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ECONOMIC REVIEW ON THE SUSTAINABILITY OF FOREST LANDUSE

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SUSTAINABILITY OF FOREST AND FORESTRY

The sustainability of forest landuse has been much understood as a problem of technology and management of forest resource utilization. The people believe that the decrease of forest resource, or deforestation, has been much caused by unappropriate technology and mismanagement of forest resource, while the facts show that deforestation in indonesia has been caused by some factors, as reported by MOF (1991), as follow.

Table 16. Annual Rate of Forest Landuse and Land Class Change in Indonesia (1982-1990)

Factors	*Ha per year*	*%*
1. Development of estate crops such as rubber and oil palm	*160,000*	*12.2*
2. Transmigration and related infrastructures	*300,000*	*22.8*
3. Shifting cultivation	*300,000*	*22.8*
4. Normal forest fire	*100,000*	*7.6*
5. Foerst fire caused by unproper forest utilization (the case of 1983)	*378,000*	*28.8*
6. Illicit logging, spontaneous transmigration, mining, and others	*77,000*	*5.8*
Total	**1,315,000**	**100.0**

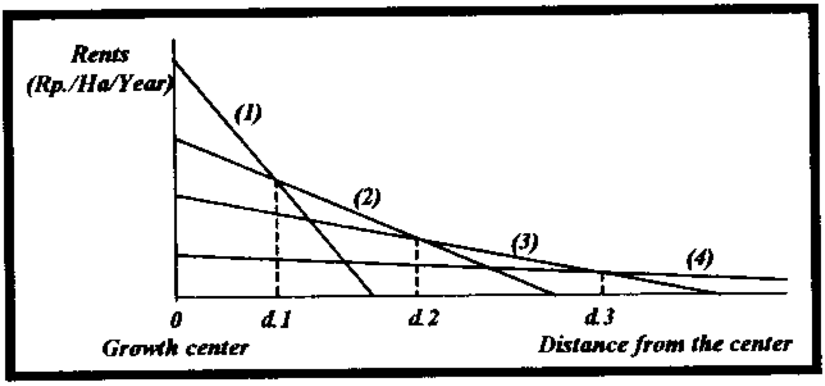
It cannot be denied that there are some unproper management of forest resource (i.e. forest management practices) done by forester (mostly are not real forester, but forest concessioners), but for sure it is not enough talking about forest sustainability without giving serious attention on the other factors, which cause 65.4 % of deforestation in Indonesia, or 65.4 % of threats to forest landuse sustainability.

It is proper enough if we expect *Prof. **Weidelt*** to talk much on technological aspect of forest management practices to sustain the forest resource utilization. While, here in this paper we should take more look at the causes outside forestry, where forestry is integrated as part of the political-economic system.

We can say that deforestation in Indonesia is caused by both competition between good and bad foresters, and competition between forestry and land uses.

BASIC UNDERSTANDING OF LANDUSE

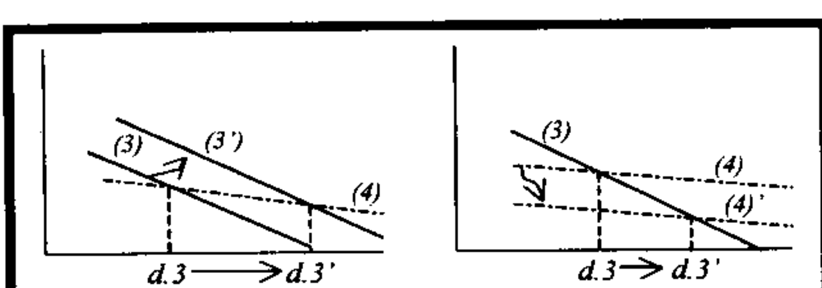
If we believe that the regional landuse is set to achieve the maximum level of the society's welfare, then the basic concept of landuse must be based on the economic concept which measures the landuse through is rentability of its possible alternatives of use. The optimum landuse must be the highest total rents created by certain combination of alternative uses of the land. To understand this, we can look at the following graphs.



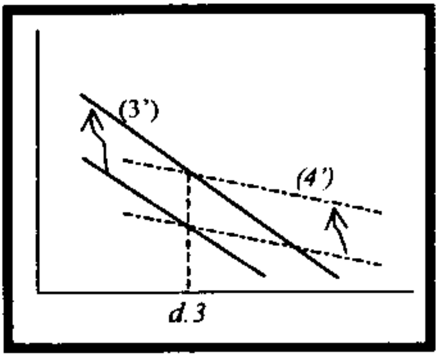
The graphs above tell us that land close to the center of economic growht, at distance *0 - d.1*, can be used by industries, setlements, agriculture and forestry. But, the best choice is industries *(1)*, since it gives the maximum rents. If we expand industry to the land outside *d.1*, this choice do not give the maximum rent, since it is lower than the setlement. So, the setlement *(2)* is the best choice for the region with the distance range *d.1 - d.2*. We can explain the same things happen in the region with distance range *d.2 - d.3* and beyond *d.3*, which are the best for agriculture and forestry, respectively.

We can understand that suistainability is the continuity of the border *d.1, d.2, d.3* and so on, among the corresponding alternative land uses. If for example, the economic efficiency of setlement increases, relative to agriculture, then the border *d.2* will shift farther to *d.2'*, and the agriculutral landuses will shrink between *d.2 - d.3*. It will be also a case if the agriculture getting higher efficiency, relative to forestry, then the border *d.3* will shift to *d.3* and reduce land from forestry.

The same case also could happen if the efficiency of forestry is decreasing, for example due to unappropriate technology and unproper management practises, the border also will shift farther and reduce the land from forestry.



To sustain the border *d.1, d.2, d.3* and so on, needs not only maintaining but also increasing and balancing the existing level of each landuse efficiency.



So, for the practical purposes the suitainability of landuse must be interpreted as: "the simultaneous and balance development among landuse efficiencies, which can increase the welfare, through increasing the total rents of all landuses, while maintaining the border between landuses".

		Forestry	
		development	**stagnant**
Agriculture	**Development**	*Sustainable and development landuses*	*Unsustainable forestry*
	Stagnant	*unsustainable agriculuture*	*Sustainable, but undeveloped landuses*

On the other words, the sustainability of the regional landuse can be achieved by promoting the efficiency of both agriculture, and the forestry simultaneously. Therefore maintaining the border between agriculture and forestry at *d.3* does not mean a stagnation in both landuses, since the rents of both landuses are simultaneously growing in harmony.

TO INCREASE THE EFFICIENCY OF FORESTRY

Since the facts show that there has been a significant progress reached by agriculture in developing its efficiency, relative to forestry, then it is very important and urgent to increase the efficiency of forestry or to increase the rent captured from forest landuse. So that the decision maker in landuse planning could get the optimum border at the former or at least at the current one *(d.3)*. Such increases can be achieved through some kinds of efforts, as follow.

1. To increase forest production efficiency, through applying appropriate technology and management scheme, which are not only in planting, tending and exploitation, but also in the processing of forest product. For example : the existing growth rate of Dipterocarpaceae, i.e. 1 – 2 m^3/ha/year could be improved by silvicultural technology to about 8 – 15 m^3/ha/year. While the survival rate of plantation could be increased about 1.5 times. Current exploitation wastes of

about 50 % could be reduced to about 25 %, industrial waste can be reduced from 40 % to about 10 %, and so on. Research on the current exploitation waste of forestry conducted by Darusman (1987) shows that the total efficiency was very low and could be increased about 6 to 8 times. Agroforestry is one among appropriate technologies in forestry to produce better income for the people.

2. Rearrange the institutional setting of forest resource utilization, which can allow more parties and more alternatives of use to participate in the forest utilization, and also to allow more competitive forest products market to stimulate forestry efficiency.
3. Explore and find more uses of forest resource, through new forest product (good and services), such as medicinal plants, ornamental plants, ornamental fish, experimental animals, new breed of domesticated animal, recreational use, bioactive chemicals, and so on, in order to increase benefits got from the same forest land.
4. Realize and recognize the unidentified or unmarketed forest products (good and services), such as water yield, fresh and healthy air, traditionally and locally used forest products (fire wood, fish, fruits, leafs, birds, honey, animal skin) and so on.
5. Change the attitude of people and decision makers toward modernization. Modernization shall not mean defeating the nature, but more clever in getting benefit from nature. It should not disturbing the nature ecosystem, but to reap more fruits from the ecosystem. Through such atittude, the people should not tend to convert forest land to other homogenous cultivations to get more and more homogenous output, but to get more and differentiated output from the existing but well managed forest land, including food, clothes, shelter, recreation, etc.

All above efforts in increasing the rentability of forest landuse need a large number of qualified and commited human resources, and to increase such qualification and commitment needs research and educations and trainings, which must be given by the highly qualified and committed research and education institutions.

A CASE OF THE GUNUNG GEDE-PANGRANGO NATIONAL PARK

The 15,000 Ha forest area of the Gunung Gede-Pangrango National Park do not produce any wood product, since it is a conservation area, but serve recreation, water yield and traditonal and local forest products for the people surrounding the National Park, as well as for the regional people, such as the people from Jakarta.

According to researches conducted by Darusman and his colleagues in the Lab. of Political Economics Faculty of Forestry, in 1991,1992, and 1993, every hectare land of the National Park has given benefit about Rp. 270 million per year to the people in term of water yield (which is the most), recreation, traditional and local forest products, which is generally higher than the agricultural uses.

Realizing the higher rents compare to other alternative landuses of National Park, it will be irrational for the people and decision makers to convert any part of the National Park into other land uses.

THE RESPONSIBILITY OF IPB AND GEORGE-AUGUST UNIVERSITY OF GOTTINGEN

IPB as one among agricultural and forestry universities in Indonesia has a responsibility to speed up the human resource development, especially in coping with agricultural and forestry sustainability in Indonesia. Such cooperation in teaching and research between IPB and George-August University of Gottingen has been enhanching the IPB's capacity to develop agricultural and forestry human resources in Indonesia.

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