

## **CHANGES IN FORESTRY: PROBLEMS AND SOLUTIONS**

**Paschalis-Jakubowicz P., Prof., dr. habil.**

Warsaw University of Life Sciences, Faculty of Forestry, Department of Forest Utilization  
(Warsaw, Republic of Poland), e-mail: Piotr.Paschalis@wl.sggw.pl

## **ИЗМЕНЕНИЯ В ЛЕСНОМ ХОЗЯЙСТВЕ: ПРОБЛЕМЫ И РЕШЕНИЯ**

**Пасхалис-Якубович П., проф., д.н.**

Варшавский университет естественных наук  
(Варшава, Республика Польша)

### **Introduction**

The attempt to present forests and forestry on a global scale is based on the assumption that only a certain fraction of the problems arising from the overlap and penetration of one of the most important terrestrial, perhaps the most important, terrestrial ecosystems are present.

The global priorities of the entire forestry sector do not always coincide with the priorities of a particular region, state or even part of the state.

Continuing the actions leading to the loss of natural forests and the uncontrolled use of productive forests only has a negative impact on the further development of man and will lead to very serious consequences for the whole of mankind. Recognizing the need to meet the demand for selected forest products, especially for forest biomass and wood raw material, it must be recognized that the development of plantation forestry and fast growing plantation is inevitable.

It is the forestry sector that needs to respond to the increased demand for forest products and services, and the shared responsibility to distribute these goods and services in an efficient, fair and sustainable way.

### **Reality**

Scenarios for the future of forests and forestry in the various regions of the world, with a specific time frame dating back to the mid-21st century, are based on the latest available data from various fields of human activity as well as on various scenarios of climate change. Regarding forest and forestry, forest knowledge and forestry are also insufficient to enable graduates of these faculties to become a serious partner in international forest policy negotiations, in the face of policies.

In Africa, just in the last few decades, most of the natural forests have been destroyed and the rest have occupied only 8% of the area 30 years old. The vast majority of African natural forests (over 93%) in more than a dozen countries have lost more than 90% of the area covered in the last 100 years. Difficult to accept is the fact that 23 African countries have lost their natural forests completely.

Approximately 31% of Latin American forest areas are natural forests, of which nearly 55% of the natural forests are located in Brazil. Similarly to the African continent, in Latin America, in the tropical zone known from the middle of the last century of unprocessed forests, less than 10% of the natural forests remained. The exception to this continent is the region of Patagonia, connecting parts of Chile and Argentina, where natural forests have preserved over 34% of the forest area.

The loss of natural forests did not bypass Southeast Asia and the Pacific Islands. There are only about 11% natural forests in the Pacific Islands and more than 57% in Indonesia and Papua New Guinea. In large surface and populated countries such as Thailand, Malaysia, India, China, Philippines, Vietnam and Cambodia, forest resources of natural origin account for less than 10%. Six countries in this region have completely destroyed their natural forests, including Bangladesh, Pakistan, Sri Lanka and Taiwan.

Only 6.4% of European forests are natural forests, of which over 90% are in Russia. The only countries with remnants of natural forests on small surface areas are Sweden, Finland, Norway and Romania, and in the remaining 36 European countries there are no forest areas in their original form.

In northern Asia, natural forests occupy about 30% of the total forest area, forming, like North America, the coniferous forests of the boreal zone (taiga). Natural forests in the People's Republic of China and Japan are only about 5% of the total forest area.

North America's natural forests occupy more than 38% of the forest area, including the vast majority of which are in Canada. The rate of loss of natural forests in North America is still very high, estimated at about 100 thousand hectares a year. More than 89% of North American natural forests are growing in boreal forest and consist of coniferous species.

Replacing natural forests with forest plantations also affects the intensity of forest functions (Sharma 1992). Production functions as the main forest cover more than 50% of the forest area and biodiversity protection, soil and water protection and other protective functions on 21% of the forest area. It is noteworthy that the 11% of forest area dominates forest biodiversity.

Taking into account only the formal income of the forest sector, attention should be paid to the dominant position of the Asia and Oceania region, followed by Europe and North America. These three regions of the world receive 90% of total income from the direct use, production function of forests. The Latin American and Caribbean regions, as well as the African continent, receive only about 10%.

### Problems

The uniqueness of forests and forestry also means that, unlike most other economic sectors, forests also provide ecosystem services whose value, even if not marketed, is hundreds of billions of dollars, according to various economic valuation strategies. More accurate evaluation of the value of ecosystem services prevents methodological shortcomings, as well as the lack of appropriate information systems (Figure 1).



**Figure 1 – Ten countries with the largest area of forests**

It is estimated that half the forests lost over the last 10 thousand years have really been destroyed in the past century, with the process accelerating especially since the mid-twentieth century. Forests and participation of forests in the economic and economic development of countries and regions of the world have different forms, and there are also patterns of proceedings in the history of forest management in the world.

Cash from direct forest management accounts for about 1% of total world production. If we take account of the relative contribution of forests and forestry in our calculations, despite the lack of full knowledge of the real benefits derived from forests, we will also receive a non-monetary contribution from the forests of individual and national forests 3-5 times greater than the formal value (World Bank Report 2015).

An important factor that enhances the importance of forest management in the world is their contribution to the creation of the labor market. Over 40-60 million (according to various estimates) informally employed persons and over 1 billion to 1.5 billion people living directly or indirectly

from forest benefits should be added to more than 13 million people formally employed in the forest sector in the world.

Problems awaiting solutions are found in both forestry and other sectors of human activities. So the list of these problems is both long and interdisciplinary. We mention only a few:

- In the coming fifty years (only half the life of the stand in Europe), we can expect synergistic effects of both human-induced and environmentally-induced changes to be taken into account for forests and forestry in a global context;

- that there will be changes in production systems (management of forest resources, primarily forest use, both in terms of size and scope) and energy sources used, with an increase in the share of renewable sources;

- that the production function of the forest (e.g harvesting of wood or by-products) is helpful to all other functions of the forest;

- that the future of forestry depends on the potential for industrial development, able to cope with global challenges and change;

- and that a clear answer to whether or not the globalization processes are going to bring or benefit the world is not possible.

Significant, though often overlooked by the political class, as well as by the forest administration, is the data related to changes in the number of plant species, as their abundance will significantly affect the condition and further development of forests and forestry in the future in the perspective of 2050. The loss of a large number of plant species (including tree and shrub) by 2050 will affect entire regions of the world, including South America, Central America and the Caribbean, Africa and much of South East Asia. Reducing the number of plant species in the world is another challenge for forest managers.

The latest forest maps allow you to determine with great accuracy the change of the forest area in the world. Are these changes an indicator of forest future?

So the question is whether forests in the near future will be subject to rapid transformations and whether this will be caused mainly by climate change or human activities, remains open. The answer to this question is not clear, and any shift of responsibility to one of these factors has very serious consequences for our future.

Looking at the main trends in forest and forestry change in selected regions of the world by 2050, we base our knowledge of the forest we are gathering, combining scientific achievements with the practical experience of generations. Both of these sources of our knowledge are not sufficient, however, to build clear scenarios for the future of forests and forestry.

Recent results of forest inventories and created thematic maps showing the planet's forest resources and the extent of their vulnerability show that maps previously executed only a few years earlier were inaccurate and inconsistent.

Can we say that the Amazon is likely to lose its ability to regulate the climate and that, according to the 2010 World Bank report, it is at risk of extinction if forest loss exceeds 20% of the area originally occupied by forests? Will deforestation of the Amazon rainforest cause extreme droughts and will increase the risk of weather extremes around the world? Will climate change occur faster?

Almost 2/3 of the forests on our globe are not natural forests, because they directly depend on man-made management. In addition, the remaining part of the world's forest area is reduced, currently accounting for 36%, which has so far been subject to no direct human intervention. Approximately 6 million hectares of natural forests should be classified annually in other groups and natural rates.

There is also a systematic increase in the area of plantation forests, which has been changing the face of global forestry for more than 100 years (Del Lungo et al. 2006). The total land area occupied by plantation forests in 2015 is estimated at about 300 million hectares. The projection of forest plantation growth trends, presented by wood industry analysts, indicates that more than 0.5 billion hectares of new plantations will arrive in 2050.

Establishing forest plantations and fast growing tree plantations is one of the major causes of deforestation and degradation of natural tropical and subtropical forests. Other countries, such as

New Zealand, Australia, Chile or South Africa, plant trees growing rapidly in former forest areas that were converted to agricultural and pasture land several decades ago. All these activities produce deep, not yet fully understood environmental consequences, and the plantations themselves remain an unresolved problem in the global forest scale. It is believed that the growth dynamics of forest plantation and fast growing plantation forests threaten forest biodiversity resources.

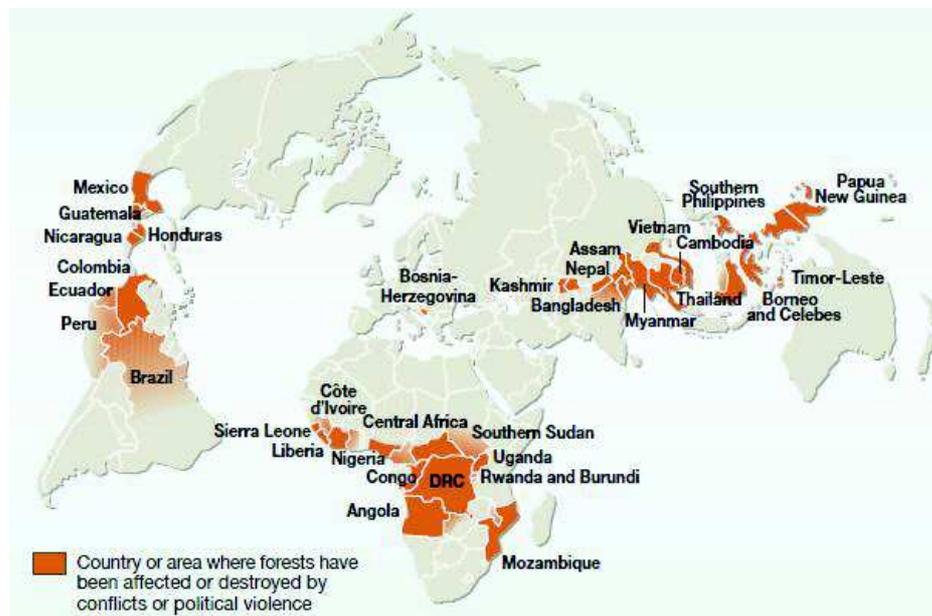
South East Asian countries, especially Malaysia and Indonesia, as well as South America (Brazil, Chile, Peru) plantations mainly in areas previously occupied by natural forests, using the agroforestry system and slash and burn. Forests planted in natural forests are planted with fast growing evergreen trees (primarily eucalyptus hybrids and *Pinus radiata*) or oil palm, rubber trees and, to a lesser extent, *Tectona grandis*.

A simple, yet very convincing example of direct impact is the forecast of the world population changing the daily use of wood for home heating and cooking one meal per day. On a global scale, day after day, all year round - and it should be assumed that this will be a lasting trend for all subsequent years - already about 2.5 billion people nowadays. The precise and true numbers are unknown, but it is estimated that more than 30% of the world's population is directly or indirectly dependent on access to wood, based on recent data published in the State of the World Forests 2015.

In addition, the good is characterized by the continuity of demand, which in the next 15-20 years will grow rather than decrease.

Some countries in the world, particularly in South-East and Central Asia, South and Central America and Africa, are facing the problem of allocating land between forestry, agriculture, energy production, how to ensure sufficient food production, and how to meet growing demand. Water and energy for a rapidly growing population.

This is one of those global problems that must be solved using a number of tools, both political and technical (Figure 2).



**Figure 2 – Forests and conflicts**

Illegal logging, infrastructure construction, natural resources and oil exploitation, and global warming are all major threats to the ecosystems of the forests, affecting the various levels of the world.

### **Solutions**

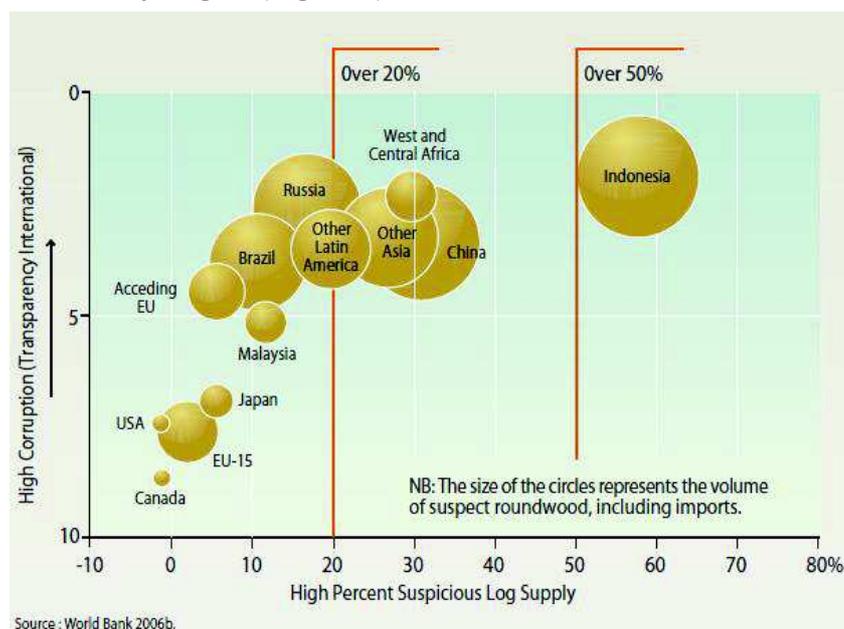
Predicting the future is risky, especially in the case of forest ecosystems, but it would be even more risky if we did not try to prepare for the foreseeable future.

Currently, the world's attention is increasingly directed towards forests and forestry as a sector that contributes significantly to the development of international trade, national economies, employment and household incomes.

The dynamically increasing plantation forest area, subordinated to the selected production objectives, will also (to some extent) have positive environmental value. By 2050, we can expect that over 60% of total wood production will come from plantations of fast-growing trees. This opens a new field for discussion on the forest paradigm and the future of forests. It also indicates the need to develop solutions that will address forest management, requiring other forest management structures and systems.

It should be emphasized that plantation forestry does not provide people with quality of life such as natural and natural forests.

We can look at three strategies of action that will contribute to the achievement of the objectives, stating that these strategies relate to actions taken by various economic sectors, not just the forestry sector, to achieve synergies (Figure 3).



**Figure 3 – Forests and conflicts**

The strongest and at the same time the most difficult task is to halt the loss of natural forests, mainly in the tropics and in the boreal zone, especially in some parts of the Far East of the Russian Federation.

This involves social integration, which is built on the understanding and acceptance of forest economic activities, which in many cases are being challenged by different social groups.

It is obvious that forest management, dependent on many other factors, must take into account not only forest management mistakes that occur on all continents but also strong competition for land from other sectors, especially agriculture.

Throughout the world, forest management (the forestry sector) needs to evolve and there is no doubt that managing this sector will become even more complex to address these challenges.

This lack of knowledge means that existing forest management systems, in order to preserve ecological balance, provide ecosystem services, and certain direct economic benefits, must be legible to the public. It is extremely important to introduce institutional changes that open opportunities for the integration of different forms of forest ownership, civil society and inter-sectoral cooperation.

The 21st century opens many important international agreements referring indirectly to forests and forestry, which contain in their content a promise to launch a new era in forest management, involving a change in some regions of the world, including in Europe, a narrow understanding of forests and recognition of exceptional importance. And lasting interdependence between the forest and man throughout the history of mankind.

A controversial issue in the development of scenarios for further development and directions of change in global forestry is the ownership structure of forest areas, and above all the identification of the

actual number of private forest owners. The estimated number of private forest owners is also not subject to any analysis related to their way of managing the forest. The fundamental problem that should be tackled in the international discussion is whether, on a global scale, the form and structure of forest ownership affect sustainable use, and if so, to what extent. The experience of European countries or North America is only a partial picture of the situation, and is more ambiguous. In the case of having the appropriate legal framework, professional staff and control systems, social participation and enforced law, the principle of forest management, regardless of the form of forest ownership, is very similar.

There is a dichotomy of the choice of strategy between developing countries - mostly poor South and developed countries - the rich North, about the direction of forest use and trends in the size of this use. The vast majority of developing countries clearly accelerate the process of direct use of the forest, while the vast majority of developed countries simultaneously increase the use of their direct production functions, accompanied by increased ecosystem-based benefits.

We still cannot determine, even approximately, the nature of the dominant function of forests on nearly 8% of forest area. The global demand for wood is strongly dependent on the region of the world and is stabilizing at about 2.75 billion cubic meters a year, and the production function, including the use of forest by-products, is used on more than two thirds of the world's forest area (Report of the Secretary -General 2009).

World forestry needs a convention on forests agreed by the countries of the United Nations. The Forest Convention will not end many years of repeated attempts at writing and approving the various fora as solutions to forest problems. It will be the beginning of activities that in a real, fully transparent and verifiable manner will prove our common commitment to the process of building and implementing a vision of forests and forestry in the 21st century.

It should be assumed that XXI century will bring unprecedented changes in the meaning of the role and significance of the forest to preserve the permanence of our existence. These changes will take place on every continent where forests grow, with respect to each form of forest ownership and in every country in the world. The relationships between the development of human civilization and the sustainability of forests must be both understood and properly assessed. We have not, until now, better tools to shape these relationships than forestry.

We can significantly and positively shape the forest and have a decisive influence on the forest being played by all the functions assigned to them (for the most part not yet known) in every scale of reference - from the local level to the global level, or to be the victim of inability to implement new solutions in forestry.

#### REFERENCES

1. Del Lungo A., Ball J., Carle J. 2006. Global planted forests thematic study: results and analysis. Planted forests and Trees. FAO Working Paper 38.
2. FAO 2006, ABARE (Australian Bureau of Agricultural and Resource Economics) /Jaakko PoyryJaakko Consulting.
3. Matti P., Uusivuori J. 1999. World Forests, Society and Environment. Springer – Science+Business. Pages: 1–403.
4. MegaForestalis 2014. Public forest agencies in the twenty first century. Driving change through transparency, tenure reform, citizen involvement and improved governance. May 2014.
5. Paschalis-Jakubowicz, P. 2015. Lasy i leśnictwo świata. Centrum Informacyjne Lasy Państwowe. Warszawa. Str. 1-550.
6. Sharma N. P. (ed.) 1992. Managing the world's forests. Looking for balance between conservation and development. Kendall / Hunt Publishing Company.
7. State of the World's Forests 2014. Enhancing the socioeconomic benefits from forests. Food and Agriculture Organization of the United Nations Rome, 2014.
8. World Bank Report. 2015. Washington DC, World Bank.