The 6th International Conference on Life Cycle Management in Gothenburg 2013

REDUCING IMPACTS OF FORESTRY – THE FALLACY OF LOW-INTENSITY MANAGEMENT

Bo P. Weidema, Aalborg University, Skibbrogade 5, 1., 9000 Aalborg, Denmark, bo@ilca.es

Keywords: biodiversity; extensive forestry; forest management; plantation forestry; forest certification.

ABSTRACT

New definitions are provided of intensive and extensive forestry in version 3 of the ecoinvent database. These definitions are based on explicit and easily measured indicators for the most important aspects of forestry management for biodiversity. Unfortunately, many certified forestry products come from what would be classified as intensive forestry in the ecoinvent classification. The real challenge is to develop forest management systems that have a neutral or positive biodiversity impact relative to that of plantation forestry. Such truly extensive, biodiversity-managed forestry is very challenging and not very common today. Ample options exist for increasing yields in intensive and plantation forests, which can be recommended as having lower biodiversity impact than similar products from other management systems, certified or not.

INDICATORS FOR FOREST MANAGEMENT IMPACT ON BIODIVERSITY

One of the most important environmental impacts of forestry is on biodiversity. Many different indicators for forest management impact on biodiversity have been suggested or are already in use, but some are more important than others and some are more easily available.

In the ecoinvent database, a distinction between intensive and extensive forestry has been applied. With the new version 3 of the database, the definition of these two management regimes have been made more explicit, taking into account six of the most important aspects for forest biodiversity, see Table 1. Thereby, a trustworthy assessment of biodiversity impacts of forest practices is facilitated.

Table 1. The ecoinvent v3 definition of extensive & intensive forestry (Weidema et al. 2013).

	Extensive (if all below apply)	**Intensive (if one of the below apply)**
Harvesting technique and patch size	Selective logging	Clear-cut patches or even-aged stands exceeding 250 m length
Stand age	Average stand age >30 years	Average stand age <30 years
Number and nature of tree species	At least three naturally occurring tree species at re-growth	Less than three naturally occurring species at planting/seeding
Amount of deadwood with > 10 cm diameter	Exceeds 5 times the annual harvest volume	Less than 5 times the annual harvest volume

BIODIVERSITY IN FOREST CERTIFICATION SCHEMES

Most forest certification programs unfortunately use criteria and indicators that are less clearly defined, less aligned with the scientific evidence with respect to the importance for biodiversity, and less easily measured (Weidema 2007). The resulting situation is that many certified forest products come from what would be classified as intensive forestry in the ecoinvent classification.

A major problem in the current forest assessments is that they are not related to the productivity of the forest. In semi-managed forests, including most so-called low-intensity, "sustainable" certified forests, the impact on biodiversity is relatively larger per produced unit than in plantation forestry, see Figure 1. Figure 1 shows how natural, undisturbed forests and the marginal plantation forests mark the two extreme ends of a straight iso-biodiversity line, i.e. a line along which forestry types have identical biodiversity impacts as measured by an imaginary, ideal, aggregated indicator of "biodiversity-adjusted hectare-years".

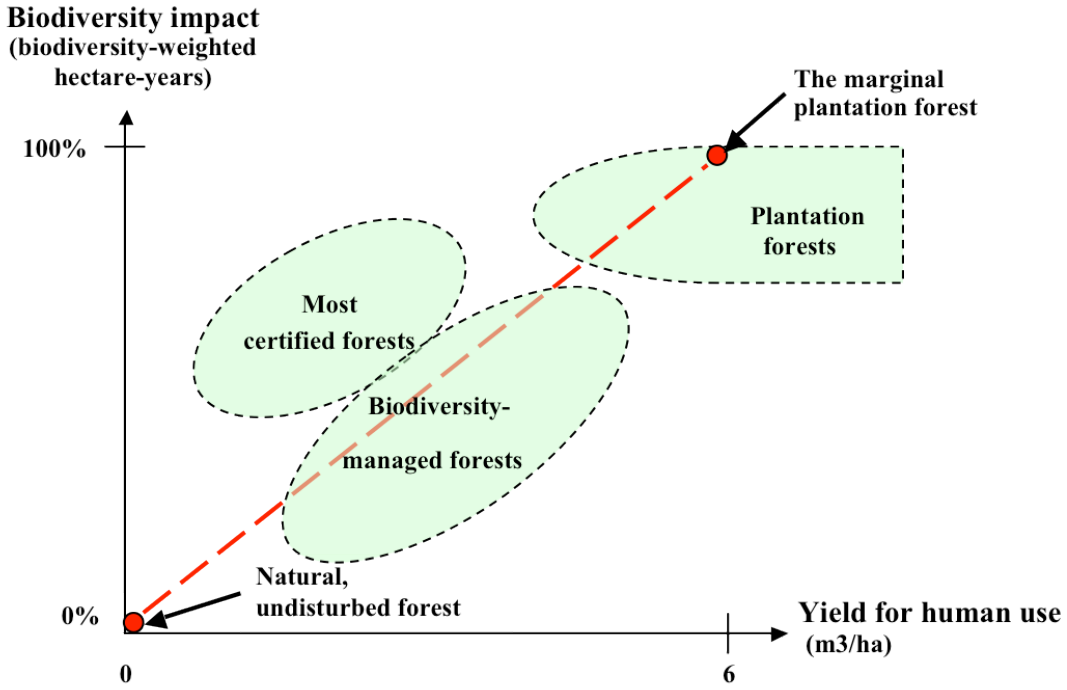

Figure 1: The place of different forest management systems ( ) relative to the iso-biodiversity line ( ), its determining extremes ( ).

Both ends of the iso-biodiversity line are relatively well-defined: In a natural, undisturbed forest, both the yield of products and the biodiversity impact from management are zero. A plantation forest has a well-defined yield, and the biodiversity impact is close to the maximum 100%, i.e. 1 biodiversity-adjusted hectare-year per hectare-year, corresponding to zero original, endemic species left.

It is less easy to determine the biodiversity impact of those forest management types that lie in-between these two extremes. However, even a low amount of forestry activity implies the

removal of sources of deadwood, which is the main habitat influencing overall forest biodiversity. Thus, it should be safe to assume that to remain *at or below* the iso-biodiversity line would require forest management efforts specifically directed to preserve biodiversity. Without judging whether such forests actually exist, we may call such forests for "biodiversity-managed forests". Any credible forest certification aimed at biodiversity conservation should aim at ensuring that the certified forests are at or below the iso-biodiversity line, since a position above the iso-biodiversity line per definition implies that its products have a higher impact than those of plantation forestry. Likewise, it should be safe to assume that whether certified for "sustainability" or not, most managed forests other than plantations lie well above the iso-biodiversity line.

It is interesting to note that the iso-biodiversity line is a "moving target", since the marginal plantation forest, i.e. the plantation that will change its area with changes in demand for plantation wood, is likely to have an increasing yield over time because more intensive plantations are more economically competitive. Thus, the iso-biodiversity line will be lowered over time, and a "biodiversity-managed forest" will become even more difficult to realise.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This reasoning implies that:

- Plantation products in general can be recommended as having lower biodiversity impact than similar products from other management systems, certified or not,
- The real challenge is to develop forest management systems that are at or above the iso-biodiversity, i.e. that have a neutral or positive biodiversity impact relative to that of plantation forestry. Such truly extensive, biodiversity-managed forestry is very challenging and not very common today. The ecoinvent classification of extensive forests could be used as simple criteria.

Nevertheless, ample options exist to expand biomass production, without increasing impact on biodiversity, or even while reducing impact, particularly if the production in intensive and plantation forests is increased. Intensifying management and choice of species can increase average yields of biomass per hectare by at least a factor 2 from the current average of 3 m^3 (Brown 2000), thus allowing more forest areas for truly extensive management or even to be left in a natural or naturalised state.

REFERENCES

Brown C. (2000). The global outlook for future wood supply from forest plantations. *Global Forest Products Outlook Study. Rome: FAO. Working Paper GFPOS/WP/03.*

Weidema B P. (2007). Framework for and review of biodiversity indicators for forest management in the context of product life cycle assessment. *Draft report prepared for TetraPak. Hørsholm: 2.-0 LCA consultants.*

Weidema B P, Bauer C, Hischier R, Mutel C, Nemecek T, Reinhard J, Vadenbo C O, Wernet G. (2013). Overview and methodology. Data quality guideline for the ecoinvent database version 3. *St. Gallen: The ecoinvent Centre. Ecoinvent Report 1(v3).*