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Environmental Policy Making and Landscape-Scale Management

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The past 65 years in Europe and North America have been marked by tremendous socio-economic and political change. The tragedy and devastation of World War II was followed by a Cold War, which divided the world and contained the constant threat of a nuclear holocaust. We learned to live, sometimes even thrive, in this environment. The West prospered, but unevenly, in part because of varying economic growth rates, the result of factors, such as lack of infrastructure, inadequate banking and credit institutions, and poor or inconsistent economic policies. Production and consumption of goods and services grew in quantity and quality, as did the rate of exploitation of natural resources. Widespread environmental degradation and pollution became matters of public controversy. International markets intertwined and evolved into a global economy. Global interdependence was a reality, regardless of who chose to recognize or not to recognize it.

Several things occurred during the 1980s with regard to natural resources and the environment. Public concern over the loss of forests around the world, especially tropical forests, began to grow. Later, about 1988, it was intensified when tropical deforestation was linked with global climate change, such as the extensive burning of forests in Brazil at the time and the consequent release of carbon dioxide into the atmosphere (FLETCHER 1995).

Landscape Ecology

The importance of scale became widely recognized in the 1980s in ecology as well as in activities such as agriculture, forestry, and wildlife management. Whatever is done in these activities has both spatial and temporal dimensions, which must be understood if consequences are to be predicted accurately. Prior to this recognition, certainly in North America, land management decisions were made at the site level. By the end of the 1980s, nearly all land management agencies in the United States understood that informed resource-management decisions had to be sensitive to the temporal scales and spatial configuration of the activities involved (TURNER *et al.* 2001).

Landscape ecology, with its emphasis on the interaction between spatial pattern and ecological processes, emerged as a separate area of study. The premise of this science is that the explicit arrangement of a landscape mosaic affects the structure and functioning ecological systems (TURNER *et al.* 2001). In other words, one arrangement of a landscape mosaic will cause an ecological system to organize itself and function one way and another arrangement can cause the system to organize itself and function in still another.

North America was generally behind Europe in the development of landscape ecology because of the early work of European scientists in regional geography and vegetation science and the application of aerial photography. The term «landscape ecology» was introduced by the German biogeographer Carl Troll (TROLL 1939). Several events transpired to compel re-thinking in North America of the impacts of land use and forest management activities upon ecosystem structure and functioning. Perhaps the most important of these

was the old-growth, spotted owl issue in the north-western United States (subsequently referred to as the Pacific Northwest), in which timber harvesting of old-growth forests had severely fragmented such forests, resulting in substantial decline in habitat for the northern spotted owl (*Strix occidentalis caurina*) and a corresponding decline of its population. The controversy began in the early 1980s and grew in intensity until timber harvesting and other related activities on federal lands in the Pacific Northwest were virtually halted in the early 1990s by several court injunctions.

The loss of old-growth forest habitat in the Pacific Northwest presented a smaller version of the larger international issue of forest habitat loss and at a scale, though substantial, which many people in the United States could grasp. Landscape ecology provided a theoretical framework upon which to organize and analyze data. It was subsequently used for integrated landscape planning in the Front Range in Colorado and forecasting land-use changes in the Southern Appalachian Mountains of the United States. It was also applied to landscape planning in Ontario, Canada in management of Crown forests, which is the general name of publicly owned forests in Canada.

Computer Technology

Rapid advances in desktop computer technology were made in the early 1980s as well as the availability of remotely sensed data, such as satellite images, whose usefulness grew dramatically with the development of computer software packages for storing, manipulating, and displaying spatial data, which we now refer to as geographic information systems (GIS). I remember well as a young department head in 1982 weighing whether or not to buy three Tandy Radio Shack TRS-80s for common use by faculty and graduate students. Some younger faculty bought Apple IIs two years later. Then there was a rush to buy Macintosh Computers when they became available. By 1988 every faculty member in the department had a computer at his or her desk. We had a computer laboratory, and there were several dedicated machines in the research laboratories. A remarkable change in a space of six years!

Advances in computer technology, the availability of remotely sensed data, and GIS software provided a means for analyzing landscape issues. They accelerated development and applications of landscape ecology.

The Fall of the Berlin Wall and the Collapse of the Soviet Union

Mikhail Gorbachev became general secretary of the Communist Party in 1985, succeeding Yuri Andropov. Gorbachev was keenly aware of the problems of the Soviet Union and that the Communist Party had become both stagnant and corrupt. He believed the Soviet Union had to concentrate on domestic development and promote international peace to catch up with the prosperity and technological advances in Europe and North America. Gorbachev wanted to integrate the Soviet

Union into the mainstream of the modern world, which meant democracy and a market economy. He gave the Soviet Union and the World two slogans: perestroika (restructuring), which held out the promise of reorganizing the State and society, and glasnost (openness), which would permit open discussion of the nation's problems.

This change resonated throughout the Soviet Union and Eastern Europe unleashing an unprecedented level of political unrest. Glasnost stimulated calls for independence. The Berlin Wall fell on 9 November 1989, part of a revolutionary wave in Eastern Europe at the time, especially in Czechoslovakia, East Germany, Hungary, and Poland. East Germany subsequently disintegrated, and on 3 October 1990, the two Germanys merged.

The Soviet Republics clamoured for independence, with the Baltic States leading the way by declaring their sovereignty and independence in economic matters in 1989. Gorbachev engaged in a bitter struggle with Boris Yeltsin, speaker of the Supreme Soviet of the Russian Soviet Federative Socialist Republic, who wanted to speed up the pace of reforms in the USSR. The Russian Republic, the largest republic of the Soviet Union, declared its independence under Yeltsin on 12 June 1990. Yeltsin quit the Communist party the following month. Soviet hardliners attempted a coup d'état on 19 August 1991 while Gorbachev was on a vacation in the Crimea. At the same time, Yeltsin challenged the hardliners, and defections from the coup were immediate. It collapsed after three days.

All three of the Baltic States declared their full independence and asserted their authority over Soviet institutions within their borders in 1991. The Soviet Union, now a shadow of its former self, acknowledged its sovereignty on 4 September 1991. Gorbachev was forced to resign three months later as president. By May 1992, 12 of the 15 republics had declared their independence, and the Soviet empire had collapsed.

For the first time in half a century, the European landscape stretched from the Atlantic to the Urals, from the Mediterranean to beyond the North Sea, without oppressive political barriers. The European landscape perspective was suddenly more expansive. It quickly coupled with public concern over the deterioration of European forests, an important environmental issue during the 1980s, which had led to an increasing awareness of the environmental, economic, and cultural values of forests.

The need for a concerted policy for the protection and sustainable management of forests led to the first Ministerial Conference on the Protection of Forests in Europe in Strasbourg in 1990. It was followed by ministerial conferences on forests and forestry in Helsinki in 1993, Lisbon in 1998, and in Vienna in 2003.

United Nations Conference on Environment and Development (UNCED)

The United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro on 3-14 June 1992 (EARTH SUMMIT 1992). It was the climax of a process, begun in December 1989, of planning, education, and negotiations among Member States of the United Nations. UNCED was unprecedented in both size and the scope of its concerns on economic development and environmental degradation, particularly as they relate to forests and forestry practices.

Three major agreements directed at changing the traditional approach to development were adopted:

- The Rio Declaration on Environment and Development, which is a series of principles that defines the rights and responsibilities of States;
- Agenda 21, which is a comprehensive program of action for sustainable development, and whose Chapter 11 is on stopping deforestation; and,
- The Statement of Forest Principles, which is a set of principles for sustainable management of forests worldwide.

In addition, two legally binding conventions aimed at preventing global climate change and maintaining biological diversity were agreed to, namely, the Framework Convention on Climate Change and the Convention on Biological Diversity. The UN was also called on to negotiate an international agreement on desertification, which has subsequently occurred.

Significant progress has been made since UNCED. The Intergovernmental Panel on Forests (IPF), from 1995 to 1997, and the Intergovernmental Forum on Forests (IFF) from 1997 to 2000, were established within the UN to implement the Forest Principles and Chapter 11 of Agenda 21. The IPF and IFF processes resulted in 270 proposals for action for management, conservation, and sustainable development of forests.

The United Nations Forum on Forests (UNFF) was established on 18 October 2000 to provide a coherent, transparent, and participatory global framework for policy implementation, coordination, and development, including carrying out the IPF and IFF proposals. It now serves as the main forum for international policy deliberations on forests in the absence of a global forest convention.

The number of legally and non-legally binding agreements related to forests grew significantly with UNCED. Ten legally binding, forest-related agreements, including UNFF, now exist, and five of them were initiated either during or after UNCED (BRAATZ 2002, see *table 1*).

Over twenty non-legally binding, forest-related international conventions and agreements exist (see *table 2*), and the majority of these were initiated during the 1990s, a direct result of UNCED.

Table 1: Legally Binding, Forest-Related International Conventions and Agreements. SOURCE: BRAATZ 2002.

International Agreement	Year of Initiation
Commission on Sustainable Development	1993
Convention on the Conservation of Migratory Species of Wild Animals	1983
Convention on Biological Diversity	1993
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1975
Convention of Wetlands of International Importance, Especially as Waterfowl Habitat (Ramsar Convention)	1975
International Tropical Timber Agreement (ITTA)	1983–1997
Convention Concerning the Protection of the World Cultural and Natural Heritage	1975
United Nations Convention to Combat Desertification	1996
United Nations Forum on Forests	2000
United Nations Framework Convention on Climate Change	1994

Policy Networks

The increase in the number of international agreements in forestry has caused an elaboration of policy networks (SCHMITHÜSEN 2000). Historically, national governments were the initiators of their own domestic policies, such as in agriculture, environmental protection, forestry, rural development, and wildlife. These networks became much more complex after UNCED in two ways.

First, forest-related policies have become multi-level: global, supra-national (among countries within global regions), national, regional (sub-national), and local. Second, forest-related policies have become cross-sectorial in their effects, as have policies in other sectors of a domestic economy – such as in agriculture, environmental protection, rural development, and wildlife – in their effects on forests and forest practices.

National governments continue to be key, however. They are the initiators of policies internationally, as well as negotiators of the framework for international cooperation. They are also the implementers within their respective political boundaries: nationally, regionally, and locally.

The effects of this complexity are remarkable. For example, with implementation of several international agreements emanating from UNCED, coupled with the revision of the forest laws of Eastern European countries in their transition to a market economy, virtually every European country has substantially revised or amended their forest laws during the 1990s; in some cases more than once (SCHMITHÜSEN 2000).

Table 2: Non-Legally Binding Forest-Related Agreements.

Source: Secretariat of the United Nations 1998.

United Nations Programmes (Created by the General Assembly or FAO)
United Nations Development Programme (UNDP)
United Nations Environment Programme (UNEP)
United Nations Conference on Trade and Development (UNCTAD)
World Food Programme
FAO regional commissions
Agenda 21
Chapter 11, Combating Deforestation
Non-legally Binding Authoritative Statement of Principles for a Global
Consensus on the Management, Conservation, and Sustainable Development of All Types of Forests (Forest Principles)
Criteria and Indicators for Sustainable Development
ITTO
Pan-European Helsinki Process (Helsinki Declaration)
Tarapoto Proposal
Central American Initiative
Dry Zone Africa Initiative
Near East Initiative
African Timber Organization
Global Environmental Facility (GEF)
Climate change and biodiversity windows
G-7 Pilot Programme to Conserve the Brazilian Rain Forest (PPG-7)
G-8 Forest Action Programme
Plan of Action for the Sustainable Development of the Americas

Recapitulation

A paradigm shift has occurred over the past 25 years, and it was caused by several interacting factors, including:

- General concern over the alarming rate of deforestation in the 1980s, especially in the tropics, and the degradation and decline of forests worldwide;

- The evolution of landscape ecology into a distinct area of study in the 1980s because of (1) the number of broad-scale environmental issues, (2) understanding of the importance of spatial and temporal scales on ecological structure and functioning, and (3) rapid technological advances in both computer hardware and software (TURNER *et al.* 2001);
- Recognition by several international organizations, including the United Nations, that economic development was a principal cause of both deforestation and forest degradation and decline as well as other environmental problems such as ozone depletion, global warming, water pollution, and the loss of biological diversity;
- The fall of the Berlin Wall in 1989 and the collapse of the Soviet Union in 1991, exposing the environmental problems of Eastern Europe and the desire of Eastern European countries convert to a market economy and a more democratic form of government;
- The 1992 United Nations Conference on Environment and Development, which spawned a number of international forest-related agreements; and,
- The elaboration of public policy networks concerning natural resources and the environment, both at many levels of government and across sectors of individual domestic economies.

New Paradigm

The way in which natural resource and environmental problems are approached today is very different than from the approach of 25 years ago. Problems are seen differently: larger in scale and with a greater appreciation of their complexity. Hence, approaches for addressing them include a landscape perspective and multiple scientific disciplines dealing with the abiotic, biotic, and social aspects of landscapes. An understanding of the connections among ecological and socio-political-economic processes at multiple spatial and temporal scales is essential.

The role of landscape ecology is substantial and will expand as its focus on landscape-ecological problems sharpens and its theoretical and methodological base becomes stronger. Nevertheless, several scientific disciplines – namely, earth sciences, ecology, economics, cultural anthropology, geography, remote sensing and sociology – will be involved in addressing landscape-level natural resource and environmental problems. Each can be expected to grasp only part of the complex reality. In combination, they will allow one or more comprehensive solutions.

The foregoing could be and has been presented diagrammatically in various ways. One way is for the vertical axis being socio-political-economic variables at increasing scales, the horizontal axis being abiotic and biotic landscape variables at various scales, and the diagonal axis between them being institutional decision or policy variables, going from narrow to broad in terms of their application (SCHMITHÜSEN 2004). The result is a three-dimensional space connecting socio-political-economic variables with landscape variables through policies at various scales of application (*ibid.*, see *figure 1*).

I expect the science will meet the challenge of providing feasible solutions to current landscape-level natural resource and environmental problems. It usually does. More daunting will be the challenge of developing and implementing effective policies at the landscape level.

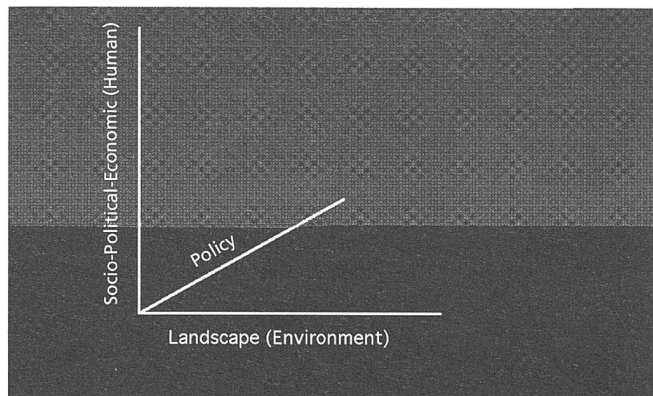


Figure 1: Human-Environment Interface.

Policy Implementation

Upon his retirement, Anthony Lewis, long-time «New York Times» columnist and a two-time Pulitzer Prize winner, was asked during an interview if he had changed his views on anything significant during the course of his career. He responded: «The most disappointing fact of life in the 20th century was that, contrary to my expectations, after the Holocaust, the century continued to be riddled with the extraordinary ability of human beings to hate others because they look a little different ... (T)he result has been cruelty and misery on an enormous scale» (BRONNER 2001).

I have a similar disappointment at a comparable stage in my career, which is the pervasive ability of human beings to savage the place in which they live, to consume resources well beyond a rate which is sustainable, to ignore that which is reasonable and informed in futile efforts to satiate what often seems to be pure gluttony.

The development of landscape ecology, advances in computer technologies, the breaking down of Cold War political barriers, UNCED, and the subsequent elaboration of public policy networks in resource conservation and sustainable development – these things combined – provide a new opportunity, if not an unprecedented one, for sustainable development in a quality environment.

As noted above, the challenge will be transformation of environmental and natural resource policies into landscape-scale management, from rule to practice, especially where a number of national governments are involved. The transformation can be made; ultimately, it has to if human kind is to survive in a world with which we are familiar. But I would suggest that at least three conditions must be present.

First, the policies must be good ones in the sense they meet five well-known criteria: (1) biological feasibility, (2) economic efficiency, (3) equity (fairness), (4) social acceptability, and (5) administrative practicality. These criteria are regularly discussed in public policy textbooks, so I will not elaborate upon them. The point is a necessary condition for making the transition from policy to management – from rule to action – is that the policies be «good» ones according to accepted criteria.

Second, the policies must have the full force of law in countries that are signatories to relevant international agreement(s). Implied in this condition is the policies would be enforced domestically even in times when a country is feeling vulnerable for reasons such as adverse economic conditions, threats to domestic security, or a disadvantageous competitive position in international trade. In other words, a signatory government during time of fear and insecurity will not abandon the rule of law.

Third, the policies must have a sound ethical foundation. Ethical behaviour can counter the banal and the venal, and it does from time to time. Fortunately the ideas of sustainable development and environmental protection have a strong ethical base. A land ethic, in varying degrees and forms, exists virtually throughout the world. People know pretty well what good land stewardship is and why it is necessary. Aldo Leopold's line (LEOPOLD 1949) is widely quoted: «A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.» So is Gifford Pinchot's «the greatest good for the greatest number in the long run» (PINCHOT 1947). The World Commission on Environment and Development's definition of «sustainable development» (WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT 1987) – «development that meets the needs of the present without compromising the ability of future generations to meet their own needs» – has resonated throughout the world because an almost innate understanding exists of what the definition means.

Environmental policymaking should have an ethical foundation because compliance will go beyond that compelled by the penalties and sanctions contained in the laws an enforcing nation state. It can go to the level compelled by society at large. It can reach the level of becoming a moral duty and obligation.

International forestry and environmental agreements – usually modified by international processes and organizations – are implemented by nation states through forest and environmental policies in the form of statutes, administrative rules, and programs (LE MASTER *et al.* 2002). In turn, these – usually modified by sub-national processes and organizations – are applied to forest landowners, directly affecting the structure of forest land tenures, forest landowner conduct, and the performance of the forest tenure system in terms of stewardship (Ibid.). Ultimately, collective forest landowner conduct and tenure performance have a direct bearing on future international forestry and environmental agreements (Ibid.). This simple model indicates how international agreements modify behaviour at the individual landowner level and why it is so important the policies emanating from international agreements make sense, have the full force of law behind them, and have a strong ethical foundation.

At this point, landscape-scale management becomes a reality. The transition from environmental rule to landscape management practice becomes complete.

* * *

The life and career of Professor Franz Schmithüsen spanned the time period discussed above. He actively participated in the paradigm shift I have described as a teacher, a scientist, a national and international policy maker, an author, and a leader in international forestry organizations. He saw and appreciated the evolution in the complexity in the socio-economic-political processes involved at the international level in sustainable development and environmental protection. He encouraged the rest of us to see and appreciate the complexity, and he also encouraged our participation in these processes, encouragement for which I will always be grateful. Thank you, Franz. And my best wishes to you in your retirement for a long and healthy life. You have done well, and you have done much good in your career. Congratulations!

Summary

The development of landscape ecology, advances in computer technologies, the breaking up of Cold War political barriers, UNCED and the subsequent elaboration of public policy networks in resource conservation and sustainable development have combined to provide a new opportunity for sustainable development in a quality environment across the landscape. The challenge will be transformation of environmental and natural resource policies (rules) into landscape-scale management (practices). Successful implementation of these policies through the networks will require three conditions: the policies must meet well-known and accepted criteria; they must have the full force of law; and they must have a sound ethical foundation. These conditions being met, landscape-scale management can become a reality; the transition from environmental rule to landscape management practice can be complete.

Zusammenfassung

Umweltpolitik und landschaftsbezogenes Management

Die Entwicklung der Landschaftsökologie verbunden mit Fortschritten der Computertechnologie, das Aufbrechen der politischen Barrieren des Kalten Krieges, die Konferenz der Vereinten Nationen über Umwelt und Entwicklung sowie die entstandenen öffentlichen Politiknetzwerke zur Ressourcenerhaltung bieten gemeinsam einen neuen Ansatz für die nachhaltige Entwicklung im Bereich Umwelt und Landschaft. Die Herausforderung besteht damit in der Anwendung der Umwelt- und Landschaftspolitiken im Hinblick auf die konkrete Managementpraxis im Massstab der Landschaft. Eine erfolgreiche Umsetzung dieser Politikbereiche durch entsprechende Netzwerke erfordert drei Bedingungen: Die Politiken müssen gut nachvollziehbaren und generell anerkannten Kriterien entsprechen; sie müssen ausdrücklich rechtsverbindlich sein; und sie müssen eine überzeugende ethische Fundierung aufweisen. Falls diese Bedingungen erfüllt sind, kann ein landschaftsbezogenes Management Realität werden und die Umsetzung von Umweltregelung in die Praxis des Landschaftsmanagements kann erreicht werden.

Résumé

Politique environnementale et gestion à l'échelle du paysage

Le développement de l'écologie du paysage, les progrès de la technologie informatique, la levée des barrières politiques découlant de la guerre froide, la Conférence des Nations Unies sur l'environnement et le développement (CNUED) ainsi que les réseaux de politique publique qui en découlent pour la conservation des ressources offrent conjointement une nouvelle approche pour le développement durable dans le domaine de l'environnement et du paysage. Le défi consiste à appliquer les politiques environnementales et paysagères (règles) à la gestion concrète à l'échelle du paysage (pratique). Une mise en œuvre réussie de ces domaines politiques par les réseaux correspondants dépend de trois conditions: les politiques doivent être parfaitement reproductibles et satisfaire aux critères généralement reconnus; elles doivent expressément avoir force de loi; et elles doivent découler de bases éthiques évidentes. Lorsque ces conditions sont remplies, la gestion à l'échelle du paysage est réalisée et la mise en pratique de la réglementation environnementale dans la gestion du paysage peut être concrétisée.

Traduction: CLAUDE GASSMANN

References

- BASTIAN, O. 2001: Landscape Ecology: Towards a Unified Discipline? *Landscape Ecology* 16: 757–766.
- BRAATZ, S. 2002: National Reporting to Forest-related International Instruments: Mandates, Mechanisms, Overlaps and Potential Synergies, <http://www.fao.org/DOCREP/005/Y4171E/Y417E53.HTM>.
- BRONNER, E. 2001: After 50 Years Covering War, Looking for Peace and Honouring Law, in *New York Times*, December 16, 2001, Week in Review.
- EARTH SUMMIT 1992: UN Conference on Environment and Development, <http://www.un.org/geninfor/bp/enviro.html>.
- FLETCHER, S. 1995: International Forest Agreements: Current Status 95-960 ENR, Washington, D.C.: CRS Report for Congress.
- LE MASTER, D.C.; BLOCK, N.E.; OWUBAH, C.E. 2002: Selection of Policy Tools in Multilevel International Networks, in *Forest Law and Environmental Legislation, Contributions of the IUFRO Research Group 6.13, Proceedings VII*, pp. 175–184, Zurich, Switzerland: ETH, Forest Science Contributions, Chair, Forest Policy and Forest Economics.
- LEOPOLD, A. 1949: *A Sand County Almanac and Sketches Here and There*, New York: Oxford University Press.
- PINCHOT, G. 1947: *Breaking New Ground*. New York: Harcourt, Brace and Company.
- SECRETARIAT OF THE UNITED NATIONS 1998: International Arrangements and Mechanisms to Promote the Management, Conservation, and Sustainable Development of All Types of Forests, note by the Secretariat, Intergovernmental Forum on Forests, Commission on Sustainable Development, Economic and Social Council, United Nations, 19 June 1998.
- SCHMITHÜSEN, F. 2000: The Expanding Framework of Law and Public Policies Governing Sustainable Uses and Management in European Forests, in *Forging a New Framework for Sustainable Forestry: Recent Developments in European Forest Law*, F. Schmithüsen, P. Herbst, D.C. Le Master (Eds.), *IUFRO World Series*, vol. 10, pp. 1–27, IUFRO Secretariat, Vienna, Austria.
- SCHMITHÜSEN, F. 2004: Forest Policy Developments in Changing Societies: Political Trends and Challenges to Research, in *Towards the Sustainable Use of Europe's Forests: Forest Ecosystem and Landscape Research*, *EFI Proceedings* 49: 87–99, Joensuu, Finland.
- TROLL, C. 1939: Luftbildplan und Ökologische Bodenforschung, *Z. Ges. Erdkunde*, 241–298.
- TURNER, M.G.; GARDNER, R.H.; O'NEILL, R.V. 2001: *Landscape Ecology in Theory and Practice*. New York: Springer-Verlag, New York, Inc.
- WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT 1987: *Our Common Future*, also known as «The Brundtland Report», New York: United Nations.

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