

rules need to specify the protective litter layer on top of the soil, the porosity of the soil or the tree root anchoring that protects from landslides.

Again, a "forest" that meets the definition can have between zero and maximum effectiveness in providing these functions, and some plantation forests are worse in providing such functions than much of current agricultural land use.

Second, the institutional boundaries which separate professional foresters from those knowing about and caring for trees in the landscape (i.e. the majority of farmers) need to be made less rigid. Indonesian landscapes display varying levels of tree cover, different proportions of naturally established and planted trees and varying degrees of tree diversity.

Thirdly, the debate needs to focus on environmental services that matter and avoid getting side-lined on non-issues. There is no shortage of atmospheric oxygen in the world, and forests, like any other vegetation, only provide an "oxygen credit" to the world that will be used when the organic matter is decomposed.

### Summary

$$\text{Next effect on atmospheric oxygen supply} = -\frac{32}{44} \times \text{Net emissions of CO}_2 \text{ to the atmosphere}$$

Indonesia is net consumer (not producer) of Oxygen.

### Discussion

The word 'oxygen' may stand for 'clean air'. Locally, trees work as filter for dust and can improve air quality in aspects other than oxygen.

# RAPID OXYGEN SUPPLY APPRAISAL (ROSA)

Trees in Multi-Use Landscape in Southeast Asia (TUL-SEA)  
A negotiation support toolbox for Integrated Natural Resource Management

## Principle and Approach

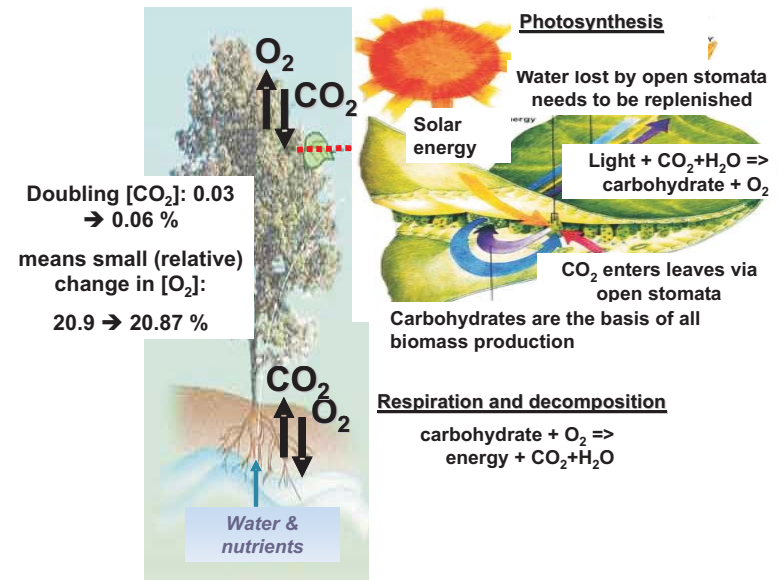
ROSA is a method to assert whether or not the rosy view of tropical's forests as lungs of the world and as suppliers of oxygen has any basis. As for other TUL-SEA methods, it has a LEK (Local ecological knowledge), a PEK (Policy/public ecological knowledge), a MEK (Modellers' ecological knowledge) and a Spatial Analysis component, can be done rapidly and at relatively low cost.

The LEK component is simple as there is likely some representation of 'freshness' of air in local knowledge, but no individual gasses such as oxygen. Elementary school concepts have probably made little inroads on the LEK (in contrast to the PEK).

The MEK component is also simple: the carbon dioxide (CO<sub>2</sub>) emission estimates for Indonesia can be mole-per-mole converted to oxygen (O<sub>2</sub>) consumption estimates (applying a factor 32/44 for conversion) -- at least if we ignore the temporary storage in flows of organic products which causes a time-lag between production and consumption of oxygen. The basic high school equation of photosynthesis (=>) and respiration/decomposition/fire (<=) is:



Because Indonesia is a net emitter of CO<sub>2</sub> its consumption of O<sub>2</sub> is bigger than its O<sub>2</sub> production. The Spatial Analysis work can readily convert land cover change maps to O<sub>2</sub> consumption maps. The PEK component is the most intriguing.



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## Study case: Forestry Ministry asks Japan to check air quality<sup>1</sup>

Indonesia has challenged Japanese scientists to check the balance between the amount of fresh oxygen produced by Indonesia's protected forests, and amounts of forest fire haze affecting neighboring countries. This information could be an important way to counter repeated international protests over haze problems, the Forestry Ministry claimed in a dialog on research cooperation between Indonesia and Japan, here Wednesday.

"We need to conduct research to check the balance between the 'amounts' of haze and fresh oxygen 'sent' by Indonesian forests to neighboring countries," the ministry forest fire prevention unit chief, Herman Prayitno, said. "We need this data to create a balanced view," he said, "which would show that our forests also create fresh oxygen and could improve our bargaining position in responding to protests from countries affected by the haze".

Indonesia has the largest area of forest in the region, with some 120 million hectares of tropical forests. However, annual forest fire smoke causing massive amounts of air pollution has prompted protests from the Singaporean and Malaysian governments. President Susilo Bambang Yudhoyono apologized to Indonesia's neighbors for the 2006 haze incidents, the second most severe after the 1997 haze disaster which blanketed Singapore and Malaysia.

Responding to the ministry's request, a Japanese researcher said that it was a matter of technology to "calculate" amounts of smoke from forest fires. It is, of course, a difficult task, but it is possible with technology.

## Response: Smoke-screens and the lungs of the world<sup>2</sup>

Reducing deforestation, has become a respected policy target for governments. Unfortunately, the term "forest" has lost its meaning in the global discourse. Cutting down a tropical rain forest and replacing it with a single species of "fastwood" is not considered deforestation -- it is even promoted as a form of forest improvement.

Replacing the natural forest by oil palm is also not (technically) deforestation, because oil palm is a tree and the crown cover of an oil palm plantation is more than enough to qualify as a forest. Thus, all the international promise to stop oil palm expansion at the expense of forest is very difficult to implement, since this type of land use change is not classified as deforestation. That is if we base our discussion on the internationally agreed definition of forests.

What is a forest? After the international climate community agreed to include reforestation and afforestation in the Clean Development Mechanism (CDM) in 2002, the definition of a forest became a serious issue, directly linked to (expectations of) money. The agreement was to use minimum values of 10-30 percent "crown cover" and 2-5 meters in tree height as measures, with final decisions left to national authorities.

Clear-cutting followed by tree planting has always been part of forest management, but temporarily does not meet the crown cover definition of forest. Under the definition, such tree-less land is still a forest as long as there is an intention to replant -- without time limit.

<sup>1</sup> Adianto P. Simamora, The Jakarta Post, Thursday, June 19, 2008

<sup>2</sup> van Noordwijk, M., Jakarta Post, Saturday, June 28, 2008

Consequently, none of Indonesia's treeless *kawasan hutan* (forest areas) could qualify for the afforestation/reforestation CDM, as they are technically still forests. Also, by definition, clear-cutting in the forest areas is not deforestation as long as the intention to replant remains.

The proposed new EU directive for sustainable energy states that biofuels associated with deforestation after Jan. 1, 2008, will not be counted as part of the EU's commitment to sustainable energy use.

Unfortunately, the directive will have no "teeth" in arresting environmental damage, since oil palm plantations meet the criteria of the forest definition used. Several studies of Indonesia's forestry sector have shown overcapacity in the pulp and paper industry, at least close to the biggest mills.

The mills' combined capacity is much larger than the legal supply that sustainably managed forests can support. To resolve the overcapacity and associated illegal logging, the government has now decided to abandon the selective harvesting system and legalize clear-cutting within the production forest, as long it is done with the intention of planting monocultures of fastwood trees.

All the esthetics of the natural forest and its biodiversity will be gone -- but the plantation will meet the definition based on tree height and crown cover, just like oil palm plantations do.

The transformation of the landscape will remain within the category of "production forest" and be 100 percent legal. There will be considerable loss of environmental services, but no deforestation.

If we simply take "crown cover" as criterion, land outside the forest areas in Indonesia has about the same probability of being a forest as land within that domain. This implies that the issue of Reducing Emissions from Deforestation and Degradation (REDD) should apply equally on lands outside the forest areas.

How can we close the gap between public concerns about forests and trees and international and national policies?

First, we need to have a clear definition of various types of forests, plantations and agroforests that reflect what we really want to achieve through national and global policies.

If we want to address carbon release from forests and peatlands, we need policies that are directly linked to the amount of carbon stored in the natural or manmade vegetation. Instead of a "forest" that can have between zero and 450 ton of carbon per hectare in aboveground biomass, we need separate terms for high/medium and low carbon stock forests.

Logging leads to a "carbon debt" by bringing forests to a lower carbon stock category; fastwood and oil palm plantations are in the low carbon stock group, and will take a long time to pay off their carbon debt. If biodiversity is the target, the rules will need to specify diversity of flora and fauna as the basis of the regulation.

Instead of "forest" that can have between one and more than a thousand tree species, and associated range of diversity in other flora and fauna. We need separate terms for high/medium or low conservation value forests. If watershed functions are the target, the