

# Sustainable Development: The Environmental Approach

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## Abstract

It has been ascertained that the reconciliation of the social, economic, and environmental dimensions of sustainability will help to strengthen effort towards achieving sustainable development. This paper therefore focuses on the importance and relevance of the environmental sustainability in achieving the sustainable development that is being preached nowadays. Amongst the prevailing problems affecting the environment, deforestation has become the most important of them due to the current downward trend of forest land area and the inextricable linkage it has with other type of environmental problem such as carbon emission, climate change, and biodiversity effects. With the aim of ensuring reduction in the rate of forest loss, the role played by the effort to expand agricultural land area has been investigated wherein policy measures to curb its further expansion so as to ensure reduction in deforestation has been formulated. These policies include the initiative to further strengthen the forest protective and reforestation measures so as to reduce and eventually restrict access to protected forest land while simultaneously advocating organic agriculture and improved agricultural technology to help enhance agricultural production. This will confine agricultural land area to the existing size (because its reduction might not be possible). In addition, other measures include providing more off-farm activities such as small and medium scale enterprises and implementation of the agro-forestry initiative made available through the Payment for environmental service scheme.

**Keywords:** *Agricultural land expansion, Deforestation, Environmental Sustainability, Sustainable Development.*

## 1. Introduction

Sustainability, in its most general level, refers to the capacity to continue an activity or process indefinitely (Markulev and Long, 2013). Out of the multitude definitions that has been offered, the most often quoted definition for sustainable development is defined as the “ [D]evelopment that meets the needs of the present without compromising the ability of future generations to meet their own needs” as offered by the United Nations World Commission on Environment and Development 1987 ( the Brundtland Commission). It is explained by Daly (1990) as the development without throughput growth beyond environmental carrying capacity of the economy.

Sustainability has become a day to day vocabulary and has been offered different interpretation in various disciplines by different people. Notwithstanding the difference in its interpretation, there has been a general consensus that sustainability is related to the objective of maintaining the wellbeing of a society over time (Markulev and Long, 2013).

### 1.1 Sustainable Development and Environmental Sustainability

Environmental sustainability is one of the key factors needed for the overall sustainable development of an economy. While sustainable development is expected to integrate environmental sustainability component along with social sustainability and economic sustainability to achieve overall sustainability, the role of environmental sustainability could not have been overemphasized. As economic sustainability is concerned about the maximum level of utility that can be achieved over time with a particular level of natural endowment according to the economic theory of sustainability (Stiglitz, 1974; Dasgupta and Heal, 1974), environmental sustainability is needed to ensure that the environmental carrying capacity and the life support systems of these natural endowments are kept in good condition and maintained in the hunt of achieving economic sustainability.

Environmental sustainability is also needed as a prerequisite for social sustainability because it is required by humans and has originated as a result of social concerns. It is expected to maintain the social capital in an economy. However, environmental sustainability seeks not to only uphold the natural physical capacity of the ecosystem (as in the case of Economics sustainability). It also ensures improvement in the welfare of human beings by caring for the homes of the raw materials need for human existence.

Ultimately, it can be rightly said that there can neither be social sustainability nor economic sustainability without environmental sustainability. Thus, environmental sustainability has found its rightful place in ensuring good environmental quality. It supplies the condition for overall sustainable development to be achieved.

Unfortunately, the economic side of sustainable development has been given too much importance without considering the social and environmental aspect of it. This can be seen through the less importance given to the environmental effect of the “grow first, clean up later” strategy adopted by most developing countries in the quest to achieve economic growth. It is paramount to note that the reconciliation of these social, economic, and environmental dimensions of sustainable development will help to strengthen the effort to promote sustainable development. This can be achieved through plans that promote sustainable consumption and production, improve the quality of life, reduce poverty, and effectively manage our natural resource base.

Going down the path, the importance of environmental sustainability has become more important due to the fall in the environment quality and the global life support systems that inflicts limitation on all and sundry within the economy. The need for overall sustainable development, through environmental sustainability has arisen from the understanding that the current wasteful, uncontrolled and unfair patterns of economic development, if projected onwards into the near future, will cause biophysical chaos. Since there is no capacity to create a new environment such as taking possession of the sun or invading the moon, efforts must therefore be put together to salvage the leftovers of the our sole environment. it would be the combination of the social, economic, and the environmental dimensions of sustainability that would make happen the overall sustainable development that we all strive to achieve. Therefore, there is need to popularize and place value on the environmental aspect of the sustainable development that we preach.

## **1.2 Environmental Sustainability, Environmental Problem and Deforestation**

Consequently, with the aim of revitalizing the damaging environment ( environmental sustainability) to achieve sustainable development, numerous problems affecting our environment have been identified, few among them include forest loss (deforestation), land degradation, pollution, carbon emission, increasing population, and global warming (Rudel and Roper 1997; Culas 2007).

Of these various forms of environmental problems, deforestation tends to hold a unique appeal due to the fact that the loss of forest cover (deforestation) is inextricably linked with almost all the other environmental problem such as carbon emission, climate change, pollution, global climate and biodiversity. The current developments in the climate change literature also put forward the prospective role of forest cover in mitigation climate change (Stern, 2007). This is because the livelihood and the sustainability of over millions of forest dwellers and likewise poor settlers that depends on the resources such as fiber, food, fuel and fodder obtained from the forest are impaired and most wild forest animals’ habitat disrupted due to deforestation. This has made Culas (2007) and other host of studies to conclude that forest loss is one of the severe problems of the environment in the recent times.

In sum, the role of forests (and its loss) in mitigating global environmental threats, such as climate change and biodiversity erosion, is a research imperative (Choumert, Combes Motel, and Dakpo, 2013). It has motivated considerable efforts towards understanding patterns and causes of the deforestation and, in fine, to deriving policy implications.

### 1.3 Deforestation and Agricultural Land Expansion.

The 2003 World Development Report stated that “one-fifth of all tropical forests have been cleared since 1960”, estimates of the Food and Agriculture Organization (FAO) also showed that rather than reducing, deforestation has increased in the past few decades within the developing countries.

In order to better understand the cause of forest loss, a considerable amount of cross-national studies have been done to examine the determinants of deforestation. In the deforestation discourse, three (3) proximate (direct) causes of deforestation have been identified. They include infrastructural expansion, harvesting or extraction of wood (wood extraction) and expansion of cropped land and pasture (agricultural land expansion). However, literature and general consensus among studies have singled out agricultural expansion as the main proximate factors influencing deforestation out of all these three causes. This is because; the larger percentage of tropical forest loss has been attributed to expansion of agricultural land (World Bank, 1992; FAO 2003; Barbier, 2004; Ewers, 2006).

Extensive work on the determinants of deforestation undertaken by Geist and Lambin (2001) provides support for the important role played by agriculture in forest loss. Their analysis indicated that agricultural land expansion was by far the foremost “land-use change” activity linked with nearly all deforestation reported. It was reported that close to 70 percent of reported deforestation is connected to expansion of agricultural by UNEP (2003). Benhin’s (2006) review also opined that agricultural land expansion accounted for about 90 percent of all deforestation in the tropics.

Furthermore, stratified random sampling of 10 percent of the world's tropical forests reveals that direct conversion through large-scale agriculture accounted for approximately 32 percent of overall change in forest cover, followed by forest removal through small-scale agriculture (subsistence form) accounting for 26 percent (FAO 2001) of the forest cover change. [The rapid fall in forest area in Philippines was pinned on expansion of agricultural land (Kummer, 1992). The main source of tropical deforestation in Indonesia in the past decades is also hinged on agricultural expansion through shifting cultivation (500,000 ha/year) and planned agriculture conversion (220,000 - 250,000 ha ha/year). With regards to Peninsular Malaysia, the expansion of export-oriented crop plantations, such as rubber and oil palm plantations was directly related to the decrease in forest cover. Sabah experienced a similar pattern of agricultural land expansion as a major cause of deforestation while in the case of Sarawak; logging is the primary cause of deforestation. Throughout the developing world, cultivated land area is expected to increase over 47% by 2050, with about 66% of the new land coming from deforestation and wetland conversion (Barbier, 2004)].

Logging (wood extraction) on the other hand has been mentioned as one of the main proximate cause of deforestation. The fact that initial logging is usually followed by agricultural production in the cleared areas makes it difficult to separate the effect of logging from agricultural expansion. However, logging should not be seen as a form of deforestation as logged forest is meant to be replanted. Even when the logged area may not be replanted, it is left to re-grow by itself. Therefore, logging only results in deforestation when already logged forest are neither reforested nor left to re-grow, but converted into agricultural use.

There are many theoretical underpinnings justifying the role of agriculture in deforestation. Firstly, the forest biomass is seen as a cheaper input in increasing agriculture production through land expansion compared to the use of fertilizer or better agricultural practice to sustain agricultural land nutrients and increase production. This dependency on natural fertility through expansion of agricultural land into the forest land is due to the insufficient accessibility and high price of fertilizers together the nature of soil which extensively limit their potential to store nutrients (Benhin 2006).

In summary, agricultural land expansion has been concluded to be the main direct cause of deforestation. Policy measures will therefore be formulated to help in combating the further expansion of agricultural land into forest areas.

#### 1.4 Policy Recommendation to Combat Agricultural Land Expansion

Proper understanding of the main cause of forest loss has been very important for the proper formulation of policy to help battle deforestation.

So far, some of the previously implemented policy interventions with explicit environment goals have had weak influence on environmental issues, a typical example is the trans-boundary smoke problems and banning of bush burning in Indonesia. This is not to say that some policies already implemented have not had any positive effect on land use. Successful policies like the (1) Use of existing fiscal instruments such as imposition of export duties and fees in Pacific Asia ( Mohd Shahwahid, 2009), (2) Implementation of Indonesia's new method of revenue collection – “*the Penata Usahaan Hasil Hutan*” – that involves collection based on cruising reports from concessionaries indicating the volume of legally extractable commercial timber within the region rather than the retrospective assessments based on the volume of logs carried out of the area (Mohd Shahwahid, 2009), (3) Establishment and the direct funding of sustainable forest management in Malaysia by the national government (Mohd Shahwahid, 2009; Ismail and Nurhajar, 2009) and (5) forest rehabilitation program implemented by the Indonesian government (Beria, Hendrayanto, Joko, and Nanang, 2009) have had tremendous effect in reducing forest areas loss in their respective capacity.

In addition to these, there would have been unplanned positive impacts from policies that were not even directed at land use at all (spillover effects). Nevertheless, the need to review the existing policies and also implement new policies to address the specific environmental problem of deforestation will help in our achievement of sustainable development.

What policy preference really can influence the occurrence of deforestation? The initiative to further strengthen the forest protective and reforestation measures so as to reduce and eventually restrict access to protected forest land while SIMULTANEOUSLY advocating for organic agriculture and improved agricultural technology to help enhance agricultural production so as to confine agricultural land area to the existing size (because its reduction might not be possible). Other measures include providing more off-farm activities such as SMEs and implementation of the agro-forestry initiative made available through the PES scheme.

##### 1.4.1 Improved agricultural technology

Intensification program in a moderate scale through labor-intensive and not too expensive technological progress have the capability to reduce the clearing of forest and enable people obtain their needed income for survival from already zoned agricultural land area. Approach to agricultural intensification such as new irrigation techniques, double cropping, favorable cultivation in dry season, increased soil water storage and precipitation for example use can help increase rural incomes and also reduce land clearing onto marginal lands.

Another measure to increase agricultural land efficiency is through improved soil management and the use of more organic fertilizers, which have been hardly used so far in Southeast Asia. Asia is known to be the world's leading users of chemical fertilizer, consuming about 43 percent of the world total chemical fertilizer each year (FAO, 2011). Consequently, inorganic fertilizers are known to be made up of “steroid” and chemical compounds which are deadly to the environments. However, organic fertilizer are those made from (or by-products of) organisms which are only naturally existing elements. This organic fertilizer includes bone meal, compost manure, corn gluten, blood meal, fish emulsion, and sewage sludge and cottonseed meal for example. These organic fertilizers are absorbed much more easily into the environment with little side effects.

Application of organic fertilizer such as crop residues and livestock manure have been recorded to bring a gradual improvement in soil productivity and crop performance, it enhances nutrient uptake and root growth leading to higher yield and increase in the biomass of degraded land. For example, in the case of Thailand, application of composting technology (organic matters that has been decomposed and recycled as a fertilizer which is a key ingredient in organic farming) has helped her, a foremost exporter of cassava and rice, to recover and repair the loss of land nutrients (Eyzaguirre, 2005)

It is quite understandable that changing the traditional production systems through agricultural technology practice is challenging, considering particularly, the inability of poor farmers to access financial capital. It

therefore rests upon the government to ensure that funds and subsidies are available to the disposal of the farmers. Incentives should also be provided to farmers through premium prices scheme for agricultural products planted and harvested on a long established agricultural lands.

Advocating an improvement in agricultural output through improved technology is not without limitations as this might threaten other land zones. Increased yield on existing land through improved agricultural technology will prevent the conversion of agricultural land use to non-agricultural land use because most of the alternative land uses might probably be less profitable. However, profitable agriculture technology might also stimulate expansion of agricultural land into other land zones (which is the case of Santa Cruz as opined by Muller et al.2013). This happens because increase in the agricultural land profitability might draw more farmers through immigration from other location as well as transfers from other income generating activities amongst the people already residing in the location. Nevertheless, this can be put to check by adopting and legally enforcing the existing land use plans (land zoning) and forest protection measures.

#### *1.4.2 Forest protection*

As made mentioned, policy for the improvement in agricultural technology should be implemented simultaneously with other efforts to encourage the protection and conservation of the remained forest lands in order to prevent further agricultural land expansion.

The body of research in Southeast Asia has pointed to the conclusion that there is no substitute to forest protection as a means to the conservation of the remaining primary forests (Edwards et al. 2011). Malaysia, for example, is known to maintain at least 50 per cent of the land areas under forest cover according to Woon and Norina (2002) in Abdul Rahim and Zariyawati (2009). However, it has been empirically seen, according to the highlights by Lawrence (2007) that protecting forest areas in the Southeast Asia region has not been fully effective because some nations namely, Philippines, Cambodia, Indonesia, LOAS and Thailand which have nominally protected 10 percent of their original forest, have had major parts of their protected forest being degraded by illegal logging activities and other nature of forest land infringement. Some of these countries' reserves have also been distorted ecologically (although some protected areas in peninsular Malaysia and java are relatively stable). Reasons for the current state of the forests are the prosperity of oil palm agriculture and logging activities (Edwards et al., 2011).

From this situation above, it will be more than fundamental to further strengthen and also expand (if possible) the existing area under protection. There would be need to improve existing land zoning to support agricultural commodity production only in selected zones.

The forest region can be divided into categories such that a particular protected forest will allow for some degree of timber exploitation while some others, timber exploitation will be strictly prohibited. With this approach, some form of flexibility will be introduced into the system to enable the system to answer to the dynamic needs and demands for resources from the forest land. However, whichever case, forest reforestation must be ensured to prevent the land been used for agricultural purposes.

For overall forest protection target to be achieved, the following conditions have to be implemented:

- Institutional capacity should be developed for proper planning and implementation of forest protection and management programs (Michaelson et al. 1998) at the different tiers of government (both at the state and local level). This is because substantial collaboration efforts are required at the different tiers for proper enhancement and protection of biodiversity and other environmental values of forests (ICRIS, 1998).
- Enforcement of land use and zoning policies must be ensured through the improvement and development of better efficient systems or strengthening the capability of the state agency that monitors the forest changes / control the land use. This will help ensure forest protection is intact.
- Enhancing the efficiency of the judicial structure in terms of the pursuing crimes affecting the environment. Crimes can be pursued through implementation of high legal fees for timber extraction (if

needed) and a higher monetary penalty for illegal deforestation. These monetary regulatory instruments to restrict deforestation can also be implemented and controlled through the banks that provide finances for the so called defaulters (this has been implemented in Brazil according to May et al. 2010).

- Healthier logging practices with long rotational cycles must be incorporated as one of the biodiversity specific guidelines prior to giving timber concessions (Dennis et al. 2008). Timber cutting concession must be accompanied with a responsibility to plant back a tree after one is been removed so as to help conserve the remnants of the already logged forests. Ultimately, it will prevent land conversion to agricultural use.
- Clarification of land tenure and property rights must be giving a high priority as these factors play a high important role in deforestation reduction (McGrath et al. 2010).
- Lastly, while the agricultural technology and forest protection program are been implemented concurrently, the forest remnants should be augmented through reforestation

In reality, it will be most likely complex to create new protected forest land due to the land use conflicts which is already in place as well as the existing fraction of total land area under protection already (Zea O'Phelan et al. 2002), however enforcing or increasing the intensity of the already protected forest area irrespective of its closeness to agricultural location must not be compromised.

#### *1.4.3 Power decentralization in forest management*

As we can rightly say, tackling the problem of agriculture land expansion and forest protection / reforestation measures has been in existence. Yet, the outcome of the intervention has been very weak due to poor implementation.

Decentralization of power in forest management (Grainger and Malayang 2004) can help in the effective implementation of policies because the success of this policy rests on the combined effort of all the economic players and stakeholders within the economy.

Within the forest sector, decentralizing power gives responsibility to the local people and allows them to contribute to the management of the entire forest land. Antons (2010) has discussed the important role of traditional knowledge as well as the rural community importance in protecting biodiversity, reflecting the importance of empowering the local communities by assigning forest management role.

Necessary steps for decentralization include:

- Grant the local communities more (and fair) access to forest resources (Post and Snel, 2003).
- Establish proper institution at the local level and transfer sufficient authority down to the local communities (Ribot, et al. 2006). This arrangement will help to curb corruption which has lead in soaring levels of illegal logging especially in countries such as Indonesia (Sodhi et al. 2007).
- After establishing institutions within the local communities, the local communities should be granted the right to challenge state authority as regards forest resource decisions (Rosyadi et al. 2005). This tends to provide a "check and balance" system between the local and the state institutions.
- Increasing the contribution of the local communities in the decision making and goal setting processes regarding the forest resources (Mapedza, 2007).
- The state should also be held responsible for any failures from the local level (Sundar, 2001). This will allow the state institution to perform an effective supervisory local on the local institution.
- Lastly, financial resources and remunerations should be made available for local governments that place high precedence to forest resources conservation and development.

#### *1.4.4 Off-farm employment opportunity*

It is very important to note that protecting the forest land and biodiversity also requires the integration of other social measures such as off-farm employment (Bickford et al. 2008). The introduction of off farm employment opportunities will be fundamental in restraining prospective deforestation because the effectiveness of expansion of agricultural land will be largely dependent on the availability and nature of alternative employment.

As such, policy measures channeled at increasing urban based (nonfarm) employment or enhancing the level of education of rural population can help to reduce deforestation along the agricultural frontiers (Barbier, Burgess, and Grainger, 2010).

A noteworthy approach to establishing rural employment has been the support for and the promotion of Small and Medium Enterprises (SMEs). SMEs have taken a position of pride in almost all the economy as a result of its considerable roles in the development and growth. SMEs present a sustainable means for achieving the objectives of the national economic to provide employment and reduce poverty by developing the entrepreneurial capabilities in indigenous technology.

Among the countries of the southeast Asian countries, in spite of their different stages of economic growth and different national priorities, small industries have been encouraged either to generate more employment opportunities, to relocate industries to the rural areas, to narrow the income gap among ethnic groups or to upgrade technology of local industries. The experiences of these countries suggest that, regardless of the peculiar situation or national priority in a country, there is always a niche where small industries can play an important role in the economic development (Soon and Huat, 1990; Munoz et al. 2014).

The Malaysian government encouraged small industries with the objective of restructuring the economy to correct for the imbalance in income among ethnic groups. Special assistance programme were introduced and implemented to develop more *Bumiputra* entrepreneurs so as to enhance the equity shareholding of the *Bumiputra*'s in the national economy. Philippines established a comprehensive institutional infrastructure for small business to create employment, encourage industry dispersal and to support export programs of the large enterprises. In Indonesia as well, the government created the directorate General of Small Industry (DGSI) to provide financial assistance to enterprising individuals within the economy as a means to develop the agricultural sector (Soon and Huat, 1990).

Unfortunately, the trend in the economies of the Southeast Asian countries is such that they have so long focused on the traditional / agricultural based SMEs such as metal products, leather, footwear, clothing, furniture, pottery, wood and food,. Although this still generates employment and economic growth. However, it still does not take people away from the forest front. Therefore, it does little to reduce deforestation.

The effort to move from been a commodity-based to a manufacturing-based has not been quite very remarkable as well. In Indonesia for example, agriculture, energy and mining account for over one-third of GDP and manufactured goods contribute just over 20 percent. Furthermore, within the Indonesian sectors, small industries account for more than 95 percent of all manufacturing establishment, absorbing about 80 percent of all persons employed in manufacturing, and generating only one-seventh of the total value added (Bjerke, 2000). The Philippines scenario is characterized by a large number of SMEs being found in the rural areas where handicrafts and cottage industries are only important; not involved in the export market (Conti, 1990).

This pattern of SMEs, although, has been contributing to the economic development and growth has also contributed to the speedy degradation of the economies natural resources. Therefore, a better approach which entails redirection of the focus of SMEs into service-oriented seems to be much more resource saving and more environmental friendly. This redirection does not impair their ability to respond flexibly to volatile changes in product, technology and markets. They can still enjoy some comparative advantage over large businesses where precision and standardization requirement can be easily met.

It is quite understandable that generally, small industries within the region have suffered weak financial assistance and access to credit (Bjerke, 2000). In Thailand for example, although the government acknowledges the potentials of small industries in its national economic development plans, but its implementation has fallen short of what is needed to create any significant impact on the small industries (Soon and Huat, 1990). However, it is also worthy to note that the Malaysian government has laid down specific guidelines for commercial banks

to allocate a specified proportion of their loan portfolio to small businesses (Soon and Huat, 1990). We strongly recommend that a review of access to funds should be undertaken along with the redirection of the focus of SMEs.

#### 1.4.5 Payment for Environmental Services

When discussing the potentialities of reduction in deforestation, another promising way out is the payments made in order to offset the opportunity costs from forest-competing land uses (Silva Chavez, 2005). This scheme involving the supply of economic incentives in return for environmental services, known as the payment for environmental service, emphasizes the economic value of the benefits of nature to humans. It promotes agro-forestry system and helps to stabilize the frontiers of the forest land (Malky and Espioza, 2010).

The payment of environmental services (PES) orientation helps to balance agriculture and forest thereby permitting the forest land to exhibit the forest status while undergoing the farming practices. It provides activities that are beneficial to the environment such as soil conservation, watershed protection and reforestation (Bui and Hong, 2006).

In developed economies, there are varieties of PES programs put in place for supplying ecologically valuable goods and services (Ferraro, 2001). However, PES is not yet popular in developing economies. It is understandable that PES is not yet popular in developing countries because (1) not all economies permit the existence of PES as a result of the nature of the protectionist measure on their forest (Bui and Hong, 2006), (2) the different valuation and methodology procedures in assigning values to environmental services involving subjective judgments (Fausold and Lilieholm, 1996), and (3) people are not familiar with purchasing of such environmental services (Perez, 2006).

PES is designed to make it worthwhile in both financial and livelihood terms for individuals and/or communities to maintain, rather than to degrade their natural forest resources. The success stories from countries that have implemented this program makes it worthwhile to consider (see To et al. 2012 in the case of Vietnam; Perez, 2006 in the case of Costa Rica; May 2006 in the case of Fiji Islands; and Pasha and Beria 2011 in the case of Indonesia).

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