CULTURAL ECOLOGY: CONTEMPORARY UNDERSTANDING OF THE RELATIONSHIP BETWEEN HUMANS AND THE ENVIRONMENT

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Received: 28th July 2012, **Accepted:** 19th September 2012

ABSTRACT

The paper explains the concept of contemporary cultural ecology, a scientific approach reflecting the relationship between human society and natural environment. This approach is used by the scholars of Faculty of Arts at Charles University in Prague, Czech Republic. Special attention is paid to the links between cultural ecology and landscape ecology, interdisciplinary study of biophysical as well as societal driven processes and patterns in landscapes.

We present important disciplines of social sciences that focused on the relationship of humans and environment, and which inspired our concept of cultural ecology. The first human ecology appears in the 1920's in Chicago. Human ecology of Robert E. Park and his colleagues was mostly aimed at urban sociology. A totally different approach is represented by cultural ecology of Julian Steward, who created it as an anthropological sub-discipline stressing the adaptive function of culture. Social ecology of Murray Bookchin brought more philosophy and social activism into the discussion. In the 1970's human ecology presented by Gerald Young and environmental sociology of William Catton and Riley Dunlap got environmental factors back to the studies of modern complex societies.

Apart from the sources of inspiration mainly from the US, we also briefly summarize Czech disciplines and scholars investigating the human-nature relationship, e.g. social ecology of Bohuslav Blažek, concentrating mostly on rural areas or the sociological approach towards environmental problems of Jan Keller.

Furthermore, four constitutive principles of today's cultural ecology are discussed. These include: 1) focus on *the problems of present times* instead of escapes into the past or the future, 2) *integrative approach* which is aware of the pitfalls of inter- or transdisciplinarity, 3) cultural core of society-environment relationships, i.e. reflection on the society-environment relationship through *culture*, and 4) *dialogue* between human (society) and environment (nature).

Finally, the landscape as an object of study of cultural ecology is briefly discussed. We conclude that cultural ecology is a broad approach, stimulating discussions among various academics rather than a well-defined rigorous scientific discipline. We believe this to be the

benefit of cultural ecology, which can foster illuminating discussions about important environmental issues.

Keywords: cultural ecology, landscape ecology, environment, social sciences, transdisciplinarity

INTRODUCTION

Present-day environmental problems show their specific nature. On one hand, they exceed local ecological crises and merge into a global phenomenon, which affects natural and even more social and economic systems around the world. On the other hand, global environmental problems can be explored by traditional scientific disciplines only with difficulties. In fact, it is impossible to investigate the problems in their complexity by separated natural, technical or social sciences. It might seem easy to incorporate existing disciplines into a new redemptive interdisciplinary approach. A lot of effort has been made in order to create such an approach, yet many of those supposedly interdisciplinary fields of study turned out to be much less successful than expected.

Local perception and understanding of global environmental problems is often insufficient because it tends to disregard possible impacts of global issues on "our" town, city or landscape. Even if science is able to provide us with crucial information about the threats, culture (here intended in the broad sense of human adaptation, thus as a manifestation of human activity) hardly ever integrates this information in a proper way.

Cultural ecology, as we present it, attempts to overcome some of the difficulties mentioned above. We first summarize important sources of inspiration, then we explain four main principles of cultural ecology and finally we mention why landscape is an object of interest for cultural ecology.

Our concept of cultural ecology[1] participates on a wider project of culturology[2], which is a holistic and integrative attempt to study culture in its complexity. It was the American cultural anthropologist Leslie A. White who coined the term, labelling this approach applied at the Faculty of Arts, Charles University in Prague. White is also the most influential author for the so-called culturological approach (Soukup 2010).

This paper does not have the ambition to construct a detailed methodology or to found a precise theoretical basis for a new social science, thus we dare to use some terms in the text in their broader sense as synonyms, like culture, human or society. Also nature and environment are sometimes used as synonyms, especially in case the character of environment is not further specified.

SOURCES OF INSPIRATION FOR CULTURAL ECOLOGY

Many scholars in 20th century focused on the relationship between humans and environment. The variety of academic approaches is abundant, ranging from the humanities and social sciences to natural sciences as well. In order to unveil the roots of cultural ecology, as we understand it, in the following section we list some of the most important

[1] Hereinafter referred only as "cultural ecology". To distinct the anthropological discipline "cultural ecology" defined by Julian Steward, we refer to it as to "Steward's cultural ecology".

[2] In Czech "kulturologie", sometimes also translated as "cultural studies". This translation is misleading, though, since culturology could also cover some research topics of cultural studies, but the discipline as such is closer to cultural anthropology.

social sciences relevant for our concept of cultural ecology and we discuss both international and Czech sources of inspiration.

Wells of inspirations in 20th century social science

Important academics and disciplines are presented here chronologically, starting at the beginning of the 20th century and ending in the late 1970's when the last fields of study penetrated into established academic curricula. This summary should help clarify the differences among various approaches named human, cultural or social ecology.

The roots of Human ecology are dated to the beginning of the 20th century in the USA. Sociologists Robert E. Park, Roderick D. McKenzie, Ernest W. Burgess and others draw inspiration from ecology and they studied dynamic processes in the growing city of Chicago, using ecological methodology and terminology. Their urban sociology focused on the community and its organization, mainly on the spatial distribution. Probably the most well known work is called *The City* (Park *et al.* 1925). In Park's and his colleagues' concept, human ecology is an ecological systemic approach towards the society and its organization. Natural environment as such does not belong to their spheres of interest. For human ecology, it "…is not man, but the community; not man's relation to the earth which he inhabits, but his relations to other men, that concerns us most" (Park 1926, p. 2).

Cultural ecology introduced by the American anthropologist Julian H. Steward as an anthropological sub-discipline in the 1950's, represents an approach quite distinct from the sociologically oriented human ecology. Steward diligently studied materially simple cultures of Native Americans in the arid areas of the Great Basin. He stressed the adaptive function of culture, a process that he called cultural ecology, and he inquired how culture change "…is induced by adaptation to environment" (Steward 1955, p. 5). The concept of culture as a non-biological adaptation does not necessarily imply mechanical environmental determinism. Culture is a creative process influenced and stimulated by, but not determined by, the environment. Steward summarized his most important ideas in the book *Theory of Culture Change: The Methodology of Multilinear Evolution* (Steward 1955).

Another inspiration, and another discipline named ecology, comes from the philosopher Murray Bookchin, one of the pioneers of radical environmentalism in the USA. The main idea of his social ecology was that environmental problems originate in social problems, such as social, economic, racial and other conflicts and inequalities (Bookchin 2005). Not only does social ecology of Bookchin and his followers want to describe the problem, but it also aspires to an active change of the society accenting more freedom and equality, and aiming for libertarian municipalism (Bookchin 1991).

In the 1970's an American scholar Gerald L. Young re-elaborated the concept of human ecology with a special focus on different aspects of interaction and with an interest in levels of organization, relation of the parts to the whole and the idea of holism (Young 1974). This non-reductive approach, aiming for interdisciplinarity, set the foundations of the modern conception of human ecology[3].

At the turn of the 1970's and the 1980's a new sociological trend emerged. American sociologists William Catton Jr. and Riley E. Dunlap presented environmental sociology and the New Ecological Paradigm opposing the Human Exemptionalism Paradigm[4] (Catton and Dunlap 1980). The traditional Human Exemptionalism Paradigm prevailing in the social

[3] This must not be mistaken for a different concept of human ecology that studies the physiological reaction of man or a population to the effects of the environment and the geographical distribution of physical and health traits (e.g. Wolański and Siniarska 2001).

[4] Also called the Dominant Social Paradigm.

sciences from the times of Émile Durkheim[5], states that people are more or less independent from the physical environment due to culture and their capabilities, and that the technological and social progress can continue indefinitely. The New Environmental Paradigm admitted that people live in particular ecosystems and that the environment has an impact on them. Literally, Catton and Dunlap defined their new sociology as follows: "Environmental sociology involves recognition of the fact that physical environments can influence (and in turn be influenced by) human societies and behaviour" (Dunlap and Catton 1979, p. 244).

The disciplines of social sciences mentioned above represent a wide range of approaches towards the relationship between humans and the environment. Human ecology of the Chicago school, albeit being a reductive approach, was the first systematic attempt to combine ecology and social sciences. Human ecology as started by Gerald Young represents an attempt to launch an interdisciplinary work. The contribution of Bookchin's social ecology consists mainly in the connection of social and environmental issues and in the emphasis on the active participation in societal changes. Nevertheless, this beneficial aspect should not mask the fact that the activities of Bookchin and his followers from the Institute of Social Ecology in Vermont are sometimes viewed as too activist by many scholars and too socialistic, not only by those from formerly socialist Central and Eastern Europe.

As the name of our concept already suggests, the most influential author is Julian Steward and his understanding of culture as a non-biological system of human adaptation. His interest in the human-environment interaction was unique in his time (1930's to 1950's). It lasted almost 30 years, until the study of influence of environment on human (and vice versa) through the lens of environmental sociology was fully established as a relevant part of the social science discourse.

Environment in social sciences in Czech academia

It is not only academics from foreign countries (in fact from the US only) who are important for the presented concept of cultural ecology. There are also some important scholars or institutions in the Czech Republic (or former Czechoslovakia) that inspired us through their works, teaching, and discussions at conferences, or because they introduced some interesting academic disciplines from abroad. This part cannot possibly cover all social scientists interested in the environment from the viewpoint of social sciences. We only intend to mention the crucial contributors to our notion of cultural ecology[6].

The point of departure was the work of Jitka Ortová, who in the early 1990's introduced cultural ecology as a part of culturology, a discipline taught at Department of Theory of Culture (Culturology) at Faculty of Arts, Charles University in Prague. She employed Steward's concept of culture as an adaptive system and she focused mostly on historical and theoretical reflections of contemporary ecological crisis in the existing scholarship (Ortová 1997). Without denying the value of such reviews, we shall explain later in the text why we prefer focusing more on empirical studies and concrete research problems.

[5] Usually it is the French sociologist Émile Durkheim to be seen as responsible for the human exemptionalism in sociology, due to his dictum that social facts could be explained only by other social facts which he stated in his famous book *The Rules of Sociological Method* (Durkheim 1966). This "anti-reductionism taboo" aimed originally to combat the 19th century tendency to explain social phenomena by psychological variables. However, it was so strong that all biological and physical features were ruled out from sociology (Catton and Dunlap 1980). This 'accusation' of Durkheim is questioned by Rosa and Richter (2008) who point to Durkheim's inaugural lecture to a course in social science at University of Bordeaux in 1887 (Durkheim 2008).

[6] For a more comprehensive review see the paper of Lapka (2012) or Lapka *et al.* (2012).

Bohuslav Blažek is one of the most renowned persons in Czech socio-environmental studies. In his work (which he called social ecology) he focused mainly on contemporary countryside, rural landscapes and living conditions in villages (Blažek 1998). He emphasised the need for a broad reflection upon the environment and also a critical analysis of the applied research itself.

Two more academic departments should be mentioned here. The first is the Department of Social and Cultural Ecology at Faculty of Humanities, Charles University in Prague. Its academic interest mainly dwells on the local and global aspects of sustainable development, for example its institutional and political aspects (Rynda 2006) or the problematic of allotment gardens.

The second leading department is part of the Faculty of Social Studies, Masaryk University in Brno. The Department of Environmental Studies examines the historic and cultural causes of the current environmental crisis and it searches for possible solutions. Philosophic, sociological and economic approaches towards environmental issues are applied onto selected research questions such as the environmental context of different lifestyles (Librová 2008) or alternative economic approaches (Johanisová *et al.* 2013).

As mentioned above, due to the limited scope of this article it is impossible to present all the important scholars who investigated the human-environment relationship. Among those who engaged in the study of landscape and culture, many worked for the former Institute of Landscape Ecology of Czech (Czechoslovak) Academy of Sciences, like Emil Hadač (1977), Miroslav Gottlieb (Lapka and Gottlieb 2000) or the aforementioned Bohuslav Blažek[7].

An important platform for meetings and discussions about landscape, environment and culture is the Czech Association for Landscape Ecology (CZ-IALE), a branch of International Association for Landscape Ecology (IALE)[8]. Despite the fact that social scientists consider themselves a minority, the meetings and conferences of the CZ-IALE always incorporate the social scientific discourse at least to some degree, and they strive for an interdisciplinary approach.

[7] For more detailed information about the landscape perception in social sciences see Lapka (2012).

[8] International Association for Landscape Ecology was established in 1982 in Piešťany, Slovakia. This illustrates the strong tradition of landscape ecology in the Czech Republic and the Slovakia. The institutional form of landscape ecology research was anchored already in 1971 when the Institute of Landscape Ecology of Czechoslovak Academy of Sciences was established. This institute was merged with the Institute of Systematic and Ecological Biology and renamed to the Institute of Ecology of Landscape in 1993. From 2006 the institute is called the Institute of Systems Biology and Ecology. Along with the change of the name, the socio-ecological approaches towards the landscape kept weakening and finally in 2011 the institute has transformed into the Global Change Research Centre of the Academy of Sciences comprising two institutions: the CzechGlobe and the Institute of Nanobiology and Structural Biology. The institutional form of landscape ecology in the Academy of Sciences was completely terminated, however landscape ecology is still institutionalized at some universities (e.g. Mendel University in Brno).

MAIN PRINCIPLES OF CONTEMPORARY CULTURAL ECOLOGY[9]

Focus on problems of the present times

Twenty-five years ago the concept of sustainable development was introduced in the famous publication *Our Common Future*. From that time, the term penetrated many political agreements and declarations, however the meaning is often so vague that the usage of this term is sometimes almost meaningless and only rhetoric. Nonetheless, neo-liberal political and economic groups challenge even this quite superficial application of the term. An object of the, at least partly, legitimate criticism is the emphasis on future generations (though this emphasis is often exaggerated by the critics). An example of such criticism is the statement of the Czech president, economist by profession, Václav Klaus[10]: "We do not live from the benevolence of previous generations and in so far we do not owe anything to future generations either. The only thing we could owe them would be if we failed to bequeath a free and prosperous society. Today, tomorrow and the day after tomorrow, we should do our best. What will be in 100 years should be left to sci-fi writers. Let's stay with both our feet on the ground and care for what belongs to us. There is more than enough to do" (Klaus 2010). Such criticism stressing uncertainty of the future is quite influential mainly in the time of the present economic downturn[11].

Nevertheless, Klaus's emphasis on the present time is exactly one of the constitutive principles of cultural ecology. There are many environmental and social problems which need to be solved, like hunger and poverty, environmental destruction, totalitarian ideologies and loss of freedom. Cultural ecology is aware of the interconnectedness of these problems, which enables it, as we hope, to promote a discussion within science as well as between science and society. The economic, environmental and social problems cannot be addressed without an equivalent dialogue of the three essential sub-systems of sustainable development (which means the end of the neo-liberal dominance of economy and neglect of values). In fact, the three pillars of sustainable development (environment, society and economy) should not be presented as three overlapping sets as they usually are (unsurprisingly with economy on the top), but as a more real bull's eye concept (Fig. 1), which reflects the position of economy, society and environment in the world. Insipid outcomes of the Rio+20 summit and the failure of political leadership (Black 2012, Robinson 2012) raise the question whether it is not high time we switched from sustainability to SOStainability (Lapka and Cudlínová 2009).

Disproportionate orientation toward future is not the only threat for socio-environmental sciences. Another weakness consists in the obsession with the history of the discipline itself, typical for social sciences and humanities. Some level of theoretical knowledge and a basic historical insight are undoubtedly useful, but scholars often run the risk of having all their time and energy consumed by an exaggerated interest in history and theoretical distinctions, which reduces their capabilities to deal with current issues. This does not mean we criticise here the recent attempts to re-interpret classic theories, which is exactly what we do in this paper. We rather wish to point to the fact that continuous revisions of a

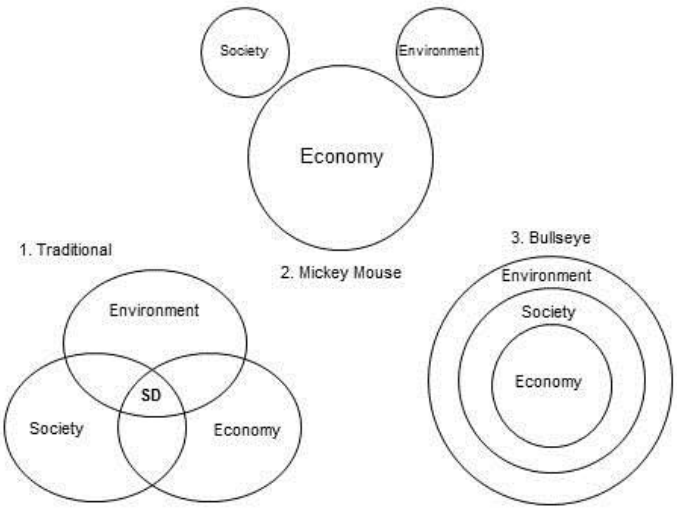
[9] These principles were originally published in Czech language (Lapka, Sokolíčková and Vávra 2012) as five principles. One of them (dealing with concrete global problems) is omitted in this section, because it is partly mentioned in the remaining 4 principles and partly also discussed in the next part focusing on the relationship of landscape and cultural ecology.

[10] This text is translated from the New Year's speech presented in Czech language, yet Klaus's understanding of economic and environmental issues can be found also in many English written texts (e.g. Klaus 2005, 2007).

[11] See the case of environmentalism and sustainable development in the US politics in Rikoon's paper in this volume.

discipline's tradition tend to grow into never ending mantras, which eventually serve the purpose of justification of one's own place in the academia, and also of setting rigorous limits for new aspirants. As Adler argues (2010), civilizations as cultural constructs should not be judged according to their claims, but to their deeds. This is not valid only for politics (with regard to the rather loose application of the concept of sustainable development) but also for science. Great history narratives and declarations of impressive goals, together with a (supposedly) interdisciplinary future oriented approach, neither enlighten nor help to solve current problems. The present time is the most important and exclusive research object of our concept of cultural ecology.

Fig. 1: Alternative visualization of sustainable development
The concepts involve: *1. A traditional form of three overlapping sets, 2. A Mickey Mouse model with huge dominance of economy, and 3. A bull's eye concept suggesting that economy is just a part of society, limited by the physical environment. See Mann (2009) for these and many other visualizations of sustainable development.*



Integrative approach

Along with the growing specialisation in science, many scientific branches tend to study the concerned phenomena in a wider context, be it well-known disciplines such as "holistic" landscape ecology (Naveh 2000), which considers interdisciplinarity as one of its priorities (Wu and Hobbs 2002), "inter- and transdisciplinary" ecological economics (Baumgärtner *et al.* 2008) or disciplines still to be fully established like "holistic, comparative and interdisciplinary" culturology (Soukup 2010). Before we explain the disciplinary concept of cultural ecology we would like to summarize the basic terms and clarify our understanding of them. We use the work of Tress *et al.* about disciplinarity in landscape ecology (2004) as a baseline for the distinctions between different concepts, and we add some ideas of other scholars. According to Tress *et al.*, a *disciplinary* approach follows the boundaries of academic disciplines and aims usually for one research goal. A *multidisciplinary* research is defined by one broad theme and various research objectives of different disciplines. The participants exchange knowledge but they do not cross the each other's boundaries. *Interdisciplinarity* is characterized by a common research goal of several unrelated disciplines with different paradigms. The cooperation is so intense that the

boundaries of the concerned fields of study are crossed and new knowledge, theories, or even new disciplines are created. Tress and colleagues also use the term *participatory* research, which means involving academics and non-academics in solving problems. When the participatory approach is combined with interdisciplinarity, we talk about *transdisciplinarity*, a project that draws in scholars from unrelated disciplines and also non-academics, and it aspires for new knowledge and theory.

Baumgärtner *et al.* (2008), dealing with the methodology of ecological economics, add some useful distinctions and ideas as well, specifying multidisciplinarity in a more precise way. They distinguish between multidisciplinarity as *side-by-side disciplines*, which strive for the same goal but do not exchange knowledge, and *division of labour between disciplines*, which demands exchange of the results and data for the sake of a common outcome (e.g. a model). Nevertheless, the barriers of paradigms are not crossed. This is something very similar to what Max-Neef (2005) calls *pluridisciplinarity*, namely cooperation among disciplines without any coordination from a higher hierarchical level. According to Baumgärtner *et al.*, transdisciplinarity, which in general means connection between society and science, has two important aspects. First, it plays a key role in particular research problems. The involvement of stakeholders helps to identify accurate research questions, it provides scientists with non-scientific knowledge and it can facilitate the adoption of given solutions. The second aspect of the relationship is linked to values and norms. Baumgärtner *et al.* talk about sustainability and the question of what precisely should be sustained, to what extent and why. If science has the ambition to reach some practical applications, and not only to accumulate knowledge, the society itself needs to determine and define the goals. Max-Neef elaborates on transdisciplinarity, characterising it as a system of coordination on different hierarchical levels. In detail, he understands transdisciplinarity as a concept combining interdisciplinary approaches with the society and he distinguished among scientific branches of pragmatic, normative and value levels.

Axelsson defines integrative research as a "research that requires integration among different kinds of researchers and/or stakeholders" (2010, p. 20). Additionally, integrative research, at least in environmental disciplines, is expected to support sustainable development processes. We follow this definition and subsume multidisciplinarity and/or pluridisciplinarity into the integrative research as we understand and apply it[12]. We define our concept of cultural ecology as an integrative approach, which aims to understand different aspects of relationship between culture and nature. As we stated before, our ambition is not to define a new discipline with strict methodology, but we would like to initiate meetings, discussions and broad scientific collaboration.

Interdisciplinarity remains to be one of the ultimate goals of the cooperation, yet at the same time there is enough reason for scepticism about this demanding (and very fancy) approach. As Baumgärtner *et al.* note, fully integrated interdisciplinary cooperation "requires from all scientists the ability to transcend the boundaries of their own discipline" (2008, p. 386). As most of the scholars know from their own experience, this requirement is one of the hardest tasks for a scientist trained in the narrow context of scientific specializations. Therefore, big interdisciplinary projects often fail or bring unsatisfactory results. Even in landscape ecology, interdisciplinarity, though presented as the discipline's main feature, is not commonly understood and the debates reviewing it have shown little progress in this respect so far (Tress *et al.* 2004). Our experience from the social sciences teaches us that interdisciplinarity is often just a declaration or a wishful thinking, not the reality. Even the background of cultural ecology, culturology, has not achieved its

[12] Tress *et al.* (2004) define only interdisciplinary or transdisciplinary approach as integrative.

interdisciplinary goals twenty years after being introduced and it would be more precise to characterise it as multidisciplinary.

Thus we appreciate any form of an integrative perspective, be it real trans- or interdisciplinarity or "only" participatory research, pluridisciplinarity, multidisciplinarity or any other dialogue of open-minded scientists and stakeholders. Cultural ecology endeavours to incorporate the public either as an object of research, an advisory group or an authority raising questions and expressing its values and preferences. Cultural ecology, ecological economics alike, may be defined as driven by both *cognitive* (describing the world) and *action* (managing the world as it should be) *interests* (Baumgärtner *et al.* 2008). This is tightly interconnected with the focus on contemporary problems. Without this preoccupation with the present, the false idea of absolute objectivity or blind isolation from reality can seize control over the academics or whole disciplines. "This indifference, this incapability to interconnect our 'scientific' objects of interest with the world in which we live, is the most profound cause for the inner dissatisfaction of most social scientists and also for their feelings of alienation and emotional desertification, which no lively entrepreneurial spirit or pathos of scientific objectivity can overshadow in the long term" (Hösle 1994, p. 21).

Cultural core of society-environment relationships

Regardless of whether culture is or is not an adaptive system, the relationship between humans and nature is determined by culture. In agreement with Steward's concept of cultural ecology we can state that technology and economy determine our relationship to the environment to a certain extent, but not completely. Both technology and economy are parts of the very complex cultural system, consisting of interlinked material artefacts, norms, values, ideas and other manifestations of human enterprise. This means that environmental problems do not only depend on the level of technology, but they are rather anchored in the whole cultural complex that is not able either to recognize or solve them. Phenomena like the Jevons paradox[13] show us that technology can hardly be the only solution for global environmental problems because technology itself does not determine the way it is used.

Considering the complexity of culture, it is evident that without social sciences, environmental problems cannot be resolved. However, any science can only provide the public with data and information. If this information is not accepted by the society (culture) and the problem is not recognised as urgent, no cultural change possibly leading to a solution can take place. According to Steward's ideas, a culture unable to pay attention to changes in the environment and to adapt to them is likely to face serious problems (Steward 1955).

It is the task of cultural ecology to foster a dialogue between science and the public, in order to supply relevant information to culture and help the society recognise potential threats. This is what Baumgärtner *et al.* (2008) mean by the *action interest* and transdisciplinarity. Robin Attfield describes the current state of the art with these words: "Contemporary problems call for more than theory if they are to be solved, and for more than personal reorientation or commitment too. Solutions will need to be coordinated

[13] Jevons paradox states that with increasing energy efficiency of the machine, the consumption of energy does not decrease but grows due to lower prices of energy. William Stanley Jevons stated this fact in 19th century Great Britain using the coal and steam engines as an example. This idea was also elaborated by modern economy and it is called the Khazzoom-Brookes postulate or rebound effect in general.

solutions; and thus political and often international action and policies are involved" (Attfield 1991, p. xviii).

Dialogue between society and environment

The relationship of culture and nature is a dialogue between two relatively equal parties. The other possibility how to understand this relationship is to prioritise the dominance of one side. If we prioritise human dominance upon nature, two interpretations come forward: the successful story of anthropocentrism or humans as the great villain abusing innocent nature. On the other hand, if we prioritise nature, mankind can be perceived as a victim of biological laws (from genes to Gaia) without any possibility to oppose natural forces and without any responsibility.

All of these interpretations are one-sided and simplified. Scientific evidence as well as our own everyday experience shows us both aspects of the human-nature relationship. The influence of nature on culture is extremely high, even in modern societies able to substitute a great part of local resources (by the transport of goods, food, money, energy and information) and to create the illusion of being independent of natural laws. However, natural disasters like floods or droughts remind us of the physical nature of our lives. Furthermore, globalisation and complexity of contemporary world causes that local natural events may have unexpected consequences even for very distant places[14]. Irrespectively of technological optimism and the "ultimate" resource of human invention[15], we still rely on natural resources and ecosystem services in terms of food, goods and energy supply and waste absorption.

Apart from this earthbound human dependence on nature, the effect of environment on culture can be studied at a more abstract level, for example the issue of amenity migration (Bartoš *et al.* 2008) or phenomenology of architecture and place (Norberg-Schulz 1980).

There is of course the second part of the dialogue, human influence on nature. The speed of resource consumption and anthropogenic changes of environment has been accelerating throughout the history along with growing population and technological development. Humans triggered substantial environmental degradation (e.g. deforestation, desertification) in their past, they cause it now and they will definitely initiate massive degradation in the future (climate changes, deforestation, water pollution, overfishing, etc.).

On the other hand, the effect of humans on nature can also be positive. We can find a lot of examples in European cultural landscapes, many of them being areas with high natural and cultural values protected by the UNESCO Man and Biosphere Programme. Natural conservation in general is another example of positive human influence on nature.

This brief list of illustrations of the mutual human-nature relationship depicts both sides of the dialogue. If only one side is accentuated, the interaction between people and nature cannot be properly understood.

[14] As an example we can mention the eruption of the volcano Eyjafjallajökull on Iceland which caused the closing of the whole European airspace in 2010. Another example is the 2011 flooding in Thailand, where an important part of the global amount of computer hard disks is produced. The floods increased the prize of electronics and it also affected car industry in Europe as well the Fukushima disaster in 2011 did. Globalisation makes people less dependent on local resources but the whole system becomes less resilient.

[15] In his book *The Ultimate Resource* (1981), economist Julian Simon states that human invention is the ultimate resource able to overcome any natural resource scarcity, meaning that natural resources will never run out.

LANDSCAPE AND CULTURAL ECOLOGY

Landscapes, more correctly cultural landscapes, are one of the relevant and important study objects of cultural ecology. Landscape is a place of interaction between humans and nature, a place where the human-nature dialogue, as explained above, is manifested. It was Carl Ortwin Sauer, the father of "cultural landscape" (Sauer 1925), who influenced this understanding of landscape and whose perspective is somewhat analogical to the classic concept of landscape ecology introduced by Zev Naveh (1995). This interdisciplinary approach was also reflected in the context of international politics in the European Landscape Convention (Council of Europe 2000). The convention values different kinds of landscapes and it explicitly names human perception as an intrinsic part of a landscape definition. We can only add that there could be no landscape without any (culturally determined) perception of it.

Due to its cultural and natural substance, landscape carries information about both of these systems. At the same time, changes in these systems are manifested in landscapes. Historically, people are used to living in particular local landscapes, and perceive their changes and adapt to them. Today, however, this sensibility (toward global changes manifested in local landscapes) seems to be weakened, probably also due to the substitution of local resources by the global economic system. If this former skill were regained, it would help us be more sensible to global environmental challenges, which still seem to be quite irrelevant for individuals. This is not only a question of dialogue between different scientific branches, the efficiency of which (as discussed above) is often doubtful. A more accurate perception of changes (often human caused) in our environment[16] is essential for the ability to adapt to current global environmental challenges. Without incorporating this ability into culture (or the social construction of reality), the cultural response to any scientific warning is at risk of being weak. For a cultural adaptation *sensu* Steward (1955), it is first necessary to know how to read the environment. We argue that landscape is the best scale for this reading.

CONCLUSION

Cultural ecology is an integrative approach, with the ambition to support the dialogue of various scientific branches as well as between science and the public. With respect to the pitfalls of interdisciplinarity, we rather talk about an attitude appreciating any real effort to foster a dialogue among scientists and other stakeholders. Cultural ecology is a *cognitive* and *action* driven approach with a deep interest in current environmental and social problems. It understands the relationship of people and nature as an equal dialogue, intensely expressed in cultural landscapes. With regard to Steward's idea of adaptation, we argue that any successful coping with environmental problems demands the transfer of knowledge from science to culture (society) and integration of the new knowledge, values, norms and ideas into culture. This mechanism is plausible for any environmental problem, be it climate change, landscape degradation or water pollution. Environmental science can help to support this process, but the core of this change does not lie in the science itself. It consists in the values and behaviour of each single individual, sharing both culture and nature with the others.

[16] We can also say not only "environment" but "Total Human Environment" in Naveh's conception (2000).

ACKNOWLEDGEMENT

Jan Vávra would like to acknowledge the support of the project Postdoc USB (reg. no. CZ.1.07/2.3.00/30.0006) realized through EU Education for Competitiveness Operational Programme. Project is funded by European Social Fund and Czech state budget.

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