

(2) Workable budget

By incorporating the national policy guidelines into the mandates of the sector, the government could support adequate budget allocation for extension activities to provide facilities and mobility for extension staffs.

(3) Appropriate and efficient technologies

Research activities on agro-ecological/ organic farming should be more emphasized in land use, soil and water conservation, forest conservation and SLM techniques. Research on local specific adaptable crops and/or trees are needed for conservation farming approach to match with local, social and economic conditions.

(4) Effective participatory extension awareness program

Participatory approaches have a positive effect on farmers' experimentation, analysis and farmer's feedback. These approaches can solve most of the generic problems of extension. It is essential to promote the use of these approaches widely in every possible area.

(5) Peoples' participation

Extension program planning, implementation, evaluation and decision making process should be bottom-up approach to be in line with participatory approaches. Without the participation of farmers and understanding of farmers' needs, no extension program can attract farmers' participation and solve farmers' problem. Thus, the concerned departments should set up the proactive and strategic extension plans to meet the needs of farmers.

(6) Regional and international cooperation

To ensure the successful national conservation program, inter-agency collaboration between government institutions, private agencies, CSOs and NGOs are essential in implementing SLM at national, regional and local levels. To reinforce and empower the national programs, regional and international cooperation are also necessary in LD issues and SLM implementation by means of bilateral or multilateral cooperation approaches.

(7) Adequate institutional capacities

Strengthening the capacities of institutions and their staffs, HRD programs such as training, workshops, seminars and discussions should be arranged periodically and adequately to cover all staffs involved in SLM implementation. Adequate manpower, mobile facilities and budget allocation are also needed to achieve a better performance of the institutions. Besides the usual implementation of departmental programs, SLM related planning and programs should be designed more and more. Research and extension linkages should be strengthened by redesigning the organization of institutions to get more coordination.

It is strongly believed that the on-going or future SLM programs will be successful if the above suggestions are properly and timely adopted to the SLM programs by the concerned institutions.

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