

The Role of Universities in Environmental Management

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Abstract

Sustainable Development (SD) is one of today's most often discussed issues. It refers living to in harmony with the natural environment as well as with the responsibility for the fate of future generations. The international community makes an effort to teach institutions, organizations and individuals how disastrous their activity can be for the environment. In particular universities, qualified to promote knowledge and to build a sensible society, are under obligation to disseminate the right ideas. They should teach how to manage the environment in the right way and how to manage organizations according to SD. Finally, they have to undertake work, even if such activity encounters resistance. Working in respect to the natural environment seems to be the only admissible direction of further development.

Keywords: sustainable development, environmental management, green universities

Introduction

There are many definitions of sustainable development (SD). We can say that SD talks about the proper point of view and future thinking of society today. It is about systematic, long-term use of resources. It requires an integrated approach and a policy that permits economic and social development of all countries. It makes interpersonal and inter-generational justice a priority. Finally, it considers environmental equilibrium to be at least as important as economic coefficients.

Climatic changes, progressive greenhouse effect, increasing atmospheric pollution, and destruction of natural ecosystems, as well as exhausting non-renewable sources, demonstrate a lack of respect for nature. Using natural goods without deliberation generates huge – not only material – costs. First of all it should be taken into account that: *“Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment*

of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations (...). The natural resources of the earth including the air, water, land, flora and fauna and especially representative samples of natural ecosystems must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate [1].”

Today SD not only means conferences, debates and documents. It is not only an ideology for ecological organizations. Concrete actions – environmental activities – should be undertaken to bring it to life in a wider range. It is a challenge for all of us. Peoples' attitudes toward this problem are obviously diverse. But we can find enthusiasts and concrete actions. More and more organizations have noticed the problem and its weight, setting up environmental equilibrium as one's long-term aim, continuously realized and controlled. From this point of view, it's a task for organization mastership at first. On this level we can consider environmental management – here is the possibility to put on the right development direction. Next, governments

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should be open for future solutions. They are obliged to encourage citizens to make an effort and to mobilize them to work in the right direction. Extremely important in the process of changing social attitudes seems to be the role of universities. They educate future politicians, scholars, engineers and planners – people who will set the direction of human development.

Historical Outline

The historical beginning of considerations regarding SD was The Stockholm Declaration. It showed the correlation between the people and their surroundings, it raised the matter of inter-generational justice and also the need of environmental education [1]. Next important steps to ‘green initiatives’ were: the Belgrade Charter (1975), The Tbilisi Declaration (1977), and the report of the World Commission on Environment and Development: ‘Our Common Future’ (Brundtland Report 1987). This report called to begin an era of development that satisfies the ambitions of present and future generations on the same rights – the era of Sustainable Development. Next conferences resulted in new records specifying aims and priorities, putting emphasis on environmental education. Of note are: Magna Charta Universitatum (Bologna 1988), The Kyoto Declaration (1990), ‘Green Universities’ - The Talloires Declaration (1990), The Halifax Declaration (1991), Agenda 21 and the Earth Charter after The Conference in Rio de Janeiro (1992), The Swansea Declaration (1993), The CRE-Copernicus Charter (1993), The Thessaloniki Declaration (1997), The Conference in Johannesburg (2002), 4th International Conference of Ecological Education in Achmedabad (2007), the round educational table on Bali (2007) and the Climate Change Conference in Poznań in December 2008. What’s more, years 2005-14 have been declared the Decade of Education for Sustainable Development [3].

The Role of Higher Education

Universities have to lead in promoting environmental equilibrium. They have a right and a duty to indicate where problems exist. They should look for, find and create tools to solve them. They ought to stimulate society to develop in the proper direction, in this case “*Education, in short, is humanity's best hope and most effective means in the quest to achieve sustainable development* [5]”. It is the best possible place to indicate how much we have destroyed the environment already and how quickly degradation is proceeding. It should teach society to understand the matter of its sensible and responsible activity. Also, “*Scientific research and development in the context of environmental problems (...), must be promoted in all countries, especially developing countries. (...) the free flow of up-to-date scientific information and transfer of experience must be supported and assisted, to facilitate the solution of environmental problems* [1]”

Where to begin? At first, buildings exert an undeniable influence on the environmental quality, waste of supplies, human health and productiveness. It relates to industrial, public utility institutions and individual consumers. Therefore experts, designers, administrators and users are looking for economically effective ways of limiting buildings’ negative influence. Applying healthy and renewable materials, increasing lifecycles, effective management of energy and water resources, as well as the creation of people-friendly environment are key issues here. The sustainable building market is developing. Objective facts and experiences confirm that benefits give reasons for incurred expenses in this field [14]. For example, smoothly operating controlling and monitoring temperature BEMS (*Building Energy Management System*) can reduce the waste of energy processed by about 20% [11]. The conception of green buildings is a promising starting point to advance actions for SD. Universities consisting of many cooperating departments and institutes have a lot of opportunities to reduce waste and optimize the utilization of resources.

Every university is unique, has its own traditions, culture and surroundings. We have both public and private schools, working in various countries. The current demographic situation and changing number of students leads to competition among universities. Objectively, environmental activity raises an institution’s prestige today. But public individuals, subsidized and accounted for by governments are more careful in undertaking investments. Private schools are rather free in funds. As green universities we will call these, which make environmental effort. All aspects mentioned determine a range of activities. It is strongly diverse: from recycling, applying alternative materials and reduction of waste, across investigations, to total reorganization and integration of an institution. In all cases workings have to be initiated by authorities, staff and students. There is a necessity of activity of the whole university community. It is the only way to transform these institutions into ‘green universities’.

Chosen Green Universities of the World

Canada

A look at practical transformations into green universities could begin in Canada. The University of Waterloo is a prime example, where working according to SD is something more than a declaration. Established and obligating values are consciousness, efficiency, equality, co-operation and natural systems. The energy waste is continuously being reduced. Alternative sources of energy and materials are used, the number of new buildings is limited. Ecological education is common here, WATgreen Committee co-ordinates and controls whole environmental activity. The University co-operates and exchanges experiences with ecologically responsible firms. The University of Waterloo is recognized as one of the best examples of practice for continuity in higher education. In general, education and

ecological consciousness are developed in Canada – the number of universities offering EA (*environmental assessment*) courses has tripled since the mid 1980s. Students aren't passive in the face of such workings. It is a mission: a good example is the creation of the Sierra Young Coalition (SYC), a nonprofit organization (a branch of the Sierra Club of Canada, concentrated on atmosphere, energy, protection of health, natural environment, biodiversity and a sustainable economy), uniting students of universities and colleges of the whole country. The most successful SYC initiative is the Sustainable Campuses project with conferences about campuses' SD, organized annually by one of five regions: Ontario, Prairies, British Columbia, Quebec or Atlantic Canada, where the University of Prince Edward Island (UPEI) the national student campaign of campus development using CSAF (Campus Sustainability Assessment Framework) has been introduced. CSAF is an audit tool. CSAF systematizes and develops previous audit solutions and is based on environmental management (ISO 14001). It assesses 10 components: water, materials, air, energy, ground (ecosystem group), health, community, knowledge, management and welfare (human-beings group). It considers a sum of 169 different essential coefficients. An individual can be certificated within each group. UPEI had been behind different universities in SD for a long time. Today, thanks to audit and organizational reform after, it aspires to a leadership role. Other Canadian universities where campus audits took place were the University of Victoria, Concordia University and Mount Allison University [4, 5, 10].

United States of America

Brown University and the University of Florida are examples of environmental activity. For the University of Michigan environmental equilibrium is part of a committed mission. Within the campus, pollution has been controlled since 1998. The university joined in The Green Lights Program – initiatives promoting more effective use of energy. Only during 1997 and 1998 did it bring savings of over one million dollars. Appalachian State University organizes for students summer practices in agriculture and about ecosystems' development, lectures about SD were also initiated. Moreover a rural/urban model of participatory planning was created to bring sustainability to agriculture, micro-enterprises and the community [5, 7]. An interesting example is the University of Buffalo, where 15 policies concentrated on effective energy use and consumption are being realized. The University of Washington's work with the United States Environmental Protection Agency should be also mentioned [3]. Analyzing concrete benefits is the Harvard University – thanks to a renewable credit from the Resource Conservation Incentive Program – during 1993-98 there have been realized 35 environmental projects with investment revenue of 34%, saving 880,000 USD and 8,8 million pounds of CO₂ [8]. Also, New York University, thanks to more effective energy management, is saving 9 million USD annually [11].

Europe

Examples of European reaction to SD are numerous and varied, we can find them on the Fachhochschule Aalen in Germany or at the University in Herefordshire in Great Britain. The 'Higher Education 21' (HE-21) project, assembling 25 British universities, is working. For more than 10 years HE-21 has been searching for new solutions and continuous improvements for SD in higher education. Next, the *Eidgenössische Technische Hochschule Zurich* with the Department of Environmental Natural Sciences engages all students to obligatory environmental projects (a prepared problem requires at least one year of research, based on cooperation with external universities, local people and institutions). Students build their own solutions - their knowledge and fresh approach is preferred to bureaucratized professionals' way of thinking. An example of such successful working was the *Zentrum Zurich Nord* 1996 project – an effective transformation of industrial production of 64 hectares that houses 5,000 people and 12,000 new jobs [6].

Unfortunately, despite having perspectives and desires, initiatives don't always succeed. The activity of UNEP-WG-SPD (*Working Group on Sustainable Product Development*) at the University of Amsterdam, for example, is stuck in deadlock. Projects for this group will probably start if new students engage [5].

An example of green initiatives from eastern Europe would be Russia. The consequences of Soviet times have to be taken into account here, - e.g. energy-consuming industry, its structure, technologies, high pollution and small ecological workings for years. From the early 1990s the situation was going to change: some dangerous institutions were closed, important resolutions were undertaken by the government, environmental institutions were appointed. Today both state and private higher education institutions offer environmental courses and 15 of them have research in this field. Moreover, 17 of them, concentrated around Saint Petersburg State University and Kaliningrad State University, are participants of the Baltic Universities Program (BUP), which promotes SD. Environmental conferences and projects are undertaken. Current educational offerings of Russian universities and their profile is transforming and also the mentality of society is changing - they are more ready to work for the common good. But Russian education is still conservative, students have the limited possibility of faculties' choice. The demographic situation will lower requirements, some universities will be closed [12]. Globalization, however, puts on this country the onus of properly treating its human potential.

Poland

The Constitution of the Republic of Poland, in Article 5, establishes that: "*The Republic of Poland (...) shall ensure the protection of the natural environment pursuant to the principles of sustainable development* [15]". Poland obliged with Agenda 21 and United Nations Framework Convention on Climate Change after Rio de Janeiro (1992)

has to accept the challenge. The ranking of countries' progress in SD by Yale University in 2005 is not optimistic for us. Among 146 studied countries, Poland ranked No. 102, with arrears in soil quality or greenhouse gases (for example Russia or Slovakia were in the first group of 50) [18].

Do national green universities exist? Polish schools participate in international programs, such as the Globe or GAP-Poland's projects. There also took place initiatives by the World Wildlife Fund, the Institute for Sustainable Development and Global Environment Facility – like the grants for bicycle paths. Thinking of universities, the University Centre of Investigations over Natural Environment (UCBS) from the University of Warsaw takes initiatives supported by the British organization Field Studies Council (e.g. 'Instruments of reduction of CO₂ emissions' were worked out and put on 'Multimedia in Education for SD'). The UCBS was funded by the European Union project 'Real Time eLearning for a pan-European Classroom' (decision game relating to energy use and emissions trading). There are also lectures and workshops about natural environment (also for interested people from behind the university) [22]. Similarly, the University of Opole hosted the 6th International Conference 'Current Issues of Sustainable Development' in 2006. It assembled about 40 researchers from 6 countries with participation of the Student Scientific Circle on Sustainable Development. The Conference turned up the necessity for continuous changes and stimulating the community to support the idea by indicating its future benefits [19]. Suchlike conference organized by AGH – University of Science and Technology performed also in Krynica in September 2008 [20]. The AGH-UST scholars and students participate in international exchanges dedicated to these issues [13]. The next, United Nations Development Programme, supports many initiatives for Millennium Development Goals, e.g. the national conference 'Problems of safety of present world' at the University of Opole (2008), the interdisciplinary postgraduate studies 'Development in day of globalization' (2007/2008) at the University of Warsaw, the project PEACE of Local Committee of the *Association Internationale des Étudiants en Sciences Économiques et Commerciales* at Warsaw School of Economics (2007) [16], or SURE BUILD 2002-05 (Sustainable Redevelopment of Buildings in Poland) - program of Poland (Warsaw University of Technology) and Norway (Norwegian University of Science and Technology) co-operation [21].

Among Polish universities, 9 of 575 UNESCO branches are working: Nicolaus Copernicus University in Toruń, University of Warsaw, University of Warmia and Mazury in Olsztyn, Polish Academy of Sciences, Leon Kozłowski Academy of Entrepreneurship and Management in Warsaw, Jagiellonian University, Academy of Special Education in Warsaw and the University of Wrocław. They help and promote realization of UNESCO programs [23].

Also important is the National Foresight Program 'Poland 2020'. One of its three covered research areas is sustainable development of our country. The partnership institutions are, for example, Warsaw University of

Technology, Warsaw School of Economics, Białystok Technical University, Adam Mickiewicz University in Poznań (Centre for Advanced Technologies) and Wrocław University of Technology (Wrocław Centre for Technology Transfer). Moreover, e.g. researchers from the University of Łódź, the Silesian University of Technology, Rzeszów University of Technology, the University of Gdańsk, the University of Kielce or AGH-UST work in various panels of the program [17].

In general, the SD situation in Polish universities isn't admirable. Despite the fact that some of our universities have signed the Copernicus Charter, there are adequate faculties and subjects in many universities' didactic offerings, the objective conclusion is that they are rather modest. Polish universities need more concrete and determined workings. The University is a specific kind of organization. Maybe it would be good for the beginning to manage individuals according to ISO 14001 (initiating examples can be found at the International Pacific College Palmerston North in New Zealand [9]).

Barriers to Achieve SD in Poland. Chances and Possibilities

People often point at the idea of Sustainable Development as still too abstract and far from reality. Why do we have such modest progress in this field in our country? It seems that the main obstacles, also for green initiatives' at Polish universities are: limited department budgets, often the necessity of large expenditures to get reimbursement, lack of knowledge and weak flow of information and experiences among individuals (mistakes are repeated), the lack of waste's measures and motivators to undertake activity. We can notice problems, so we should also try to solve them: information and experiences of individuals who took the initiatives and made an effort ought to be disseminated and published (case studies, benchmarking). A lot of examples of actions can be found all over the world. People have to get information about new technological possibilities and should be motivated to work, by economical factors or additional rights for environmental friendliness, for example. Initiatives have to go on, even by small steps. The didactic offer supplementing (interdisciplinary faculties, new courses and the postgraduates), the encouragement for scholars to investigate in SD projects and intercollegiate co-operation are good for the beginning. Proper waste management and using recycled materials are necessary. Individuals should monitor and limit water and energy use (accounting for kilowatt-hours not for 'a meter' will be better solution). Modernization of heating installations is recommended. Campus transport infrastructure should be developed and wornout areas should be reclaimed. The first, in this way the quality of life within campus will certainly improve. The second, proper workings for SD are not only right idea realization: the improvement of a university's standard will make it more attractive. This will probably result in the growth of the interested students' number.

Right workings don't have to be so expensive. Proper, brave and creative planning is also a chance for covering the majority of projects' realization costs from European Union funds in Polish reality.

Conclusions

Ecosystems always were and they are still stable but not static. SD is a dynamic conception. It is not enough to set rules once. The revision and deep changes in the society's mentality are necessary. Right institutions' structure and functioning is needed. The new quality of education in range of the natural environment protection and SD must be built. Responsible planning, systematic and integrated management will be helpful to achieve satisfying results. A university with a mission of promoting and proper social attitudes is obliged with one's charter individual to be a real partner for industry, economy and society, "... *universities must give future generations education and training that will teach them, and through them, others to respect the great harmonies of their natural environment and the life itself* [2]".

Taking into account the situation of the natural environment, we found ourselves in critical historical moment. In majority it is a result of our own workings. In this reality we have to give up conservative thinking, conformist and consumptive-only approach to life. It is a priority to want to notice the problem and the necessity of working. A critical, wise and future focus on reality is required as well as courage in action. We have to think about future generations' fate. It is required from each of us as we be educated and responsible citizens.

References

1. STOCKHOLM DECLARATION 1972.
2. MAGNA CHARTA UNIVERSITATUM, Bologna 1998.
3. WRIGHT TARAH S. A., Definitions and frameworks for environmental sustainability in higher education, *International Journal of Sustainability in Higher Education (IJSHE)*, **3**, (3), 203, 2002
4. BERINGER ALMUT, Campus sustainability audit research in Atlantic Canada: pioneering the campus sustainability assessment framework, *IJSHE*, **7**, (4), 437, 2006.
5. HANS van WEENEN, Towards a vision of sustainable university – A case of University of Amsterdam, *IJSHE*, **1**, (1), 20, 2000.
6. MIEG H. A., University-based projects for local sustainable development, *Designing expert roles and collective reasoning*, *IJSHE*, **1**, (1), 67, 2000.
7. SCHRIEBERG M, Sustainability management in campus housing – A case study at the University of Michigan, *IJSHE*, **1**, (1), 137, 2000.
8. LEVY J. I., DILWALI KUMKUM M., Economic incentives for sustainable resource consumption at a large university, *IJSHE*, **1**, (3), 252, 2000.
9. FISHER R. M., Applying ISO 14001 as a business tool for campus sustainability, A case study from New Zealand, *IJSHE*, **4**, (2), 138, 2003.
10. STEELMACK C. M., SINCLAIR A. J., An overview of the state of environmental assessment education at Canada universities, *IJSHE*, **6**, (1), 36, 2005.
11. DAHLE M., NEUMAYER E., Overcoming barriers to campus greening, A survey among higher educational institutions in London, UK, *IJSHE*, **2**, (2), 139, 2001.
12. VERBITSKAYA L. A., NOSOVA N. B., RODINA L. L., Sustainable development in higher education in Russia, The case of St Petersburg State University, *IJSHE*, **3**, (3), 279, 2002.
13. DOBROWOLSKI J. W., Polish Scientists and European Integration for Lasting Economic Development, *BIP* 118/119, June-July 2003, [In Polish].
14. HARTMAN T., Moving Toward a sustainable building industry, www.AutomatedBuildings.com, December 2006.
15. Constitution of the Republic of Poland, 1997.
16. <http://www.undp.org.pl/rozwoj/aktualnosci.php?news=609> [in Polish]
17. http://www.nauka.gov.pl/mn/_gAllery/25/92/25929/20070410_Narodowy_Program_Foresigt_Polska_2020_EN.pdf.
18. http://www.yale.edu/esi/b_countryprofiles.pdf
19. http://www.ekon.uni.opole.pl/konferencje/k1r07_en.html
20. <http://szkola.imir.agh.edu.pl/konferencja/> [In Polish]
21. http://www.ab.ntnu.no/sure-build/_download/sb_brochure.pdf
22. <http://www.klimatdlaziemi.pl/e-cms/ob.php/referat%20p.Kalinowskiej.doc?id=755> [In Polish]
23. <http://www.unesco.pl/edukacja/szkolnictwo-wyzsze/katedry-unesco-w-polsce/> [In Polish]