OECD Co-operative Research Programme sponsored conference

International Symposium for the Convention on Biological Diversity

-The role of forest biodiversity in the sustainable use of ecosystem goods and services in agro-forestry, fisheries, and forestry-

April 26- 28, 2010
Waseda University, Waseda Gallery, Tokyo, Japan

Organized by
the Forestry and Forest Products Research Institute and
Waseda University Environmental Research Institute

Message from symposium organizers

The year of 2010 is important in terms of conservation of biodiversity as the International Year of Biodiversity declared by the United Nations. Addition to this, Nagoya, Japan takes place the 10th Conference of the Parties to the Convention on Biodiversity (CBD/COP10), where achievement of the 2010 target of CBD will be assessed and post-target(s) and action plan will be discussed. Preceding CBD/COP10 in October, SBSTTA-14 (the Subsidiary Body on Scientific, Technical, and Technological Advice), which is another possible meeting where scientific information is transferred will be held in May in Kenya. There are lots of meetings, workshops and symposium prepared for this year.

However, although the conservation of biodiversity is getting recognized by society as a crucial element of sustainable agriculture, fisheries and forestry, it seems that biodiversity is too natural for most of us to be aware of necessity to develop national and international policies agreed by majority. One of the important tasks that science should take is feedbacks between society with knowledge, new findings, technology and techniques, and so on. Scientists including ecologists, taxonomists, economists have accumulated research results relevant for conservation of biodiversity for last few decades. It would be a right time to exchange knowledge and deliver new findings and technology from scientists to discuss about them together with both scientists and non-scientists. In this symposium, we particularly focus on forest biodiversity and its importance for Agriculture, forestry and fisheries recognized as ecosystem services so that we better understand value of forest biodiversity benefiting society. This symposium will further provide information to CBD/COP10, and other relevant fora.

This symposium is organized the Forestry and Forest Products Research Institute and Waseda Univeristy, Environmental Research Institute with collaboration of the organizing committee, and sponsored by OECD Co-operative Research Programme.

Kimiko Okabe (FFPRI)
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Symposium Abstract

Ecosystem services provided by forest biodiversity

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Biological diversity does not always play important roles for all kinds of ecosystem services. Some ecosystem services are not strongly associated with biological diversity, or sometimes in tradeoff between biological diversity. It is necessary for the decision making of forest management to have clearer vision on the relationships between ecosystem services and biodiversity.

Many experimental studies to elucidate the relationships between biodiversity and ecosystem functions have been made on grassland or freshwater microcosms, and very limited on forested ecosystem. Though many functions and ecosystem services are proved to have some relationships with biodiversity, most of these experiments have not dealt with very high level of biodiversity.

In general, simple ecosystems tend to be chosen for effective provisioning services. The effects of biodiversity on many regulating services are not clear. Only some services like biological control or pollination are strongly related to biodiversity, and several trials to value these services have recently been made. Most of cultural services are strongly associated with biodiversity, though they are not highly evaluated by people. Even among the pro-environmental services, there are some tradeoffs, such as carbon sequestration and biodiversity.

For relating to provisioning and regulating services, the composition and/or proportion of components in ecosystem are main concern. Appropriate composition leads to the soundness of ecosystems and thus ecosystem services. As for cultural services, however, the species unique to a particular ecosystems and regions have important roles. Therefore, the responses to keep biodiversity should be different according to these situations.

The relationship between biodiversity and forest ecosystem resilience and relationship to climate change

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Forests normally undergo change as a result of many natural disturbances such as fire, blowdown and insects. However, a resilient forest ecosystem can maintain its 'identity' in terms of taxonomic composition, structure, ecological functions, and process rates over time. The capacity of forests to resist environmental change is dependent on biodiversity at multiple scales. This resilience is an emergent property of forest ecosystems and an 'insurance policy' against severe environmental change. Increasing forest biodiversity using especially endemic plant species in planted and semi-natural forests will have a positive effect on resilience and often on productivity (including carbon storage) and >80% of the studies reviewed supported this concept. Larger, less fragmented primary forests are generally more resilient, stable, resistant, and adaptive than modified natural forests or plantations. Gamma diversity is also an important component of resilience. If threshold conditions are exceeded, forests can change states, or even move to a non-forest state. Degraded forests, especially those dominated by invasive alien species, may be stable and resilient in a different state and be difficult to recover to the original forest ecosystem. Paradoxically, some forest ecosystems with naturally low species diversity also have a high resilience (eg, boreal pine forests). These forests are adapted to severe disturbances, and the dominant species have high tolerance to a wide range of environmental conditions. We provide a number of recommendations to enhance forest resilience, especially to climate change.

Ensuring food production: Native biodiversity provides pollination and biological control services

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It is well known that certain species can provide ecosystem services, such as pollination or biological pest control, which are needed for food production. Previously, it was less clear whether few, or even a single species, could provide these services, or whether diversity of ecosystem service providers was necessary. However, recent evidence suggests that diversity of animals that provide ecosystem services can enhance food production, particularly when there is a diverse assemblage of functional groups, as well as species. For example, pollinator assemblages where several species differ significantly in their morphology and/or behaviour are the most effective at pollinating crops. This benefit of biodiversity is greatest in natural, heterogeneous ecosystems, such as those found in agroforests and forests. Similar patterns can be shown for the attack of insects by their natural enemies. In addition to these direct benefits of animal diversity, plant biodiversity can lead to increased animal diversity, and also enhance the ability of animals to provide ecosystem services. For example, natural enemies of crop pests can benefit from resources obtained from non-crop plants, making them more effective at biological control. This phenomenon is well-studied in arable crops, though its potential for the enhancement of biological control in forests and agroforests has received less attention.

Although biodiversity can clearly enhance the provision of ecosystem services, deforestation and intensification of agroforestry can negatively affect biodiversity and the ways in which species interact with one another. For example, intensification of cacao agroforests can promote invasion of ants that reduce native biodiversity, and conversion of forest to pasture or arable crops can reduce diversity of beneficial insect species. These changes can also alter food web interactions between beneficial species and their own natural enemies, which can result in higher attack rates on the ecosystem service providers.

In addition to maximising mean or total ecosystem service provision, stability in food production is essential. Thus, variability in biodiversity and ecosystem services must be taken into account, and both of these may be affected by land use intensification. Agroforests seem to have much lower impacts on biodiversity and ecosystem services than other land use practices, and therefore their inclusion in mosaic landscapes may provide benefits outside of the agroforest itself.

Valuation and PES for Management of Ecosystem services and Biodiversity

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The paper builds upon the work of under conceptual foundation of the economics of ecosystems and biodiversity (TEEB). The paper has three sections. First sections deals with the nuances in valuation of ecosystem services For example, while estimating the economic loss of biodiversity and ecosystem services for effective public policy, a number of challenges appear. They transcend the boundary of disciplines of ecology and economics. Like, whether the physical loss of biodiversity or that of ecosystem services should be accounted, remains unclear. Doing both might bring the issue of double counting as there are evidences where ecosystem services and biodiversity are intricately related and decoupling them might not be easy. Further, standard methods of economic evaluation confront the issues of irreversibility, non linear changes and thresholds which are further complicated if the resilience of ecosystem services are strengthen by the biodiversity. Also, there is strong need to get consensus on how the future would look like for both biodiversity and ecosystem services in the medium and long.

Second section assesses the nuances of economic valuation when faced with non linear changes in ecosystem dynamics. The paper will present a framework for scientific assessments of the impacts of policy interventions on biodiversity and ecosystem services, which includes but is not limited to economic valuation. It presents current knowledge on the relationship between biodiversity and the delivery of ecosystem services and goes into appropriate methods for measuring these relationships. It discusses the role and pitfalls of economic valuation of biodiversity and ecosystem services, and presents innovative approaches to dealing with the technical as well as socio-cultural problems related to environmental valuation. It also lead to the conclusion how important the valuation is for operationalization of payment for ecosystem services (PES).

And finally the paper provides guidance on how the design of the payment system which would be different for different ecosystem services like carbon, biodiversity and other ecosystem services. one of the most significant PES opportunities is REDD (Reducing Emissions from Deforestation and Forest Degradation in developing countries), which is being negotiated as part of the post-2012 climate change regime under the United Nations Framework Convention on Climate Change. Recent proposals for ‘REDD-Plus’ would offer incentives for forest conservation, sustainable forest management and enhancement of existing forest carbon stocks. Deforestation is estimated to account for up to 17% of global greenhouse gas (GHG) emissions: an agreement on such a mechanism could make a significant contribution to addressing global climate change and also provide substantial biodiversity benefits if designed and implemented with due consideration to the wide range of values of nature.

Conservation of ecosystem service agents in forest landscapes for agro-food production

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Forestry and Forest Products Research Institute

It is widely understood that forests are essential habitats to maintain terrestrial biodiversity as well as mitigate recent climate change. Thus, conservation of forests and forest biodiversity has become a common goal at the global, regional and national levels. Japan is rich in biodiversity because of its geographic characteristics, which include a high ratio of forested mountainous regions, a long, narrow archipelago from north to south, as well as its location in the Asian monsoon climatic zone with high precipitation. Japanese forest cover, ca. 67% of the total land area, has been maintained since World War II. However, dramatic changes in the social and economic situations in Japan have been affecting terrestrial biodiversity during the last 30 years: although the number of species of forest-dependent birds has not changed much, their distributions have been changing probably in response to changes in land use.

This raises the question: do all those changes in forest use and biodiversity alter ecosystem services, particularly those provided by the forest? Many researchers have suggested that biodiversity plays an important role in providing agriculture with ecosystem services such as pollination, regulation of pests, and decomposition. For example, our study showed that natural forests within a few kilometers of buckwheat fields contribute to their high seed set by providing them with pollinators including European and Japanese honeybees and native insects. Although forest decomposers may not directly work in agricultural fields, forest litter including dead leaves and small branches is used as organic soil material by farmers living near forests. We examined which types of forest contribute most in terms of ecosystem services and goods in regions where agricultural fields are surrounded by secondary and plantation forests. Generally, forests at the early successional stage maintained richer species diversity of bees (pollinators), parasitoids (natural enemies) and cerambycid beetles (decomposers) compared with older forests, while diversity of mushrooms (decomposers) was richer in old growth forests. Although natural forests had more species of ecosystem service agents than plantation forests at every successional stage except just after clear-cutting, different vegetations and successional stages represented different species compositions. Thus, though conservation of primary forests is a priority to protect those species that depend on them, forest management to maintain a mosaic landscape is important around agricultural fields in order to utilize ecosystem services originating from forest biodiversity.

Capturing the ecosystem service of pest control: Natural enemy movement between native forests and crops

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Forest habitats are thought to play an important role in maintaining the ecosystem service of pest control for agricultural crops. The value of this pest control service is estimated at more than US$ 400 billion per year worldwide. To better capture these pest control services we conducted two experiments. The first, focusing on 15 insect predators of agricultural pests and using bi-directional interception traps we assessed their occupancy in- and movement between habitats in two landscapes, one with > 65% and < 5% of native forest, over one year. Four habitats were evaluated including two edge communities (ecotones): 1) riparian forest – crop (RF-C), and 2) forest – crop (F-C), and two interior habitats 3) crop, and 4) forest. All predator species were found to occupy all habitats. They were found more often in the RF-C ecotone habitat, but there was strong preference by some species to prefer the crop and the F-C ecotone. In addition, in the landscape with > 65% native forest, there was strong net immigration of predators from the RF-C habitat into the crop, suggesting that riparian forest habitat is providing a source of predators into the crop. In the second experiment, using a model plant-pest-natural enemy system, we assessed pest suppression on cotton plants adjacent to (< 100 m) or far (>400 m) from native forest. Sentinel cotton plants infested with pests were placed in bare fields either adjacent to (20-100 m) or far (> 400 m) from native forests. They were arranged in a 100 m x 75 m 20 point grid and left for four days, removed and replaced three times. We showed that parasitism was significantly higher on pests adjacent to the native forest. These results demonstrate that natural enemies of agricultural pests are using multiple habitats, and are moving from these forest edges into crops and providing pest control.

Forest ecosystem serves to coastal marine biodiversity and production

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Recently, Japanese fishermen are planting in mountains. This movement is due to their belief that a cause of deterioration in marine environment is deterioration of forests. However, this belief has not been examined by scientific studies. Because there are many factors on the deterioration of coastal marine environments, i.e. the effects of forestry, agriculture, city construction, repair works of river, artificial structure construction like dam, barrier for landslip, harbors, breakwater, etc. In particular, human impacts are so strong that they mask the interaction between forest and coastal marine ecosystems.

I have studied how the land use and vegetation affect coastal marine ecosystems in R. Bekanbeushi, Hokkaido. This river system has a very few human impacts. Three catchments in R. Bekanbeushi were chosen as a comparison of land effects on marine ecosystems. In the estuary, Akkeshi-ko, there are some skeletal food chains which maintain high biodiversity.

The study revealed that forests and wetland in the catchment have very important role in constant water and nutrients supply to the estuary. This constant supply supports high biodiversity and high productivity in the estuary ecosystem. Sporadic heavy rain or snow melting cannot support to normal production systems in the estuary.

The connectivity of land and coastal marine ecosystems has also important role on habitat diversity in the coast. The connectivity guarantees flow of sand from upstream to estuary, which can form a variety of habitats, such as tidal flats, sand beach, sand bank, muddy flat, seagrass beds, etc. Currently, many artificial structure constructed cutoff the connectivity in water and sand flows. So, depletion of habitat diversity and biodiversity has been occurred.

On the other hand, artificial forest which has simple vegetation may have also negative effects on coastal marine biodiversity. However, we have not enough evidences to this problem. One example for negative effects of artificial plantation is shown in banana plantation in tropical countries. In the Philippines, banana plantation is expanding by cutting original forest. The negative effects of the plantation are severe erosion of surface soil. It flows out into river by heavy rain, and river water become dirty. Heavy siltation and sedimentation in estuary and coastal shallow sea bottom leads to serious depletion of marine biodiversity. Seagrass beds are disappeared, so dugong population is seriously endangered. We should study the severe effects of forests change to coastal marine ecosystems to conserve marine biodiversity.

Importance of diversity in foods and culture for sustainable resource use

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Provisioning services are supported by primary production and material cycling (supporting services), which is probably enhanced by biodiversity. The reason why does biodiversity enhance ecosystem services is usually explained by a similar idea of the classic theory, diversity-stability hypothesis. The diversity-stability hypothesis means that community with higher diversity is usually more stable and robust against disturbance. Although this intuitive hypothesis is convincing, the mathematical evidence has not long been obtained. Recently, our recognition of stability of communities has slightly changed. The total biomass of a community with rich species diversity is stable, although biomass of each species may change.

This suggests that resource management of single species is hopeless, the resource abundance may fluctuate even without harvesting. Deer and sardine are typical examples of such natural fluctuating resources. Therefore, we need to build resource management of multiple species, or rather ecosystem-based resource management.

There are several merits to harvest multiple species: (1) stabilizing the total yield from the community rather stable than the case of harvesting a single species, (2) reducing monitoring cost of unused species, (3) reducing exploitation rate when the resource abundance is low. The target switching in fisheries is effective on multispecies fisheries management (Matsuda and Katsukawa 2002 Fish Oceanogr 11: 366-370). In addition, resource management may be easier than nuisance control of deer (Matsuda et al. 1999 Pop Ecol41:139-149). These mean that diversity in foods and culture is important for resource management.

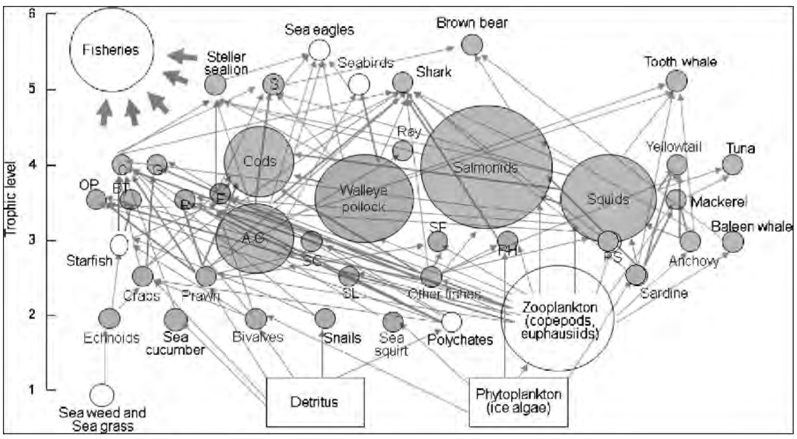

Fig.1. Marine food web of the Shiretoko area as depicted by the Scientific Council of Shiretoko World Natural Heritage. It includes bears and sea eagles. Grey circles represent taxa that are used by fishers or human, and those catch statistics are compiled.

Mitigations of negative impacts of IAS to endemic ecosystems and ecosystem services

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Japan is an island country with unique ecosystems. In particular, the Ryukyu Islands and the Ogasawara (Bonin) Islands, to the southwest and the south, support several endemic species, but their local ecosystems are so fragile that endemism could easily be affected by invasive alien species (IASs). As a nation Japan depends on international trade, importing massive volumes of goods, including living organisms. Many uninvited species are unintentionally brought into the country, with the imported goods, in the transporting containers, and sometime attaching with touring human.

The present Japanese quarantine system was set up within the framework of the International Plant Protection Convention and World Organization for Animal Health. It is designed to prevent adverse effects of IASs on agriculture, forestry, and fisheries but does not apply to wild fauna and flora and ecosystems. In light of this situation and with the intent to implement the provisions of Article 8(h) of the Convention on Biological Diversity (1992) and the guiding principles for the implementation of Article 8(h) adopted as COP 6 decision VI/23 (Sixth Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity, The Hague, Netherlands, 7 - 19 April 2002), the Japanese Government created a new Act in 2004 addressing IASs.

IAS Act aims to control IASs and to prevent damage caused by IASs to ecosystems. It defines alien species recognized as or suspected of causing damage to ecosystems, human safety, agriculture, forestry, and fisheries as IASs. The Ministry of the Environment decides which species should be designated as IASs based on the scientific data and advice from scientific experts. The alien species defined as invasive can no longer be legally imported, introduced, transferred, bred, or released in the field. Thus far, about 100 alien species, including mammals, birds, reptiles, amphibians, fish, arthropods, and plants, have become restricted. The number of restricted species will increase, and this is expected to reduce the future introduction of alien species.

Actually, with the law enactment as turning point, topics concerning IAS have got a lot of publicity in the media, and consequently the meaning of IAS has been widely recognized. However, the number of IAS species and individuals have increased continuously, as similarly as CO_2 gas has little decreased although the term "Global Warming" has been widely recognized. Why the IASs keep to be produced and increased? We must consider the human economy dynamics as backgrounds of the issue. As global economy is changing radically and transportation of goods and human is increasing rapidly, the risk of accidental introductions of IAS will be increasing much more since now. On the other hand, intentional introductions of alien species as pet animals and biological agents have also increased.

Of course, it will be the best way to prohibit introducing all such alien species in order to prevent biological invasions. Actually, for example, in Australia and New Zealand, all of alien species are prohibited to introduce in principle except for the species national governments of these countries decided as safe for natural environment. We call this quarantine system “White-List System”. On the other hand, we call the Japanese quarantine system “Black-List System” in which only the species listed as risky must be prohibited to introduce. Although it is difficult for Japan to introduce the “White-List” system as the country is the great economic, we should do effort to raise the self sufficiency of food and energy (reducing consumptions) for reducing the risks of introduction of IASs.

Not only ordinal people but also we ecologists must carry high risks of expanding alien species. For example, our DNA analysis of the chytrid fungus *Batrachchytrium dendrobatidis* which is considered a factor causing world-wide amphibian decreasing suggested that the fungus originates from Japan. The fungus has caused serious impacts especially on the amphibians in rain forests in highland of Australia and the Middle and South America. The very man who carried the fungus in such unexplored forests might be an ecologist flying between the forests in the world for conservational researches. The restriction of alien microorganisms attaching with goods and human is a large loophole in conservation biodiversity.

We should first understand that invasive alien species would increase under the loss of diversity and locality in the world. Simply eradicating IASs cannot stop the next IASs. We must also consider and decrease the habitat destruction, fragmentation, pollution and artificial transportation for mitigation of negative impacts of IASs.

Restoring Biodiversity and Forest Ecosystem Services in Degraded Tropical Landscapes

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Over the past century, an estimated 850 million ha of the world's tropical forests have been lost or severely degraded, with serious impacts on local and regional biodiversity. A significant proportion of these lands, originally cleared of their forest cover for agricultural development or other economic uses, today provide few if any environmental goods or services to society, and in particular to forest-dependent rural populations. Despite the scientific, social, economic, and policy challenges involved, the rehabilitation of degraded tropical forests and landscapes offers a major opportunity to both improve the livelihoods of the rural poor and to reverse the seemingly relentless tide of biodiversity loss and environmental degradation worldwide. Meeting this challenge requires: (a) understanding of the underlying socio-economic, cultural and political drivers of deforestation and ecosystem degradation at local and broader spatial scales that can be used to inform strategies for biodiversity conservation linked to enhancement of livelihoods, and (b) development of innovative, participatory, approaches to forest restoration that involve a creative synthesis of the collective knowledge gained through decades of research in the fields of forestry and ecology, and the traditional knowledge of forest-dependent people who have the most to gain or lose in the process. This paper will explore a range of strategies and options developed and used in several tropical countries to restore both biodiversity values and other economically and socially important environmental goods and services in degraded tropical forest landscapes.

Planted forests and biodiversity conservation

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Plantation forests and other planted forests represent a small but growing proportion of the world's forests. Plantation forests cover about 3.5% of the total world-wide forest area (ca. 140 million ha) and this is increasing by about 2–3 million ha per year. This trend is likely to continue as climate change mitigation and 'carbon forestry' add to the motivation for afforestation. Plantation forests are usually composed of few, often exotic, tree species that are grown as pure, even-aged, intensively managed stands with clear-fell harvesting after relatively short rotations. There are concerns that plantation forests negatively affect forest biodiversity because they are typically less diverse than natural forests and because some plantations replace natural forests, although land clearing for agriculture is the main driver of global forest loss. These are important issues as deforestation and fragmentation of natural forests continue in many regions, which are generally considered to be among the main reasons for the ongoing decline in biodiversity. It is important to protect or enhance biodiversity in plantation forests to increase their value as habitat for biodiversity. Furthermore, biodiversity contributes to ecosystem functioning, resistance and resilience to disturbance, and to the provision of ecosystem goods and services that are important to society. Therefore, biodiversity is highly relevant for plantation forestry.

Effects of plantation forestry on biodiversity and methods for protecting biodiversity within plantation forests and the surrounding landscapes have received much research attention in recent years. There is good evidence that the conversion of natural forests and afforestation of natural grasslands and other natural non-forest land is detrimental to biodiversity. However, in many countries afforestation occurs primarily on land previously cleared for agriculture. Under those circumstances, plantation forests may integrate well into the landscape matrix of natural forest. Here, afforestation of agricultural land can assist biodiversity conservation by providing additional forest habitat, buffering edge effects, and increasing connectivity between forest patches. This may be particularly important in landscapes where forest loss has reached critical levels and may result in extinction of forest species that are sensitive to habitat fragmentation. Although the use of native tree species is generally more beneficial for forest biodiversity, even plantations of exotic trees can have a relatively rich understory of native plants and associated fauna. However, exotic trees may spread beyond the planted area and can cause problems by becoming invasive species, with flow-on effects on biodiversity in affected habitats.

Numerous opportunities exist for the protection and enhancement of biodiversity in the management of plantation forests, at both stand and landscape levels, and these will be reviewed, briefly. For example, surveys for rare and threatened species and habitats of high conservation value should be conducted to ensure their specific protection. The maintenance and restoration of natural habitat remnants within plantation forests is important, and this may compensate for effects of intensively managed areas elsewhere. Managers of forests certified under the Forest Stewardship Council and other responsible forest managers already adhere to such guidelines, with positive effects. We will also give an overview of biodiversity effects on ecosystem functioning and the provision of ecosystem goods and services. For example, mixed forests are, on average, more resistant to outbreaks of forest pests than single-species forests. Furthermore, diverse forests are likely to be less affected by climate change because at least some tree species would be able to adapt to changed climatic conditions and also because of facilitation processes. We will explore these and other relationships with biodiversity and highlight opportunities for combining plantation forestry (and 'carbon forestry') with biodiversity conservation objectives.

Tropical forests and sustainability

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Center for International Forestry Research

Continuing to search for a globally accepted definition of sustainable forest management seems pointless. Even if we could agree on what we mean by “sustainable” applying the concept and achieving the desired outcomes face many problems. Trying to satisfy multiple and often disparate objectives, each with differing timeframes and spatial extents, is one complication. Attempting to accommodate varying environmental, economic, social, and political conditions, many of them outside the reach of forest management, is another.

Rather than aiming for an unattainable and contentious ideal, it may be more useful to strive for continuous improvement to achieve better outcomes when the best is unachievable. Such an approach would tailor both research and management to the relevant features of the environment and background conditions. Research could also be scaled more appropriately, taking into account more realistic local ecological and management timeframes and spatial extents. By looking for ongoing improvement in management, rather than holding to some distant and probably unattainable ideal, planners, managers, and researchers may be better placed to deliver more sustainable use of forest resources.

Multiple-use forest management is considered by many as a preferable alternative to single-use (generally timber-dominant) management models. In several places, integration of timber and non-timber forest resources plays a key role in the subsistence and market economies of rural communities. This is however largely happening as an informal sector economy. Managing for multiple use in “legally” designated land-use types (e.g. logging concessions) appears hampered by the spatial overlap of different interests and bargaining power, the multiple (often antagonist) uses of some favorite timber species, inadequate institutional support, inappropriate policies and incentives, poor law enforcement and unclear tenure and use rights. A few promising but yet ‘unfinished’ examples do exist and we review these cases to draw lessons and recommendation.

If nothing else, concerns about what it means to manage multiple resources sustainably, and how, has sharpened focus on the need for trans-disciplinary training and research on the many factors affecting both forest composition and functioning, and the societal dynamics that will determine the future. It would encourage a more outward-looking, team-based approach to resolving complex social–ecological–economic problems in tropical forestry, fostering a more creative exchange of perspectives, ideas, and information among researchers in different fields. This calls for a rethinking of existing management models in tropical forests and the possibilities to manage actively both timber and biodiversity with a special emphasis on residual timber stand, wildlife and certification

Sustainable Forest Management (SFM) and biological diversity under changing needs of society - as an example the European situation

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Metla, Finnish Forest Research Institute

The demand for new forest products and forest services by various sectors of society increases continuously. Especially the energy sector with increasing use of wood-based bioenergy, the health sector using forests as medicinal compounds and therapeutic means and the construction sector using wood as environmental sound material require new products, services and up-to-date forest information for their purposes. In addition there is also increasing need to serve society with forest information in thematic areas such as: climate change, biodiversity conservation, human health, various forest ecosystem services, environmental characteristics and the manufacturing chain of wooden products.

These new services are reflected in profitability of forestry and in timber prices; aspects which are important in maintaining the forest conditions and safeguard of forest functions.

The criteria and indicators on Sustainable Forest Management (SFM) are an important tool in providing a balanced compendium of information on forests (ecological, economic, social and cultural) because of three aspects: 1) showing long-term trends and changes in the forests, 2) integrating the forest policy goals and decisions with the measurable indicators and 3) making a continuous base for the international comparability. The indicators deliver information for decision-making, and on the other hand they serve as guidance of the forest management according to the society’s needs.

The present Pan European Criteria and Indicator set (MCPFE tools) has been compiled mainly for the purposes of the forest sector and is not flexible enough to provide the required new information. This presentation provides a proposal on how criteria and indicators of SFM could be updated to serve better society’s needs. The proposal covers following items: updating quantitative and qualitative indicators in accordance to new demands, overall policies and special policy areas, threshold values, verification issues and applications on how SFM criteria and indicators can serve also other sectors and thematic areas.

Application of the forest biodiversity indicators for the European situation in the light of COP 2020 targets

The MCPFE forest indicators can be used for illustrating the forest biodiversity in Europe as follows: Forests cover 31% of Europe's land area. Long-term human intervention has changed the structures of European forests. The major part of European forests (87%) is classified as semi-natural forests. The forest area dominated by introduced tree species is around 4 %, and their total area is not increasing.

About 8 % of Europe’s forests are protected with the main objective of conservation of biodiversity and another 10 % with the main objective of conserving landscapes and specific natural elements. The area of protected areas is increased over the last years. The forest management practices have changed in ways that promote the conservation and enhancement of biological diversity, notably through the increased use of natural regeneration and more mixed species stands. Measures are also being taken to encourage deadwood accumulation. The average amount of deadwood is about 10 m^3/ha, but varies depending on the growing stock volume by forest types and vegetation zones.

COP 2020 target on indicators and forest protection

The indicator on the area of protected forest areas is practical tool to monitor the change.

European forest biodiversity has become a very complex and varied issue because of the intensive historical use of forests, the specific small scale of the private ownership structure and the fragmentation of forests within the landscape caused by other land use forms. Therefore the protected forests areas are often small, with most located in fragmented landscapes and protected with various management options and regimes. Based on these facts the MCPFE Assessment Guidelines for Protected and Protective Forest and Other Wooded Land (MCPFE classes) were created in 2001-2003 especially for European conditions.

The results of this UNECE/FAO data collection process according to the MCPFE PFA guidelines in 2003 and 2007 show that this classification is workable, and provides a comprehensive and versatile overview of the European situation. Thus national networks of protected forest areas should not be seen in isolation but a part of an overall forest management and biodiversity strategy.

In Europe the main emphasis in protection for biodiversity is on active management. The share of protected forests for biodiversity with no active intervention (strict protection) is small, 0.9%. This is logical because nearly all the rare and vulnerable forests in Europe are already protected. The ideal non-intervention, strict protection concept, is not a realistic scenario in Europe. Natura-2000 conservation network is a special tool within the European Union. The Natura-2000 network aims to maintain species and habitats in addition to the protected areas also in multifunctional forests when appropriate. Wood cuttings are allowed if the favourable protection status in habitats designated in EU Directives is maintained. The CBD SBSTTA targets 2020 should be set by taking into account the local forest conditions and all legal instruments available (legal protection areas, voluntary legal contracts and tenders, Natura-2000 areas and close to nature management) as integrated protection approach.

Climate change issues and biodiversity with COP 2020 target on resilience

It is estimated that European forests sequester approx. 10% of Europe's annual carbon dioxide emissions. They have been functioning for several decades now as carbon sinks because their annual growth has exceeded fellings, thus helping to slow the build-up of carbon dioxide in the atmosphere. This means that the forest utilisation rate, or ratio of felling to growth, was over the last 40 years less than 60% on average within the European area.

Based on the opinion(according to scientific evaluation) of the European Economic and Social Committee (EESC, 25 March 2009) in the face of the potential negative effects of climate change, EU Member States should develop forest management contingency plans for the prevention of forest damage caused by extreme phenomena (storms, drought, forest fires, damage by insects) and for remedying the effects of such damage, in addition to increasing information about the importance of continuous good forest management. The importance of natural forests as carbon stores and as preserves of biodiversity must be ensured. However there is an important difference between commercial forests and natural forests in terms of carbon sequestration. From the perspective of climate mitigation, natural forests in their "end state" are carbon sinks, in which carbon sequestration through the growth of biomass and carbon release through the decay of biomass are in equilibrium, whereas commercial forests are constantly developing new and additional carbon sequestration capacity due to the harvesting of timber and timber use for wooden products and for substitution of fossil fuels by bioenergy.

On these facts the wood resources allow a considerably expansion within the frame of biodiversity in the use of wood for construction and also for forest bioenergy purposes, provided that close to nature forest management is used and the harmful environmental effects are minimized.

How scientists and NGOs can contribute to CBD and the post-2010 target: Challenge facing public awareness raising (particularly for urban residents)

Ryo Kohsaka
Nagoya City University

Scientists have played a critical role in giving birth to the Convention of biological diversity. They have monitored and alarmed number of trends in biodiversity related indicators. The term “biodiversity” was coined by scientists themselves.

The current focus is on role of the scientists for the issues related to implementation of the Convention.

Similar questions can be raised for the role of non-governmental organizations through their campaigns and actions. The actions has been effective in raising awareness of the crisis of the global ecosystems and biodiversity trends.　Yet such actions, particularly for saving “pristine nature” possibly had certain side-effects that the issues are not felt very relevant in urban contexts, especially for consumers in developed nations.

We will examine and review the possible role of the scientists and NGOs in improving the science-policy interface as well as the public-policy interface. Issues related to urban forestry is examined as a case study.

Global Forest Biodiversity Targets and Scientific Monitoring

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Convention on Biological Diversity Secretariat

This presentation will give an overview of the policy context for global forest biodiversity targets and discuss the need for scientific monitoring.
The global community has set several policy targets at the multilateral level which are directly or indirectly related to the conservation and sustainable use of forest biodiversity.
Such targets currently include the Strategic Plan and the 2010 Biodiversity Target set by the Parties to the Convention on Biological Diversity (CBD), the four Global Objectives on Forests agreed upon under the auspices of the United Nations Forum on Forests (UNFF), and the Millennium Development Goals. In addition, several new targets for the time beyond 2010 have been suggested. The monitoring of these targets requires sufficient scientific data and knowledge. Despite the improvements in data availability and criteria and indicators to measure the achievement of the targets, further research and development needs exist. In relation to forest biodiversity, these include further improving the monitoring of forest biodiversity at the national level (in particular in developing countries); using easy-to-use yet robust methods; refining and/or operationalizing the definitions of certain terms, such as forest degradation and the classification of forest types; analyzing the patterns of success or failure at the national and local level in reducing or halting the trend of forest biodiversity loss; and providing early indications of the feasibility of medium- or long-term political targets related to forest biodiversity, such as the potential for large-scale forest landscape restoration.

Keywords: Forest biodiversity, biodiversity targets, monitoring


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