REPUBLIC OF INDONESIA

Indonesia - Land Degradation Neutrality National Report

JAKARTA
2015

This report summarizes the key outcomes of the national efforts carried out in 2014 and 2015 towards putting in practice the land degradation neutrality concept. The LDN project, which was sponsored by the Republic of Korea, was carried out with the support of the UNCCD Secretariat and implemented in partnership with the Joint Research Center of the European Commission and CAP 2100 International.

1. LDN National Voluntary Target and Strategy

- **LDN National Voluntary Target**

Land degradation is a reduction in the physical, chemical or biological status of land, which may also restrict the land's productive capacity (Chartres, 1987). It encompasses not only soil degradation, but also vegetation degradation, which has been defined generically as "a temporary or permanent reduction in the density, structure, species composition or productivity of vegetation cover" (Grainger, 1996). Land Degradation Neutrality [in arid, semi-arid and dry sub-humid areas] is a state whereby the amount of healthy [and productive] land resources, [necessary to support ecosystem services and enhance food security], remains stable or increases within specified temporal and spatial scales.

There is no nationally-approved definition of "degraded land" and corresponding definition in Indonesian law or policy. However, degraded land in Indonesia can be defined as "critical land" based on standard as described in the Regulation of Dirjen 4/V-SET/2013 about Technical Guidance of Conducting Spatial Data of Critical Land by The Ministry of Forestry (The Ministry of Environment and Forestry since 2014). Based on the regulation, critical land is the land which has been damaged, hence losing or reducing the function up to the defined or intended level. Therefore, the assessment of critical land in an area is adjusted with the area function. The value of critical level of land is acquired from multiplication of weights and scores value (Prasetyo et al., 2013).

Republic of Indonesia is a Southeast Asian nation located between two continents (Asia and Australia) and two oceans (Indian and Pacific) with total land area by 1,904,569 km^2. It makes Indonesia listed as 15th biggest country by land area and best known as the biggest archipelagic country in the world. Agricultural land (cultivated area) and Forest area in Indonesia was last measured at 30.08 % in 2011 (according to the World Bank) and 66.7 % in 2013 according to Ministry of Forestry(MoF).

Indonesian population increases year by year. Total population in 2010 reached 237,424,363 people with rural and urban population 50.2 and 49.8 % respectively (Indonesia's Central Bureau of Statistics). Human Development Index (HDI) of Indonesia (2013) ranked 108th out of 187 nations and classified as medium level with value 0.684.

The Gross Domestic Product (GDP) in Indonesia as reported by World Bank Group was worth 888.54 billion US dollars in 2014 (3,475.25 USD GDP per capita). The GDP value of Indonesia represents 1.43 percent of the world economy.

There are several parameters used to determine "critical land" level based on the regulation No. P.32 / Menhut-II / 2009, including: land cover, soil slope, soil erosion hazard level, land productivity, and land management. Bulk density, soil permeability, soil texture, soil structure, and soil organic carbon are some soil parameters needed in determining soil erosion hazard using USLE (Universal Soil Loss Equation) method.

Degraded land in Indonesia was 24.3 million ha in 2013 (MoF). It was caused mainly by inappropriate land use, no soil and water conservation measures applied in such areas entailed to severe erosion, sedimentation and degradation of water condition (quantity and quality) in the downstream area. Land and forest net rehabilitation targeted 5.5 ha in 5 years. Related to achieving LDN, degraded land in Indonesia could be reduced by 27.5 million ha in 2040. it means that LDN could be achieved in Indonesia in 2040 with assumption there is no additional degraded land (or less than 3.2 million ha during 2015-2040).

- **Strategy**

1. Promotion on site forest management through forest management unit, devided into 3 categories namely conservation, production, and protection forest management unit.
2. Public support and participation is critical for applying and implementing methods of prevention and rehabilitation control.
3. Developing a partnership with local institutions and community and non government organizations for an effective implementation of land degradation control.
4. Co-ordination with implementation of Convention to Combat Desertification (CCD) for synergic and effectiveness of the needed supports and resources.
5. Strengthen co-operation with related regional institutions, regional CCD thematic programme networks and international organizations.
6. Developing the capacity to be better consolidated, manage and deploy existing financial resources (APBN, APBD) and strengthen the capacity to negotiate with international and national agencies for increased financial support.
7. Establishing priorities and development of action plans through active involvement in the decision-making by local communities in the implementation, monitoring and evaluation.
8. Full participation of representative community should be engaged in all level activities (planning, implementation, monitoring, and evaluation).
9. Use best practice knowledge and robust technologies including traditional knowledge and wisdom.
10. Rising awareness about good quality environment and sustainable agriculture development.
11. Project should be holistically concern about the unique characteristic of the community in the respective degraded land (integrated and sites special project).
12. Project should concern on long-term security investment through a good and attractive land tenure system.

2. Different Critical Processes and their Corresponding Key Drivers

- **Land use/Land cover changes 2000-2010**

Land is a major factor and an essential input to fulfill human needs. Thus, land is the backbone of agricultural, industry, mining, public housing, and other human activities. Land use change is necessary and essential for economic development and social progress. However, changes in land use without sustainability approach can cause negative effects on the environment. Land use/land cover change is one of the most important environmental issue in the last decades, especially rapid decreasing of natural vegetation related to green house effect. It has been widely accepted that land use change is a result of the complex interactions between driving factors (Kelarestaghi and Jeluodar, 2009). Population growth, intensive and extensive of agricultural practices, urbanization, as well as economic development are among the forces that cause change in land use lead to server environmental problem (Giri et al., 2003). As the largest archipelagic and 15th biggest state by area in the world, Indonesia has a big impact on the world's climate conditions

. Land use is affected by the growth of population. It is related to growing demand for agricultural products that are necessary to improve food security and generate income not only for the rural poor but also for the large-scale investors in commercial farming sector. Expansion of cultivation in many parts of Indonesia has changed land cover to more agro-ecosystems and decreased natural vegetation. Population growth also related to growing demand for settlements, industry, mining etc that often converted natural vegetation. Indonesia's population increases year by year. Population of Indonesia in 2014 reached more than 240 million people, it makes the country as the 4th largest country by population in the world.

Land use/land cover change as an impact of human activities contribute to land degradation through deforestation, removal of natural vegetation, and urban sprawl; unsustainable agricultural land use management practices, such as use and abuse of fertilizer, pesticide, and heavy machinery; and overgrazing, improper crop rotation, poor irrigation practices, and so forth (WMO, 2005). The consequences and symptoms caused by mistakes in land managing also contribute to the negative effects in upstream and downstream such as floods, pollution, and sedimentation of water bodies and reservoirs. Thus, land degradation resulting from changes in land use or climatic conditions does not only involve stakehoders in the upstream, but also in the downstream (Pender et al., 2001 and Vries et al., 2002 in Valentin et al., 2008). The purpose of this study is to measure current land cover, especially the distribution of land cover types at greatest risk from land degradation (cropland, rangeland, etc.) in Indonesia.

Land degradation, a decline in land quality caused by human activities, has been a major global issue during the 20th century and will remain high on the international agenda in the 21st century. The importance of land degradation among global issues is enhanced because of its impact on world food security and quality of the environment.

An overview of Land Use Change (LUC) in Indonesia between 2000 and 2010 based on the Global Land Cover 2000 (GLC, 2000). It shows the distribution of 23 of the world's major broad land cover categories. Although this indicator does not provide information about land degradation or Sustainable Land Management (SLM) when used on its own, land cover information is required to evaluate other indicators such as land productivity and water availability. In addition, it allows for monitoring of changes in land cover, particularly

forest cover, which is an important indicator in terms of greenhouse gas emissions and carbon sequestration.

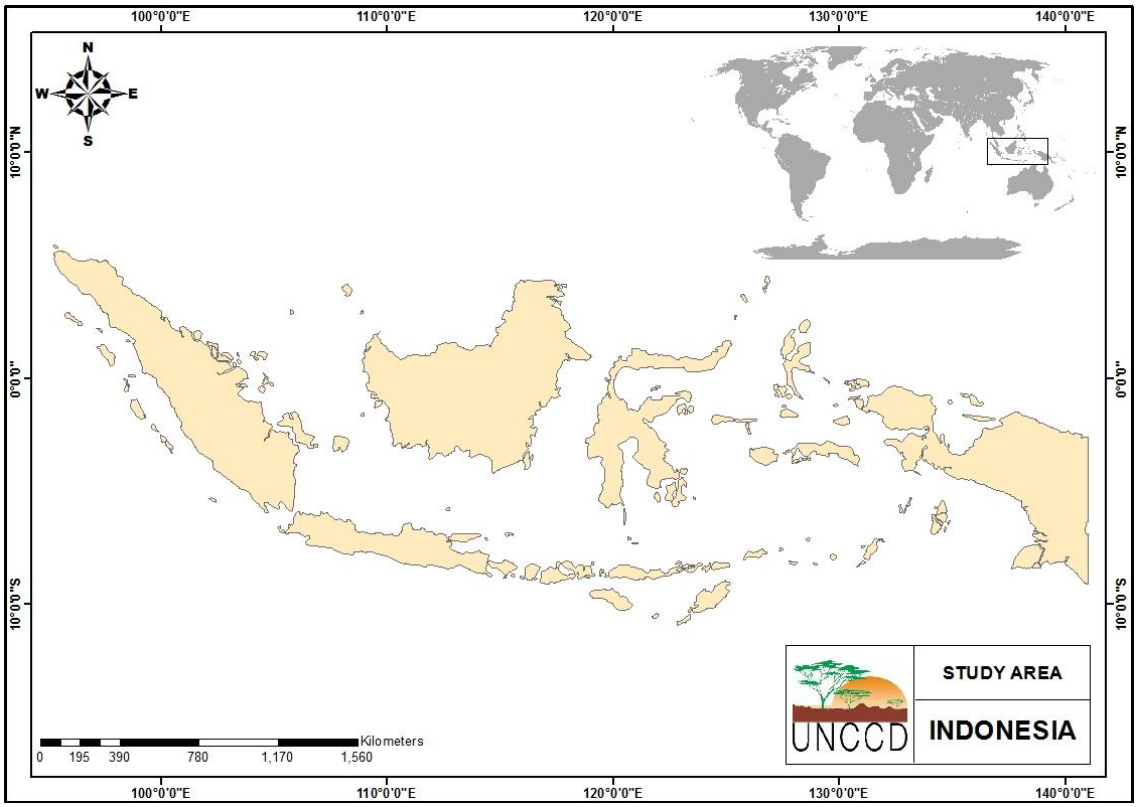

Figure 1. Map of Indonesia

Major land use changes have occurred in Indonesia during the period of 2000-2010. The total area of forest decreased by more than 2 million hectares (1.7%), while the total area of Shrubs, grasslands and sparsely vegetated areas increased by 276,966.78 hectares or 3 %. The total area of cropland increased by 1,810,485.16 hectares or 2.7 %. There is no change in wetlands and water bodies and artificial area during the period.

Table 1. Land use change in Indonesia between 2000-2010

Land use	Total Area (ha)		Land use change	
	2000	2010	hectare	%
Forest	122,124,007.15	120,036,555.24	-2,087,451.91	-1.7
Shrubs, grasslands and sparsely vegetated areas	9,330,275.59	9,607,242.37	276,966.78	3
Cropland	66,901,096.60	68,711,581.76	1,810,485.16	2.7
Wetlands and water bodies	10,077,646.16	10,077,646.11	0	0
Artificial areas	1,257,537.46	1,257,537.46	0	0

Deforestation

Indonesia is one of the most important areas of tropical forests worldwide. These forests are also of global importance because of their biodiversity and the carbon sequester. Seventy-five percent of Indonesia's total land area of 191 million hectares is classified as forest land, and the tropical rain forest component make up the vast majority of forest

cover. Total forest area is approximately 133.6 million ha and non-forest area is 54.3 million ha. Based on its function, about 15% of forest area is categorized as conservation forest, 22% as protection forest, 46% as production forest and 17% as convertible production forest. Based on 2007 satellite assessments, forest area covered by forest was about 85.9 million ha (64%), 39.1 million ha were without forest and 8.5 million ha were unidentified due to cloud cover (Ministry of Environment, 2010). Indonesia boasts the world's third largest area of tropical rainforest. But high deforestation rates mean that vast areas of rainforest are being lost every year. This study showed that 276,966.78 ha forest has changed and become shrubs, grasslands and sparsely vegetated areas and 1,810,485.16 hectare become cropland.

The main driver of this loss is export-led agricultural expansion, including for the production of palm oil. Key factors behind the forest loss and land use change in present-day Indonesia are the expansion of oil palm, plywood production and pulp and paper industries. Oil palm has been one of the fastest-growing sectors of the Indonesian economy, increasing from less than 1 million hectares in 1991 to 8.9 million hectares in 2011. The plywood and pulp and paper industries have also expanded significantly since the log export ban in 1985. All three sectors have contributed to deforestation (Casson et al., 2014).

Agricultural Expansion

Cropland area in Indonesia increases by 3% between 2000-2010. The Food and Agriculture Organization of the United Nations (FAO) estimates that in developing countries alone at least 13 million hectares of forest are lost to agriculture each year. Agriculture, like any other use of natural resources, has an environmental impact. Soil organic matter, as a key indicator of soil quality and health declines as a result of the conversion of natural vegetation. Aeration from cultivation speeds up decomposition rates of existing organic matter in the soil. In addition organic matter is removed in the form of harvested crops rather than being returned to the soil, so it is not replaced at the same rate as in natural ecosystems. Croplands are the most susceptible to erosion because of repeated cultivation and the continual removal of plant cover. About 80 percent of agricultural land is moderately to severely eroded and 10 percent suffers slight to moderate erosion (Pimentel *et al.* 1995).

Degradation has resulted from soil compaction, water erosion, and the depletion of minerals and organic matter through overplanting, intensive harvesting without replenishing the soil, and overgrazing. In addition, where rainfall is inadequate there is considerable salt buildup (salinization) from improper irrigation and poor drainage.

Nothing protects soil as much as permanent cover. Dense forests provide the best cover, but even grasslands offer substantial protection and reduce soil erosion to negligible amounts. Annual crops, on the other hand, leave soils exposed for weeks and sometimes many months before plants grow enough leaves to cover the ground. Often crop residues are removed after (or as part of) the harvest, leaving the soil exposed to the elements for many months before the next planting season. Roots and leaves of annual crops can never provide as much erosion protection as the dense root systems and overlapping leaves and stems in natural grasslands or multistoried forests. Even perennial crops are, for the most part, worse in soil protection compared with any natural ecosystem.

Wetlands, Water Bodies, and Artificial Areas

There is no change in wetlands, water bodies, and artificial areas in Indonesia between 2000-2010. It is occurred because of the spatial resolution that used in this study (300x300 m) caused changes in wetlands, water bodies, and artificial areas can not be read. It has been recognized that spatial pattern and spatial scale are inseparable in theory and in reality (Qi and Wu 1996; Turner et al. 1989). Spatial pattern occurs on different spatial scales, and spatial scale affects spatial pattern to be observed. Consequently, the results of urban land use pattern analysis also show difference in different spatial scales, and it will influence the construction of spatial model of urban land use change.

Mangrove is one of important wetlands ecosystem in Indonesia. One of the latest publications on the status of Indonesia's mangroves can be seen in Indonesian Mangrove Atlas published by the National Survey and Mapping Coordination Agency (Bakosurtanal, 2009). The Agency is confident that the figures presented for national mangrove area in this publication are the most accurate because these estimates are based on analysis of satellite images that cover the entire coastal regions of Indonesia.

Table 2. Indonesia's mangrove estimates

Source and year of publication	Mangrove Estimate		Data Source
	Area (ha)	Year	
Giesen et al (2006)	2,930,000	2000	FAO (2003); Spalding et al. (1997)
FAO (2007)	2,900,000	2005	Dephut (2003) and other supporting sources
RLPS-MoF (2007)	7,758,410	2000	National land system map 1995 – 2000
Spalding (2010)	3,062,300	2003	MoF (2003)
Bakosurtanal (2009)	3,244,018	2009	Satellite Images Analysis

Source: Ilman, et al. (2011)

Widigdo's (2000) research of the literature on the extent of Indonesia's mangrove forests indicates that they shrank drastically from a total area of 5.21 million to 3.24 million hectares in the five years 1982 – 1987. This depletion continued until only 2.5 million hectares remained in 1993. Another study, Anwar and Gunawan (2006), state that the rate of mangrove destruction in Indonesia has reached an alarming 530,000 hectares a year. This is much faster than the rate of mangrove rehabilitation, which is estimated to be around 1,973 ha a year.

Table 3. Changes in Mangrove Area in 6 regions of Indonesia based on data from RePPProTand, Geospatial Information Agency

Region	Area (ha)	
	1989	2009
Sumatera	857,000	576,956
Java	170,500	34,482
Bali and Nusa Tenggara	39,500	34,524
Kalimantan	1,092,000	638,283
Sulawesi	242,027	150,017
Maluku	197,500	178,751
Papua	1,500,000	1,634,003
Total	4,098,527	3,247,016

Source: Ilman, et al. (2011)

- **Land productivity dynamics (LPD)**

Land degradation is reduction in the capacity of the land to provide ecosystem goods and services over a period of time. Eswaran *et al.,* (2001) noticed that Land degradation can be considered in terms of the loss of actual or potential productivity or utility as a result of natural or anthropic factors; it is the decline in land quality or reduction in its productivity.

The term "dynamics of land productivity" refers to the fact that the primary productivity of a stable land system is usually highly variable between different years/vegetation growth cycles as a function of natural (semi-natural systems) or partially human induced adaptation and resilience to diverse environmental conditions and human intervention. Hence a land system's primary productivity assembles rather a dynamic equilibrium than a linear evenly evolving continuum.

The spatial extend and distribution of the LPD classes have been disaggregated by the 6 LUC classes described before and can be made available for each country as numerical values of the area of LPD class under the respective Land Cover classes mapped by the ESA data in 2000 and 2010, as well as in relation to areas which have been subject to land cover change. Land Productivity Dynamics data sets have been clipped per each of the 6 land cover categories. The 6 separate maps have been generated, classifying each land cover type according to 5 degrees of productivity (declining, early stage of declining, stable but stressed, stable not stressed, and increasing). Declining and early stage of declining should get more intention in land productivity dynamics.

Declining land productivity for forest, cropland, and artificial areas 9,246.4; 21,208.3; and 2,723.8 sq km respectively. Meanwhile, declining in Shrubs, grasslands and sparsely vegetated areas by 4675.2 sq km. Declining in wetlands and water bodies by 3505.6 sq km. Land productivity dynamics in Indonesia can be seen in Table 4.

- **Soil organic carbon content**

Excluding carbonate rocks, soils represent the largest terrestrial stock of C, holding between 1400 x 1015 g (Post et al., 1982) and 1500 x 1015 g C (Batjes, 1996). In most soils (with the exception of calcareous soils) the majority of this carbon is held in the form of soil organic carbon (SOC) (Batjes and Sombroek, 1997). Thus changes in terrestrial SOC stocks (both increases and decreases) can be of global significance and may either mitigate or worsen climate change. SOC is vital for ecosystem function, having a major influence on soil structure, water-holding capacity, cation exchange capacity, and the soils ability to form complexes with metal ions and to store nutrients (van Keulen, 2001).

Appropriate management of soils to increase SOC levels can therefore increase the productivity and sustainability of agricultural systems (Cole et al. 1997). Such management also has a part to play in the mitigation of green house gases (GHGs), with soils having the capacity to release or store C. This is recognised by the United Nations Framework Convention on Climate Change and the Kyoto Protocol, which refers to the removal of C from the atmosphere by the improved management of agricultural soils (Article 3.4.) and by forestry activities, including C storage in forest soils. Wetlands and water bodies have the highest soil carbon content, followed by Forest land , Shrubs, grasslands and sparsely vegetated areas, cropland, and artificial areas. Soil organic content for each land use in Indonesia can be seen in Table 4.

3. National Land Management Plan

A) Summary tables

Table 4 (*) - Presentation of national basic data using the LDN indicators framework

Land-Use Category	Land area (2000)	Land area (2010)	Net change in area (2000-2010)	Net land productivity change (sq km, 2000-2010)					Soil organic carbon (2010)
	sq km	sq km	sq km	Declining	Early stage of declining	Stable but stressed	Stable not stressed	Increasing	ton/ha
Forest land	1051739.1	1031504.8	-20234.3	9246.4	31585.1	98962.4	843348.9	43693.6	97.18066786
Shrubs, grasslands and sparsely vegetated areas	87549.8	90187.1	2637.3	4675.2	5717.6	10944.8	50480.4	14678.8	96.20785076
Cropland	647240.1	664837.1	17597.0	21208.3	24209.6	59397.6	481713.1	56983.7	94.76364849
Wetlands and water bodies	84446.1	84446.1	0.0	3505.6	2697.3	9071.0	41233.3	5849.1	153.8662783
Artificial areas	12261.7	12261.7	0.0	2723.8	783.6	1836.7	4209.5	2363.4	76.75702699
Bare land and other areas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Balancing term	0.0	0.0	0.0						
Total	**1883236.8**	**1883236.8**	**0.0**						

Table 5 - Target setting

Negative trends	Area (sq km)	Corrective measures	LDN target		Investments required (M USD)
			Area (sq km)	Time (year)	
Conversion of forests into shrubs, grasslands and sparsely vegetated areas (12) with declining productivity (1)	2637.3	Forest rehabilitation	-2637.3	2040	181.9
Conversion of forests into cropland (13) with early signs of declining productivity (2) or stable and not stressed (4)	17597.0	Forest rehabilitation	-17597.0	2040	1,213.6
Forest (11) showing early signs of decline (2) and having a declining productivity (1)	40831.5	Forest rehabilitation	-40831.5	2040	?
Shrubs, grasslands and sparsely vegetation (22) showing early signs of decline (2) and and having a declining productivity (1)	10392.8	sustainable land management practice by applying soil and water conservation technology using mechanic and vegetation method	-10392.8	2040	?
Cropland (33) showing declining productivity (1) and early signs of decline (2)	45417.9	sustainable land management practice by applying soil and water conservation technology using mechanic and vegetation method	-45417.9	2040	?
Wetland and water area (33) showing declining productivity (1) and early signs of decline (2)	6202.9	Mangrove forest rehabilitation	-6202.9	2040	?
Shrubs, grasslands and sparsely vegetation (22) increasing productivity (5)*	14678.8	sustainable land management practice by applying soil and water conservation technology using mechanic and vegetation method	-14678.8	2040	?
Total	**-**		**0,00**		**-**

4. LDN Centered NAP SWOT Analysis

NAP Resume

The United Nations Convention to Combat Desertification (UNCCD) was established in efforts to halt land degradation in 1994. The land degradation issue became a matter which requires an immediate attention of the international society, an issue that must be dealt by all humankind; the enhanced implementation of the Convention is critical for our future survival. Land degradation refers to any reduction or loss in the biological or economic productive capacity of the land resource base. The concept of land degradation neutrality was first introduced as "zero net land degradation". This goal or target would be achieved by: (a) managing land more sustainably , which would reduce the rate of degradation; and (b) increasing the rate of restoration of degraded land, so that the two trends converge to give a zero net rate of land degradation. Achieving LDN could contribute to global sustainable development efforts; it could deliver greater food, energy and water security and build the resilience of UNCCD Parties to the impacts of drought and other climate-related disasters. Rio+20 heralds a global commitment to achieve a land degradation neutral world or, in other words, a world where all countries individually strive to achieve land degradation neutrality.

National action programmes (NAPs) are the key instruments to implement the Convention. The NAPs are developed through a participatory approach involving various stakeholders, including relevant governmental offices, scientific institutions and local communities. They spell out the practical steps and measures to be taken to combat desertification in specific ecosystems. Indonesia as a party of the convention and participating in the implementation of the LDN Project has its own NAP which signed in 2002. The NAP was considered as the focus of the actions, consolidation of projects and activities identified for an integrated solution in combating land degradation in Indonesia. This review emphasizes in suitability of Indonesia's NAP related to the objectives of LDN Project to reach zero net land degradation.

As one of parties of the convention, Indonesia is required to fulfill some obligations including national reporting, preparation of National Action Plans or Programme and participate actively in convention activities at national, regional and international level. National Action Program (NAP) addresses the underlying causes of land degradation and drought and identifies measures to prevent and rehabilitate it. This NAP is considered as the focus of the actions, consolidation of projects and activities identified for an integrated solution in combating land degradation in Indonesia. In line with the scope of the convention, the focus of the programmes is directed to solve land degradation, developing strategies for drought mitigation and relief, and encouraging partnership with local community to combat land degradation in the driest provinces in Indonesia, namely East Nusa Tenggara, West Nusa Tenggara, and Central Sulawesi.

The National Action Programme (NAP) to combat land degradation (CLD) in Indonesian context in particular, is therefore defined as measures to prevent land degradation and to rehabilitate degraded land on dry land with full participation of local communities. The purpose of NAP is to identify the factors contributing to land degradation and practical measures necessary to combat land degradation and mitigate the effects of

drought. There are 13 Thematic Programmes & Projects mentioned in the NAP: Providing Enabling Conditions, Land Degradation Inventory and Monitoring, Promoting of Agroforestry, Monitoring and Mitigating the Impact of Drought, Prevention of Land Degradation, Rehabilitation of Degraded Lands, Improvement of irrigation facilities and Water Conservation, Sylvo and Agro-pastoral Development, Monitoring and Evaluating of Climatic Variation, Empowerment of Local Communities and Local Institutions, Establishment of Sustainable Land Management, Providing Guidelines and Manuals, and Creating and improving market system.

In general terms, drought considered as the situation where water demand for any particular system use significantly exceeds water supply from the traditional water source for the system. Precipitation is the major factor that often determines water avaibility from most natural sources of water, including water that may be available from underground aquifers, rivers, lakes, etc. Drought is a naturally occurring phenomenon that can accelerate desertification and land degradation (Nkonya et al. 2011). Drought has long been recognized as one of the most insidious causes of human misery. It has today the unfortunate distinction of being the natural disaster that annually claims the most victims. Its ability to cause widespread misery is actually increasing. While generally associated with semiarid climates, drought can occur in areas that normally enjoy adequate rainfall and moisture levels. In the broadest sense, any lack of water for the normal needs of agriculture, livestock, industry, or human population may be termed a drought (Schramm and Dries, 1986).

Drought in semi arid areas in Indonesia become a focus point of the NAP. Those areas are West Nusa Tenggara, East Nusa Tenggara, and Central Sulawesi Provinces. Those areas are well known as the driest climate areas in Indonesia and mostly different with other Indonesian regions. Dry climate areas are defined as those areas with an annual rainfall less than 1000 mm. Based on this criteria, most areas in North and South-East Coast Bali, most of Nusa Tenggara (East and West), Central Sulawesi have this pattern and they comprise the dry lands of Indonesia. The climate of East Nusa Tenggara province is untypically dry relative to the rest of Indonesian archipelago with more than 6 dry months (<100 mmm monthly rainfall) and <4 wet month (>200 mm monthly rainfall). While, most of Indonesian regions such as Western Sumatra, Java, Bali, Kalimantan, Sulawesi, and Papua are mostly humid with annual rainfall of more than 2,000 mm (Mulyani et al., 2013).

Droughts normally occur during long dry seasons in certain areas, especially in eastern Indonesia such as West Nusa Tenggara, East Nusa Tenggara, and several areas in Sulawesi, Kalimantan and Papua. Beside causing water supply for crops and hydropower plant, drought also potentially lead to an increase in the number of tropical diseases such as malaria and dengue fever (BNPB, 2006). Figure 1 describes potential drought areas in Indonesia with red colour reflects highly potential drought and three provinces of NAP focus are including.

Drought, especially in semi arid areas in Indonesia, is a serious problem that the government have to concern in it, but undoubtedly the main problem of Indonesia realted land degradation and its drivers is deforestation. The loss of forest and their products and services is mainly a national policy problem in the sense that the costs are born by Indonesia (Tacconi, 2003). The alarming rate of deforestation in Indonesia has become a major concern nationally and globally (WWF, 2009).

Despite the benefits they provide, Indonesia's forests have been under considerable threat in past decades, and the extent of forest cover has declined considerably (Pagiola,

2000). The absolute rate of deforestation in Indonesia is considered to be among the highest on the planet, and has been estimated to fluctuate between 0.7 and 1.7 Mha yr-1 between 1990 and 2005 (Hansen et al., 2009).

Deforestation in Indonesia was clearly mentioned in the NAP. "The latest record of deforestation in Indonesia points out at a rate of 1.8 million hectares per year until 2002. Recent data from the Ministry of Forestry shows that degraded land has reached 34.8 million hectares consists of the following classification: 4 million hectares in Protection Forest, 1.9 million hectares in Conservation Forest, 13.8 million in Production Forest, and 15.1 million in non forest lands".

Indonesia lost 0.48 million hectares of forests during the period 2009-2010. This figure is smaller than the rate of deforestation over the period 2000-2006, which reached 1.7 million hectares per year (UNDP, 2012). Other study showed that Indonesia's forest area totaled 134 million hectares (ha) in 2009, about 60% of the country's land area. From 1990 to 2008, actual forest cover decreased by 7.5%. The vast rainforest is a habitat for a wide diversity of species, and provides goods and services that are important in sustaining the country's water supply, agriculture, coastal fisheries, tourism, and livelihoods. Deforestation is thus a critical problem in Indonesia. Its far-reaching effects include a loss of biodiversity, desertification, flooding, food insecurity, and impoverishment of local communities whose incomes depend critically on the use of forest resources (ADB, 2012).

Beside tropical rain forest, Indonesia also has the largest area of mangroves of any country, a large part of which is concentrated in Papua. Mangroves are found throughout the country, although they are scarce in West Sumatra. Other very large areas are found along the east coast of Kalimantan and the east coast of Sumatra. The diversity of mangrove species found in Indonesia is very high (FAO, 2005). In this term, Indonesia also faces critical problem related to mangrove forest loss. One third of the total area of mangroves (3,8 ha) in the mid-1980s, or 1.3 million ha, had been cleared by 1993, which would be equivalent to over 160,000 ha per year (Pagiola, 2000).

The main reason for mangrove clearance is conversion to brackish-water fishponds (tambaks) (Pagiola, 2000). Losses of mangrove areas in Indonesia can mostly be attributed to the development of shrimp ponds and logging activities. Conversion to shrimp ponds is especially prevalent in East Java, Sulawesi and Sumatra. Local use of mangrove products includes timber for construction, considerable usage for fuelwood, the use of Nypa for sugar production and Nypa leaves for roofing. Commercial uses include charcoal production and large areas of logging concessions. Production of woodchips and pulp is increasing (FAO, 2005). Many publications on the distribution and status of Indonesia's mangroves. Ilman et al. (2011) assumed that there were 4,098,527 ha in 1989 and 3,247,016 ha in 2009. It means 851,511 ha loss in 20 year period (42,576 ha year-1).

NAP SWOT Analysis

The analysis of the strengths, weakness, opportunities and threats (SWOT) is used in assessing Indonesian NAP related to LDN project. This NAP is considered as the focus of the actions, consolidation of projects and activities identified for an integrated solution in combating land degradation in Indonesia.

The SWOT matrix

STRENGTHS	WEAKNESSES
1. The existence of specific institution in handling land and forest rehabilitation related to combating land degradation. 2. There are a good coordination between Ministries in combating land degradation 3. Strategy, project, and programme related to combating land degradation well mentioned in the NAP	1. Selected site location did not describe the main problem of land degradation in Indonesia 2. Selected site location did not describe the climate in Indonesia
OPPORTUNITIES	**THREATS**
1. There are so many regulations about combating land degradation in Indonesia 2. Support from the Government of Indonesia in combating land degradation 3. There are several sources of funding (government, private sector, civil society, etc.) 4. Support from NGOs in the environmental field.	1. Geographically, Indonesia is a vast country and it has different climate from the eastern to the westernmost part of the country 2. High deforestation rate 3. Increasing in total of population 4. Increasing in urban society 5. Increasing in cropland area 6. Low public environmental awareness

5. National Map of Selected LDN Hotspots

There are 3 region (provinces) that selected as Indonesia's Selected hotspot. These areas are East Nusa Tenggara, East Kalimantan, and North Sumatra Province. East Nusa Tenggara is best known as one of the driest area in Indonesia. Drought is the main problem in this area and occurred almost every year. As described above, Indonesia is one of the most important tropical area in the world. Deforestation in Kalimantan or Borneo island well known globally and being worse year by year. East Kalimantan Province is selected as one of LDN hotspot in Indonesia. Degradation in mangrove ecosystem also being concerning in the last several decades. North Sumatra Province selected as LDN hotspot related to mangrove ecosystem.

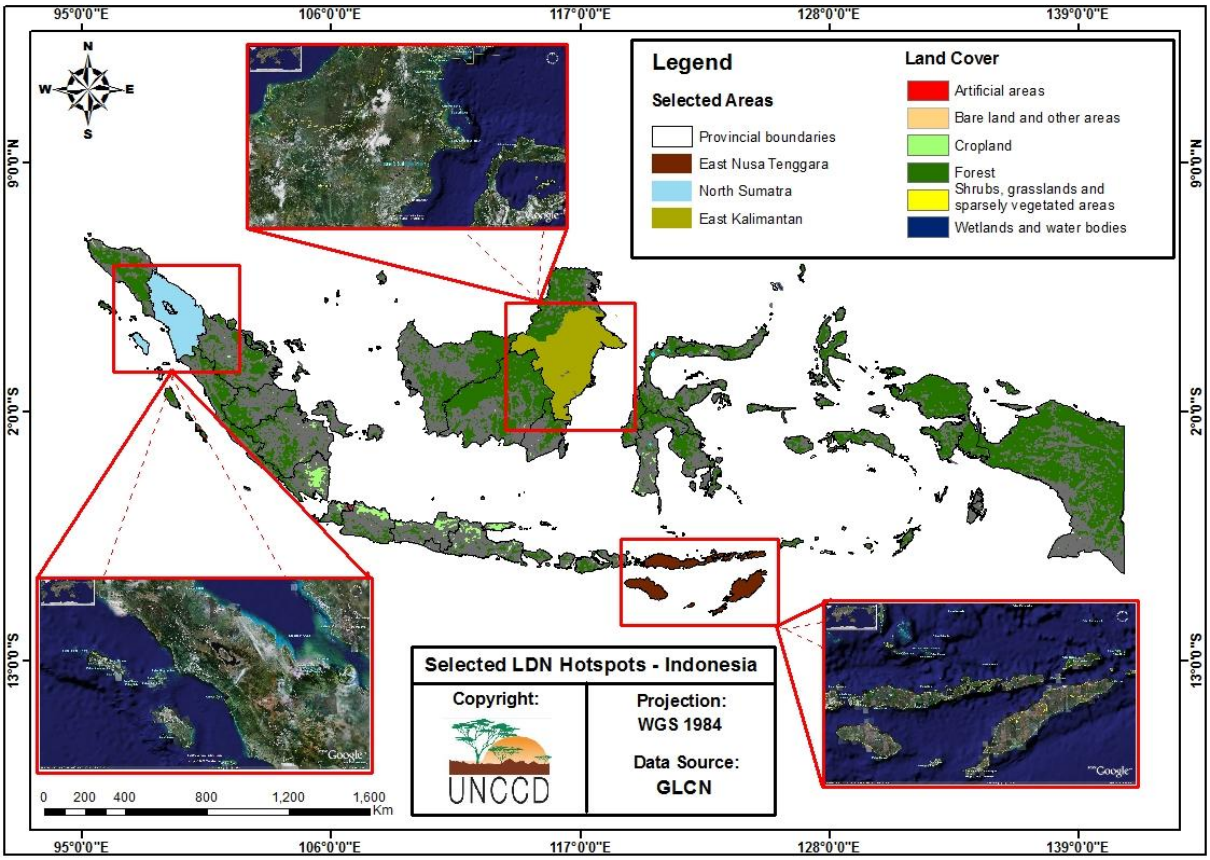

Figure 2. Indonesia's Selected LDN Hotspots

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