



Comments on the Non paper prepared for the MCPFE/PEBLDS consultation meeting on pan European recommendations for afforestation and reforestation in the context of the UNFCCC (Draft Pan-European Guidelines for Afforestation and Reforestation in the Context of Climate Change Mitigation)

Petr Petrik

coordinator of the Czech BioPlatform (www.ibot.cas.cz/biop)

Institute of Botany, Academy of Sciences of the Czech Republic, CZ-25243 Pruhonice

Pruhonice 15/05/07

Ecological Guidelines

1. When developing policies and planning procedures for afforestation and reforestation activities take precautionary measures to avoid negative impacts on areas of high ecological values, particularly natural non-forest ecosystems, areas of high soil carbon stock as well as areas of traditional land use, and highlight good practices and methods for site selection.

Ministry of the Environment implements ecosystem approach into basic forestry policy, legislative documents and practice¹. However, the Ministry of the Environment has only supervision and not decision-making competences. Started in spring 2006, a group of Czech scientists has protested against unsustainable management in some Czech forests and suggested improvements focusing on biodiversity (<http://lesy.drosera.cz/?eng> and see below) to avoid negative impacts on areas of high nature values. In their statement, they call for adopting the following important measures: elimination of clear-cutting, restoration of the natural tree composition, retaining old trees and deadwood in forests, elimination of liming and fertilization, sharp reduction of deer populations, more effective protection within Specially Protected Areas, and **regulation of afforestation and reforestation**. At present, the National Forest Programme II for 2007–2013 is being prepared in the CR and scientists from Czech BioPlatform (<http://www.ibot.cas.cz/biop>) participate in negotiation process together with foresters and policy makers. Discussion is further coordinated by the Ministry of Agriculture (administrator of forestry in the CR) with very active participation of Ministry of the Environment, which attempts to establish

¹ The targets on biodiversity-related research and strategy have been incorporated into the State Environmental Policy 2004–2010, Strategy of Sustainable Development (2005), State Nature Conservation and Landscape Protection Programme of the CR (2005), National Biodiversity Strategy (2005), National Capacity Self-Assessment in the CR for Fulfilment of the Obligations of the Rio Conventions (Zima et al. 2006, review on the research see Petřík et al. 2007) and many other documents related to specific aspects of sustainable development (the Horizontal Rural Development Plan of the Czech Republic 2004–2006, Action Plan of the Czech Republic for the Development of Organic Farming, National Forestry Programme 2003–2006 etc.).

nature-close non-clearing forms of forestry, and it will result in a new forest law in the near future.

In Europe, about **70% of all carbon in the terrestrial biosphere is present in soil** (Jones et al. 2003). **Therefore, this carbon stock in soils should be protected against inappropriate forest and agriculture management on the first place.** To avoid further CO₂ emission and to mitigate climate changes, **large deforestation of old nature-close forests should be inhibited.** Of extreme importance is a **high proportion of organic material in the form of humus and deadwood.** Especially the soil rich in organic content, Histosols, should be preserved in preference. To avoid negative impacts on areas of high ecological values and raising N₂O emissions, **fertilization of soils should be decreased.**

However, until now, the Czech forestry research did not develop any concentrated action towards strategic goals formulated within the European Framework Programmes and concerning climate changes according to the results of IPCC (see Šanc 2006). There is no comprehensive methodology for monitoring changes in species diversity in forests that would include assessment of adverse impacts. The system of forest categorization has remained unsatisfactory, there are inadequate rules for felling and control of compliance and there is insufficient emphasis on introduction of suitable systems of forest certification. The system of valuation of the non-productive function of forests based on ecosystem approach and supported by Ministry of the Environment is a subject of very hard discussions with representatives of market approaches. On the other hand, there is a rather high professional potential in some practicing foresters to introduce a new approach and methods of a sustainable forestry (see e.g. integrated ecological concept of the Czech forestry by Ministry of the Environment, Vyskot et al. 2003).

Biodiversity of Czech mountain forests and freshwaters has been significantly reduced by high acidification and eutrophication since the 1950s. Soil and streams became acidic and soil acidification and high SO₂ concentrations in the air resulted in widespread dieback of the Norway spruce monocultures/plantations. In general, soil organisms (Rusek in Hruška & Cienciala, 2003) and plant communities' biodiversity was reduced significantly due the three main reasons: **1. acidification, 2. exceeded nitrogen, and 3. forest and agricultural management.**

1. Acid deposition itself, caused mainly by sulphuric acid was reduced significantly, but previously acidified soils have been only slightly restored. Situation at many sites and areas (northern mountains of the Czech Republic, well known as the Black Triangle, see e.g. Fanta 1997) has not been significantly improved. Results from biogeochemical models show that soil chemistry will be similar to the current one in the next 30 years and soil restoration will be very slow. There will be regeneration in upper most soil horizons, but mineral soils will continue in acidification. Consequently, mountains and forest freshwaters will stay acidic with harmful effect on freshwater biota particularly during high flow episodes (Laudon et al. 2005) when acidity will decrease and mobilized toxic elements in the water will reduce biodiversity.

2. Nitrogen compounds deposition has been stable since the mid-1990s and slightly increases during last five years. However, common nitrogen deposition in forested areas is now between 10–20 kg.ha⁻¹ per year! The typical critical load for mountain forests is between 5–9 kg.ha⁻¹ per year (Hofmeister & Hruška 2005).

Nitrogen deposition exceeded the critical loads for nutrient nitrogen on the almost whole territory of the Czech Republic (Skořepová in Hruška and Cienciala 2003). Target, nitrogen sensitive species withdraw, despite historical records (beginning of the 20th century) documented their high abundance and diversity (Hédli 2004).

3. Also forest and agricultural management practices are important beside pollution and deposition level (see also other part of the present review or Emmer et al. 1998). In the Czech Republic, salvage cuts have contributed to wood production with dozens of percent in last years (Ministry of Agriculture 2005). Plantations of high productive Norway spruce decrease biodiversity at all the three main levels. The monocultures also enhance acidic deposition (dry deposition onto canopy) and consume a lot of essential nutrients from soils (mainly Ca and Mg). But the nutrients are also essential for mitigation of the acid rain effect. Moreover, foresters fertilized soils with nitrogen in forests despite of its high level in the air and water solutions.

2. Increase carbon sequestration through alternative measures in SFM in those cases where afforestation and reforestation may negatively impact on the environment.

Concerning afforestations, a large number of high conservation value habitats were destroyed by these projects in the past. Czech scientists

(<http://lesy.drosera.cz/?eng>) call for to prevent afforestation of biologically valuable yet naturally non-forested areas such as small enclaves of grassland within forest stands, species-rich meadows etc. Despite involvement of some old and open forests into the European Community Natura 2000 network, some organisms living there are close to extinction due to the current forest management. In this case, alternative management (e.g. forest grazing or coppicing) is proposed by the Czech BioPlatform group.

3. Promote afforestation and reforestation with native tree species or provenances of species that are well adapted to site conditions now and in the future.

There is still high percentage of afforestation and, continuously, reforestation with non-native species and natural renewal is not always preferred.

4. Use only those non-native species, provenances or varieties, whose impacts on the ecosystem and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimised Take measures to avoid invasive alien species and take a precautionary approach to genetically modified trees.

Some basic research on this topic is carried out, however, without any consequences to real forest management. There is one exception for forest management to use non-native tree species, although the Czech Act on the Protection of Nature and the Landscape No. 114/1992 prohibits their use.

5. Develop research on and promote the use of well-adapted species and provenances with regard to climate change.

No developed research on this topic is carried out.

6. Promote species composition and structural diversity in line with the natural diversity of the specific habitats in afforestation and reforestation and promote the development of natural dynamics of forest ecosystems, as long as it does not cause considerable damage to forests (i.e. forest fires).

There are numerous gaps in ecological and environmental issues in forestry such as nature and biodiversity conservation, role of forests in landscape protection and restoration, etc.; multifunctional use of forests is heavily underestimated (see Lindenmayer et al. 2006). Very valuable research on structure and dynamics of natural forests (see e.g. Vrška et al. 2006) is fully managed by Ministry of the Environment, which is, however, non-responsible for forestry management. There is no serious research on assessing the ongoing forestry policy. Only few Czech forest scientists are working on the CO₂ sequestration and related issues of climatic change (e.g. Cienciala & Tatarionov 2006 and see activities of the Institute of Systems Biology and Ecology tackling grant on carbon sequestration Czech Carb, <http://www.usbe.cas.cz>).

7. Promote afforestations for biomass production which aim at the establishment of natural or semi-natural forest ecosystems.

Currently, this issue is not very well implemented and without any clear economical benefits.

8. Promote afforestation and reforestation activities that contribute to the improvement and restoration of ecological connectivity and ecological corridors, as appropriate.

Czech scientists (<http://lesy.drosera.cz/?eng>) call for employment of natural primary succession, which leads to valuable vegetation and local tree species composition, even in chemically extreme soils at climax. For this reason, afforestation of these areas should be left to pioneer species, which should be allowed to follow natural succession. In contrast, afforestation of the vast devastated areas of open-pit coal mining, sand excavation, mining tailing ponds and similar operations is usually expensive and leads to an unnatural species composition in the resulting growth.

Until now, in the Czech Republic, there are no measures, tools and subsidies available to use pioneer tree species for forestry management. Instead of this, during reforestation of clearings and afforestation of farm agricultural land, the seedlings of climax species such as fir or beech are planted right away.

9. Limit the use of chemicals as fertilizers and pesticides/herbicides to those areas and conditions in which it is necessary to ensure the establishment and maintenance of forests.
10. Maintain and protect all ground and surface water resources in terms of quantity and quality in all afforestation and reforestation activities.

In the Rural Development Plan there are subsidy schemes in agricultural sector for forest restoration, recovery and conservation in aggravated conditions in the areas affected by air pollution. However, there are also some questionable financial support for protection of cultures against forest weed, pine weevil and rodents (chemical use in forests may be harmful for biota; see below), construction of new game-proof fences (the problem of high stocks of deer cannot be resolved by this expensive way), forest stands fertilisation and liming (using such methods can be harmful for soil; during the discussions on National Forest Programme, there is an obvious reluctance from foresters to diminish using of such chemicals), water drainage (Czech BioPlatform calls for implementation of all forest wetlands into special category of protection), alteration and embankment of rivers and/or streams and dykes, construction of new forest roads, afforestation of non-forest land (it can have potentially unfavourable impact on the biodiversity). Use of pesticides, industrial fertilizers and heavy machinery by modern agriculture (and partly forestry also) is responsible for significant depletion of soil biodiversity (Rusek in Vačkář 2005).

There is some evidence that organic farming practices relying on natural processes and manure can restore soil biodiversity (see above). The Czech Republic has already implemented the Nitrates Directive (91/676/EC), which is now obligatory in cross-compliance scheme (including treatment of sewage sludge, persistent organic pollutants etc.).

There are under-funded measures such as Natura 2000 payments in forests, planting of trees and shrubs in agricultural landscape, and forest-environment payments. On the other way, there is also subsidy for supporting in environmentally sound technologies during the forest management (e.g. primary extraction and skidding of wood by cableway or by horse in forest stand). Some clauses in the Rural Development Plan may be in conflict with the European Agricultural Fund for Rural Development (EAFRD) goals and objectives, and those of the EU Sustainable Development Strategy and other documents (Bláha & Kotecký 2006a, b). Without clear environmental eligibility criteria, several proposed measures risk undermining some of the Union's, and EAFRD's own, goals and objectives. Vague definition of some measures undermines possible synergies and leads to unnecessary loss of the potential to achieve EAFRD environmental and biodiversity objectives. Some of the crucial measures are worryingly under-funded.

11. Raise public awareness on environmental issues related to afforestation and reforestation in particular in the context of climate change mitigation.

There is still no public awareness related to this issue.

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