Chapter 1 : SFM Criteria & Indicators - Forest Europe

Criteria and indicators for sustainable plantation forestry in Indonesia CIFOR has developed a system for testing criteria and indicators to assess the sustainability of management of natural forests at the level of the forest management unit.

Karim To cite this article: Aswar Limi, Jufri Karim. Agriculture, Forestry and Fisheries. Information of land suitability is needed to prioritize suitable forest plantation for land use development. This is important to increase land productivity and eficiency on forest management decision making process. This research aimed to: This research was conducted from January to May in four districts namely: The research method used was a spatial research method using GIS [1];[3]. The research has three main activities: Data collection included data on land biophysics, climate, and forest management development using survey method. Land evaluation was carried out on FAO method [14] and [15]. The last but not the least, spatial data development was used to map recommended forest land uses. The results showed that: Result and Discussion 4. Land Suitability Potential for Plantation Forest 4. Determination of Trees Priority 4. Conclusions Acknowledgements References 1. Introduction Forest is one of the natural resource that is important for human life. Trees provide many benefits in human life, especially for producing oxygen and absorbing carbon, thus making human beings can breathe well and remain comfortable living environment. Besides that, if properly managed, forest will provide economic benefits through job creation while maintaining environmental advantages. In the other words, the depletion of forest resource can lead to unavailability of oxygen and an increased in carbon concentration in the atmosphere, thus causing global warming, which in turn is definitely an uncomfortable environment even human life can be destroyed. On the other hand, forest development sector encounters many obstacles and threats, including highly sensitive of forestry land use which can be rapidly change to other land uses, such as housing, infrastructure, and agriculture land, thus threatening a sustainability of forest community development [17]. Futhermore, according to [12] the conversion of forested land to other land uses will decrease the ecological benefits, such as hydrological roles, erosion control, reducing surface runoff and soil fertility control. Thus the need to continuously maintaining existing forest and the development of forest plantation efforts should be sustainably conducted in order to obtain socioeconomic and environmental benefits. The development of plantation forest area in this region is potential. This is due to land availability and well adapted of trees to relatively low rainfall. To deal with a relative low rainfall in this area, the soil structure needed to properly managed so that infiltration capacity of soil can increase as well as soil aeration. This is because the rough structure of soil has a better aeration and infiltration capacity compare to the clay soil. According [25] the development of sustainable forest plantation area can be managed through corporate agribusiness system approach in overall management process ranging from commodities selection to production techniques land preparation, planting, maintenance, harvesting and post-harvesting. Forestry plants can only be well grown and achieve optimal productivity when supported by land characteristics particularly suitable climatic and soil conditions. According to the [13], there are three aspects of climate that affect plant growth and productivity of the forest, namely changes of air temperature, changes of precipitation and atmospheric CO_2 concentration. According to [30] crop management will be more efficient and sustainable when in accordance with the biophysical and preferences of society toward plant species developed. Land use planning that involves multifactors and multicriterias, especially biophysical aspect based on pedo-agroclimate, and socio-economic and cultural aspects will be appropriate solution for land use development in the study area [2];[19]. However, a proper land use planning has not been developed due to lack of spatial and attribute data. Based on aboved explanations, the need for conducting land suitability analysis for plantation forest management employing multi-criteria approach is urgent. This research was conducted on four districts out of seven districts in Buton regency, including Kapontori 38, Methodology This research using multiple criteria that include secondary data and primary data. The research was conducted in three main: These three main steps were performed in five stages: Figure 1 shows the schematic diagram of

research activities. At the early stage, preparation was conducted to collect data and information on secondary and primary data. Secondary data were directly collected from the sources, while primary data were collected using survey method and interview, either directly or through questioners. Land biophysic data were directly collected in the field on each research site, based on technical guidelines provided by the Research Center for Soil and Agroclimate [32]; [31]; [27]. Method for soil sampling and analysis was based on Soil Survey Staff [33]; [34]; [35]. Similarly, social and economic data which has been collected and analyzed by appropriate method. Analysis of data to determine land suitability classes using FAO method [14] and [15]. The last but not the least, spatial data development was used to map recommended forest plantation land uses. Diagram of Research Activity. There is still Kapontori 73 units 12, Landform GIS analysis interpretation and field observation show that there were five landform categories on the recerch region with a total area coverage is different, namely: Hill system H 15, All categories are included in the four districts with different coverage areas, for example category hills system H which has the highest coverage area was in Kapontori 6, Geology Interpretation of satellite images and regional geological map was relevant to the field observation of geological formation on research locations, in which the geological formation in the research region was relatively complex and they were grouped into nine formations: Geology formation that is located in four research location namely Wp, Td, and Al, with an area of coverage vary from one location to others. Geological formation with the highest coverage area was Wp 13, Topography and Slope The results showed that the topography in the research region are relatively varied, ranging from flat areas flats , wavy undulating , corrugated rolling , rolling hilly to mountained mountainous. The Slope ranges on the research region are varied that are grouped in to seven classed: Temperature Climatic data analysis showed that the overall air temperature in the study area ranges from 26 - 28oC to Rainfall There are four yearly rainfall categories over the research region, namely: This is spread over in almost of the study area, except in Kapontori. Whereas rainfall with 1, Besides, there is also 1, Climate Type Accumulation of all climate conditions, particularly monthly rainfall, creates a certain climate type. Based on Schmidth-Fergusson classification method in the research region, there are two types: Soil Type The soil type ranges on the research region area varied, grouped into six classed: The six types of soil are located in all research location, except in Kapontori. Tropudults and Dystropepts types are located in Siotapina. Eutropepts is the widest area and is located in Kapontori 5, Soil Texture The results showed that the soil texture in the research location consists of eight broad categories with different extent, namely: The soil texture with the most extensive coverage is clay which spread over in the research location, which is 3, Soil Structure The results showed that the soil structure in the area consists of three categories with a total area of coverage varies: The structure range with the highest coverage area is blocky and existed in all research locations, in which the highest coveraged area was in Kapontori 8, Soil Depth Soil observation and measurement showed that the thickness of the solum and effective rooting depth in the research location consists of five categories with different scope: Soil depth of the dominant category in the research region is Shallow 20 to 50 cm , the widest available in Kapontori 5, While very deep soils are most widely available in South Lasalimu, Lasalimu, Kapontori and Siotapina which cover 2, Rock Surface The results showed that the condition of the soil surface rocks in the study area consists of seven broad categories with different scope: The broadest category of surface rocks is very rocky, of which is located in Kapontori 4, While the not rocky is the smallest rocky surface which is relatively evenly distributed in all areas of study and covers Surface Rock Outcrops Land surface analysis showed that the condition of the ground surface rock outcrops in the study area consists of seven broad categories with different scope: The broadest category of surface rocks outcrops is pretty rocky, of which is located in Kapontori 4, While the outcrop rock is the smallest rocky outcrops surface which is relatively evenly distributed only in Siotapina Soil Fertility The results showed that the fertility of the soil in the research region consists of three broad categories with different scope: From category soil fertility that is most widespread medium category, are the largest in Kapontori 9, While soil fertility with a low category, only in South Lasalimu Land Use The interpretation result satellite data and field observation revealed that there are

extremely diversed land primary forest Htpr 1, The widest land use is a mixture of dry land agriculture bushes, mostly located in Lasalimu 4, Primary forest is only found in Kapontori 1, Land Suitability Potential for Plantation Forest There are three types of trees that has been evaluated using Land Suitability Classification for the plantation forest and management, namely Teak Tectona grandis , Mahogany Swietinia sp. Results of analysis of potential land suitability classification of the trees can be seen in Table 1.

Chapter 2 : Criteria and indicators for sustainable plantation forestry in Indonesia

Criteria and indicators for sustainable management of industrial plantations in Indonesia were developed and tested during and This work was made.

Forest policy and governance As an overall approach to address forest policies, institutions and instruments for Sustainable Forest Management, overall qualitative indicators have been elaborated and endorsed at the pan-European level. These 5 qualitative indicators provide general information on policy for a sustainable forest management and the way forests are governed in the pan-European region and at national level. The assessment of these indicators help monitor the status and changes in policies, institutions and instruments, enhance accountability and transparency of policy making, and allow a better understanding of the interplay between the state and trends of forests and forest management and the policy making. They also support the strategic orientation of policies and, over time, help create more efficient and effective policies and institutional arrangements to govern SFM. In the Pan-European Region there is a greater number of countries using NFP to develop sound forest policy frameworks. However, there is still a need to keep them dynamic, flexible and able to respond quickly to emerging needs and issues. They must encourage substantive participation of key stakeholders and strengthen the link to overall national development goals and forest-related sectors. The institutional and legal frameworks of SFM have changed in the majority of countries of the region adapting to changing societal needs and priorities. Timely and adequate changes are necessary to address current challenges effectively, seize emerging opportunities and contribute to fostering a green economy. Most European countries are pursuing active and target-oriented policies in a number of forest-related policy areas. They currently focus on issues as climate change, mobilization of wood resources, biodiversity, non-wood goods, forest ecosystem services, and economic viability of the forest sector and its contribution to rural development in a green economy. Increasingly, society and global markets are placing multiple demands on forests. Changes in national policy objectives concern biodiversity, the production and use of wood, carbon balance and land use and forest area. These changes are often accompanied by new regulations or amendments of existing ones. Institutional reforms have mainly affected policy areas like climate change and carbon as well as research, training and education. The following qualitative indicators describe and enable to monitor periodically and assess the current situation and change in overarching policies, institutions and instruments for sustainable forest management. In fact, Europe is the only World region having a positive net change in forest area for the past two decades and has gained 5. Indeed, forest cover in Europe is very heterogeneous. North Europe and the Russian Federation are the parts of Europe with the largest forest cover, while South-East Europe is the least forested part of Europe. About 50 percent of pan-European forests are in the Russian Federation. Half of these forests are predominantly coniferous, a quarter are predominantly broadleaved, and a quarter are mixed. The total growing stock of forests in pan-European region is In the last 20 years, on average, more than million m3 has been added each year due to expansion of the forests into non-forest lands and an increase in stocking levels. Between and , the average annual sequestration of carbon in forest biomass reached million tons in the European region, about 10 percent of the greenhouse gas emissions, of which million tons corresponds to the EU in The stock of dead organic matter and soil organic carbon also seem to have increased. Majority of these forests can be cosidered even-aged, in which majority of trees in each forest stand are, approximately, of the same age. The majority of the forests in the region, 43 percent, without the Russian Federation, are from 20 to 80 years old, 12 percent are younger than 20 years, and 18 percent are above 80 years. The areas of old overmatured and uneven-aged forests tend to increase slowly. Forests Health and Vitality Criterion 2: Air pollution and depositions, especially of sulphur, have been reduced in the last decade. Yet emissions of nitrogen compounds are still high. Both nitrogen and ammonia depositions indicate the need for further emission reductions. European forest soils are endangered by acidification by 0. Yet, the development of pH and base saturation of soils did

not show a uniform pattern within Europe since both increase in acid soils and decrease in the rest of the soils. Additionally, it was found that there was an increase in organic carbon in the organic and upper soil layer of the majority of the plots analysed. Another indicator of forests health is tree defoliation. Around 20 percent of European trees are considered to have a mean defoliation of 25 percent or more, what classifies them as damaged or dead. These high levels reduce trees potential to withstand adverse environmental impacts. Yet the defoliation rates vary among regions and tree species being higher in central Europe and along the Mediterranean coast in Croatia, Italy and France. Lower mean defoliation occurs in northern Europe. The drivers of trees defoliation are insect attacks and fungal diseases, in combination with increased vulnerability caused by deposition loads, weather conditions, and other anthropogenic factors. Forests are subject to abiotic, biotic and human induced damaging agents. The damage is most frequently caused by insects and diseases. Productive Functions of Forests Criterion 3: It reflects the aim to maintain an ample supply of forest products and services, while ensuring that production and harvest are sustainable and do not compromise the management options for future generations to have productive forests. Wood still remains the main forest product. To secure current and future wood availability and to stabilise the growing stock in forests, the balance between net annual increment and fellings is crucial. In most European countries wood removals do not exceed increment and thus comply with sustainable forest management principles. It is estimated that just approximately 40 per cent of the annual increment is used which represents million m3 of fellings. Trends show that the felling rate has decrease in the Russian Federation from 41 per cent in to around 20 per cent since In Europe without the Russian Federation, the felling rate increased from 58 per cent in to 62 per cent in In , more than million m3 of roundwood were produced with a market value of EUR The demand for fuelwood and biomass is rapidly increasing in many European countries. Apart from wood, non-wood products derived from forests can be an important source of local income. It differs between countries, therefore, a comprehensive view on all types of these goods across Europe is difficult to obtain. The total reported value of marketed non-wood goods amounts to EUR 2. In , Christmas trees, fruits and berries, and cork were the most important non-wood goods in Europe. The market value of non-wood goods represented 15 percent of the value of marketed roundwood in countries that reported both values. Forests also provide multiple services including soil protection, water, regulation of global carbon cycle, genetic resources, biodiversity, recreation, hunting, cultural services, etc. These services can become a source of significant income for private and public landowners. Though their value is still difficult to quantify, it is estimated at EUR million. Most of the forest area in Europe is covered by a forest management plan or its equivalent, created to manage the multiple array of products and services of the forests and attain sustainability goals in the long term. Forests Biological Diversity C4:

Chapter 3 : Criteria and indicators for sustainable plantation forestry in India

An hierarchical system of principles, criteria and indicators can be used to organise this information in a manner useful to conceptualise, evaluate and implement sustainable management of forests (Lammerts van Bueren and Blom ; Prabhu et al.).

In implementing the system the logs transported to the industries should be covered by a legal letter of Logs or Sawn-timber clarifying that it comes from the forest concessions who owned the Annual Allowable Harvesting Volume License before it is transferred to the industries. In following the system, the industries are implementing the chain of custody system in Logs or Sawn-timber. Considering of the above brief clarification, it is noted that Indonesian government has been aware of the importance of sustainable forest management and chain of custody. This shows their strong efforts to support the Indonesian sustainable development through the forestry sector. As long as sustainable forest management is concerned, Indonesia has taken fundamental strides as follows: The total of permanent natural forest of It is totally closed to logging operation and maintained in its natural stage forever. For this production forest Indonesia Government implement the Selective Harvesting System, one of the internationally acknowledged proper Sylvicultural System for Sustainable Forest Management. Under this system, the timber harvested license is rendered only to the forest concessionaire holders after evaluating their properly performance in conducting all the substances, standard and criteria of Selective Harvesting System. The standing commercial timbers allowed to be harvested are trees with 50 cm and up diameter. The logged over area is maintained and the younger trees is simulated to grow naturally and in healthy condition. The rotation of the harvesting is 35 years. It is condering that diameter increment of the younger trees is 1cm per year; so, after 35 year, the trees with 20 cm diameter grew become 55 cm in diameter. To protect and to save the permanent natural forest, Indonesian government allocated additional This Conversion Zone is available for conversion to non forestry purpose to anticipate the rising demand for land in sustaining the national development. Considering the above elaborated system implemented in Production Forest, although without certification, Indonesian production forest is sustainably managed. This system is known as relatively a new concept. Therefore, the system and technical infrastructure are not available yet in developing countries. However, Indonesian Government is now preparing of implementing this system. For sustainable natural forest management consisting of production, environmental and social aspects which are totally 57 indicators. Currently, the draft is being finalized and there will be another public consultation in order to obtain approval from related stakeholders. For Community Forestry, The preliminary draft has been consulted with related stakeholders and it is now in stage of finalization. The next step will be field test. Certification System There have been formulated a natural forest certification system as a national system developed by LEI. To promote and to synchronize this national system with FSC System. In this regards 4 companies accredited by IEI, consist of two domestic and two foreign companies together with two international accredited by FSC appointed as Certification Bodies in Indonesia. By above mentioned achievement of certification Indonesia has been identified by ITTO as having made significant progress towards the realization of ITTO objective which represents the fully commitment of ITTO and its member of moving rapidly as possible to achieve the implementation of sustainable forest management.

Chapter 4 : Criteria and indicators | ITTO | The International Tropical Timber Organization

CIFOR has developed a system for testing criteria and indicators to assess the sustainability of management of natural forests at the level of the forest management unit. This system was used to develop and test C&I for industrial plantation concession areas in Sumatra and Kalimantan.

This is a message we want to spread further, and we are excited this year to hold our annual Encounter alongside the 4th International Congress on Planted Forests in Beijing. This review takes a closer look at these topics, as we seek to further develop the solutions plantations can provide. It brought together more than 50 participants from Uganda and six other African nations, as well as from Europe, China and the Americas. They included representatives from forestry companies, NGOs and the finance sector. The five-day tour included a one-day workshop in Kampala, visits to NFC plantations, conversations with outgrowers and community members, and opportunities for reflection and guided discussion. This document provides the context for these discussions, and summarizes some of the insights we gleaned. The following document summarizes the main proposals put forward by participants on the study tour. We hope government agencies, forestry companies, NGOs and others working in Chile will consider these proposals and take them forward in order to strengthen landscape resilience. This is a study tour in adaptation. How can landscape restoration after large-scale forest fires improve socio-ecological resilience? A series of talks, discussions, high-level receptions and field visits took us from iconic venues in London â€" the Royal Society, Chatham House and the Houses of Parliament â€" via the Great Hall in Edinburgh Castle to the Scottish highlands. But as we celebrated the achievements of our first 10 years, our focus was on the future. So here are 10 things we need to do next Part B showcases stories of the role plantations are playing around key issues: In Part C we look to the future, considering how plantations can contribute to major global agendas such as the Sustainable Development Goals and the Paris Climate Agreement, the possibilities of new technologies, and how NGP itself needs to evolve to rise to these challenges. This think piece and these questions is to help participants understand some of the underlying issues and whilst also helping them think about the bigger picture. With China promising billions of dollars of investment into a new Silk Road for the 21st century, Gansu is looking to the future. But can development in this fragile, dry region be green and sustainable? And what role can plantations play? Here are some of the things we discussed How do we establish social and environmental conditions that encourage people to stay in arid regions? How do we prepare rural economies for hotter, drier conditions in the future? And what role to plantations have to play? These Letters, written by Andrew Heald, give you a sense of the discussions held during the study tour. The aim of this Think Piece is to help think about what questions the study tour might be, and to assist in gaining a wider understanding of the issue. Here are some of the things we saw What can plantations and the NGP concept contribute? And what lessons can NGP participants learn? Are the key questions from this Think Piece. What does the future hold? And how can we ensure developments in plantations are sustainable and accessible to all? Here are 10 of the things we learnt Discover the last two years stories. This brings opportunities for economic and social development, but also potential environmental and social risks. So what are NGP participants doing to minimize the potentially negative impacts on people and nature, and to maximize the shared benefits? And what lessons can we learn? If the NGP concept is applied, plantations can have positive environmental and social impacts. The market for bamboo looks set to grow as rapidly as the plant itself. Bamboo has the potential to supply high yields of fibre in a relatively small area, provide ecosystem services like carbon sequestration and erosion control, and support rural development. The word of the week was TRUST, and like restoring forests is a long-term process and has to be earned? Important now is to acknowledge the past, but look to the future. Here are the 10 Things we Learnt. The word of the week was TRUST, and like restoring forests is a long-term process and has to be earned â€" but as this meeting showed, it has at least begun. Thinking at a landscape level. These concepts can complement and provide new perspectives on each other, bringing the RLA into plantations

management, and NGP into the landscape approach. This paper looks at 10 things we learnt about social forestry and land use. It showcases bioenergy and carbon projects that NGP partners are already engaged in. The paper was developed over a two year period during and between the study tours in Scotland, Brazil, China and Columbia. It summarises tools that have been developed or could be adapted for use in plantation projects. It poses a series of questions such as: Who decides that something is of High Conservation Value and what criteria are used? How do HCV stakeholder processes relate to other official processes? What are the options to manage any identified HCVs?

Chapter 5 : Library - New Generation Plantations

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Chapter 6 : Criteria and indicators for sustainable plantation forestry in India.

6 Criteria and Indicators for Sustainable Plantation Forestry in Indonesia widely planted on Sumatra and Kalimantan and plantation areas are expanding rapidly.

Chapter 7 : Montréal Process - Wikipedia

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