Readiness for Applying Innovations Promoting Retardation of the Pace of Resources Transformation in Rural Areas

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Abstract: The article presents some aspects of sustainable development in rural areas, stressing the need for activation of local communities to take local initiatives moderating the adverse transformation of the ecosystems. The paper is a review article based on the literature analysis. Its goal was to highlight the role of the Polish rural areas in the protection of biodiversity and highlight the need for education of their residents, for making innovative solutions for the protection of the natural resources. The authors also requested students of Agriculture at the University of Rzeszow (Poland) to express their opinions about and attitude to the problem of innovation, as the basis for applying for EU funds in support of rural development for the period of 2014-2020. The questions concerning innovations referred especially to those which allow slowing down the pace of consumption of the resources. Interest in innovation was shown by 70 % of the students, who generally properly understand this issue. Respondents expected innovation mainly in agriculture (100 %). Students' interest in innovations in areas other than agriculture covered mainly medicine, investments, production of consumption goods and sustainable life style. Just under half (47 %) of the respondents were interested in innovations in the field of ecosystems and biodiversity protection The results of the evaluation clearly indicate the need for further education in the scope of justifying the need to seek and introduce innovative measures to protect nature and its resources.

Keywords: biodiversity, innovations, retardation, Poland, university education.

Introduction

Sustainable rural development is an economic process that consists in using natural resources in such a way as to meet the food needs of present and future generations. By introducing the environmentally friendly production technology, it aims to maintain and even increase the production potential of these areas. Sustainable agriculture must protect the soil, water and genetic resources of crops and livestock. It must also be understood by the local communities as a long-term strategy for the future by means of:

- using resources in a way that does not damage their ability to renew,
- acting for the food production increase only by increasing productivity of resources,
- acting for the symbiosis of both ecological and production goals,
- maintaining the high quality of the natural environment.

Implementation of those targets requires full approval of local communities, seeking a new lifestyle and innovative methods to improve the way they step toward balancing the social, economic and environmental aspects of their development.

Poland's integration with the European Union and the membership benefits received in the years 2004-2016, is a very good period for Polish rural areas and their inhabitants. As a result of the common agricultural policy and cohesion, there has been some improvement in the income and infrastructure as well as education. Rural areas have become more attractive places of residence, and the number of rural population and its share in the total population has been increasing in Poland since 2000 (Wilkin, Nurzyńska, 2016).

There are more and more enterprises being located in rural areas, but one must not forget that due to the variety of habitats and landscapes, these areas are primarily the main sanctuary of biodiversity of unique character in Europe.

The study highlights the role of the Polish rural areas in biodiversity conservation and the need to seek innovative solutions for not only economic and social spheres but also the natural one, which must be protected against excessive pressure from the former two. Undertaken innovative activities should be an interconnected group of initiatives aimed at the innovative decision of redirecting the reality of rural

areas towards sustainable development by making such choices promoting slowing down the conversion and use of natural resources (Poskrobko, 2010; Kostecka, 2010, 2013a) at the same time achieving socially friendly economic results.

The authors' objective was also to ask the students of Agriculture at the University of Rzeszow (Poland) about their opinions on the topic of innovation as an important basis for applying for EU funds in support of rural development, in view of the new funding for the period 2014-2020.

The results of this evaluation are very important for identifying or adjusting the specific objectives of education for the surveyed students in the next academic year.

Material and methodology

This paper is a review article, based on a study of the problem and analysis of the literature. The authors educate the students of Agriculture at the University of Rzeszow (Poland) in the range of several environmental subjects (biological basis of agriculture, ecology, environmental protection and ecophilosophy) as well as specialized English language and their objective was to research the students' opinions concerning innovation. It is important that future farmers apply for the support of the EU funds in rural development and in view of the new funding for 2014-2020, the aspect of innovation is an important element.

Students were also asked to assess the state of ecosystems and biodiversity, and the need for innovation for sustainable lifestyles and slowing the rate of ecosystems destruction. The results of this evaluation will be useful for planning the content emphasis and expansion in the conducted courses.

There were two short surveys conducted in Oct./Nov. 2016. First, the young people (5 women and 15 men) were asked about the willingness to innovate in rural areas. Then they were asked to assess the state of ecosystems and biodiversity, as well as the need for innovation for sustainable lifestyles and slowing down the pace of destruction of the ecosystems.

Results and discussion

Urgent need for halting biodiversity loss

Conservation of biodiversity is essential from the economic, social and scientific point of view. Contact with properly functioning nature is essential for humans. Biodiversity determines the well-being based on broadly understood ecosystem services (Mizgajski, Bernaciak, 2014; Kostecka 2013a, 2013b). The Millennium Report constructed at the turn of the centuries (Guide to …, 2015) points out that across the globe 60 % of ecosystem services is currently being degraded or used contrary to the objectives of sustainable development, which would allow these services to rebuild themselves. The extinction of species is most often associated with their natural habitat disappearance, introduction of species from other geographical areas or direct destruction of individuals. The disappearance of habitats results from the development of road networks, urbanization, eutrophication, wetland drainage, soil contamination, monoculture crops, and many other reasons, including the tourist industry pressure. The presence and extent of these problems is related with the increasing consumption, changes in the economy, delays in the implementation of environmentally friendly technologies, and others, but mainly due to the low ecological awareness of the communities.

To protect biodiversity, signatories to the Convention on Biological Diversity (CBD) (CBD-Biodiversity …, 2015) introduce various practical solutions including an international initiative called: *Communication, Education, Public Awareness-CEPA / CBD* (Kalinowska, 2016). Established in Montreal CBD Secretariat was obliged by the Conference of the Parties to appoint CEPA's international team of experts - the Informal Advisory Committee (IAC) called CEPA / IAC (Meeting of the Informal Committee ..., 2016).

CEPA / IAC experts believe that it is necessary to put a greater emphasis not on the accumulation of knowledge but on the ability to act locally, create a sustainable lifestyle and build a conviction about the need for the linkages between the state of biodiversity and the welfare of people. This is important because, despite the considerable efforts undertaken in many countries to halt the loss of biodiversity, the evaluation of the implementation of the Strategy for Biodiversity for the period 2011-2020 (Global Biodiversity Outlook 4, 2014) is poor (Kalinowska, 2016). According to many indicators, at least until 2020, the pressures on biodiversity will continue and even grow, and its resources will decrease. This will be the

result of insufficient concern for biodiversity at the level of daily activities, ways of thinking, problem solving and resource management without prophylactic slowing down the conversion of ecosystems (Kostecka, 2010, 2013a, 2013b). Research results indicate that today the main factors (over 70 %) responsible for the loss of diversity are linked with agriculture and food production. It seems that it is largely due to the greater availability of natural values in rural areas than in cities and to thinking that commonly available goods are not valuable enough. So to slow down the rate of adverse changes, the key is not only the pursuit of sustainable agriculture, sustainable production and consumption, but also the development of new trends in lifestyle. It is hard to imagine such changes without the development of public awareness of all the social groups affecting ecosystems and using their services, namely decision-makers, producers and consumers all around the world. The *Convention on Biological Diversity*, adopted at the Earth Summit in Rio de Janeiro in 1992, is an international agreement comprehensively covering all aspects of our relationships with the natural resources.

What is innovation?

The term "innovation" comes from Latin *innovatio* and means renewal. Since the term now and in the future is to decide on the granting of funding for many activities, including those in rural areas, its interpretation should be spread to the future beneficiaries of those funds in the most favourable sense (Kostecka, Kostecki, 2016).

While in science innovation should be understood as actually the first, original solution of a problem of a certain nature, showing a new manner of operation or solving a research problem, in practical areas, however, innovation for a particular social group may be understood as breaking the previously existing standard procedure, imitating better functioning solutions, "borrowing" solutions from other areas of life, industries, regions or even countries.

In social economics, innovation can be understood as new areas of business, new ways to support social entrepreneurship, or innovative tools, as well as a practical application of the principles of sustainable development, which have not been used in the area before.

According to A. Śpionek (2016) innovations can be divided into the following:

- according to the area of innovation: product innovation – i.e. improving the product; procedural one- changing methods of manufacture (or services); organizational and marketing,
- according to the degree of novelty: global, regional or local innovation, concerning a branch of industry or an enterprise,
- from the point of view of the changes they cause: radical - new products, technologies or way of management, recombination – using the existing technology, production and organization in order to create new products and modification –introducing minor changes to existing products, aiming to improve them.

According to R.K. Merton (2011) innovative actions in a given group consist in criticism of values, opinions and behaviours functioning in the group, and the introduction of a new quality. New quality - innovation - relates primarily to the means of accomplishing the objectives of the group, to which there is a consent. The new measures do not necessarily coincide with the system of values professed earlier. Initially, the action being innovative can be met with contempt or harsh criticism in a society or social group, but they often disseminate and finally become binding. According to J. Kostecka and A.W. Kostecki (2016) innovative solutions can be widely known, but used in a new way, or jointly with other activities. The condition is that this type of application and connection has not been previously widely used (especially in this area).

Willingness to innovate in the Polish rural areas

Most of the students of Agriculture, University of Rzeszow, were interested in innovation (70 % of the respondents) and properly understood (90 %) the notion of innovation as being associated mainly with something that makes life easier. The respondents (100 %) declared that they thought strategically about the future and a vast majority (72 %) considered themselves innovators. They expected innovations in agriculture (100 %), a few also mentioned other areas of life requiring innovation. They hoped that innovations would make their everyday life easier. These same students were asked to express their

opinions again after a couple of weeks. This time they were asked to assess the state of ecosystems and biodiversity (Table 1).

Table 1.

Students' answers (%)

Questions	Answers				
	It is/They are in a good condition	It is/They are destroyed to the degree of			
		10-20 %	20-40 %	40-60 %	60-80 %
How do you assess **the state of ecosystems** in your area?	40	33	20	7	0
How do you assess **the state of ecosystems** on the Earth?	0	0	33	67	0
How do you assess **the state of biodiversity** in your area?	40	33	27	0	0
How do you assess **the state of biodiversity** on the Earth?	0	6	60	20	14

The state of both – the ecosystems and biodiversity of the students' surroundings were assessed better (40 % of the respondents) than the status of ecosystems and diversity of the Earth. This was probably the result of the assimilation of information contained in the Millennium Report (Guide to ... 2016). However, some of students of agriculture (Table 1) do not seem to have assimilated the knowledge well, as the authors of the Millennium Report, who researched the ecosystems of the Earth, stated that ***60 % of the services (15 out of 24) provided by the ecosystems have been destroyed or used in an unsustainable way.***

Students' interest in innovations in areas other than agriculture covered mainly medicine, investments, production of consumption goods and sustainable life style (Table 2). Just under half of the respondents (47 %) were interested in innovations in the field of ecosystems and biodiversity protection. The fewest of the students pointed innovations in education, economics and law as very important, and what is interesting – the same refers to the innovations in obtaining energy (Table 2), although when asked to give examples of innovations that help to slow down the pace of the resource diversity use, the students mentioned innovations from that group (Table 3).

Table 2.

Students' interest in innovations in areas other than agriculture. Question and students' choices (%)

If I was looking for innovation in the area other than agriculture, it would be connected with *			
area	%	area	%
Medicine	73	Economy	20
Sustainable life style	53	Law	27
Ecosystems protection	47	Production of consumption goods	60
Education	27	Energy generation	12
Protection of biodiversity	47	Investments	67

* possibility of 5 most important choices

Table 3.

Students' opinions concerning other issues (%)

Questions	Answers				
	Definitely yes	**Yes**	**I don't know**	**No**	**Definitely not**
Do we need innovations?	40	60	0	0	0
Do we need slowing down the pace of consumption of natural resources?	47	47	6	0	0
Does excessive consumption of natural resources affect you?	20	67	0	13	0
Do we need innovations allowing for slowing down the pace of consumption of biodiversity resources	27	67	6	0	0
Give examples (other than using recycled materials)					
Do you support financial provision for pro-environmental innovations?	33	67	0	0	0

The respondents were asked about their opinion if we need to slow down the pace of consumption of natural resources (Table 3). Positive answer was given by 94 % of the respondents. Six percent of them did not know the answer to this question. Similarly, 94 % of those who responded felt that we need innovations that help to slow down the pace of the resource diversity use. Examples of the expected effective innovations included: solar panels and windmills, geothermal energy, ecologically friendly household power stations and motor engines powered by hydrogen. All the students opted for the financial support for pro- environmental innovations (Table 3).

In the survey (Table 1), 70 % of the students showed interest in innovation and they expected it primarily in agriculture (100 %). When later asked to define other areas where innovations were needed, they pointed out at medicine, investments, production of consumption goods and sustainable life style. Unfortunately, less than half of the respondents were interested in innovations in the field of ecosystems and biodiversity protection. Education scored the lowest.

Knowledge and education

The student survey results should be evaluated in the context of importance of the ecosystem services and biodiversity described by many authors (Chichilnisky, Heal, 1998; Costanza, d'Arge, 1997; Lautenbach, Seppelt, 2012) as ***a lack of knowledge***. In Europe, a similar situation was found in various cross-sectional social studies concerning biodiversity awareness (Kalinowska, 2014).

However, with a deluge of information and constant access to information technologies it is easy for everybody to overlook things that are really important. The world is changing and innovations are needed in every field of life. Common sense dictates that we should start with changes in and a different approach to education and upbringing.

We are born with great potential, which is often wasted throughout the process of socialization. As small children we are usually happy, creative, with an individual view of the world, curiosity, sensitivity and a lot of imagination. We are not afraid of making mistakes, we live here and now, and probably that is why we absorb knowledge quickly and learn effectively. At the same time our talents begin to develop, but unfortunately only a few of us manage to sustain them to be fully developed in adulthood, not only for the sake of the individuals but other people as well. The current system of education, the formal

framework of which was established in the nineteenth century to meet the needs of industrialism, despite many reforms, does not meet the expectations of the modern world because it is a completely different world. It seems that, in spite of the efforts of many great teachers, the school does not really value, is not capable of or is not fit for developing individual talents, encouraging enthusiasm, creativity, imagination, self-esteem and self-confidence. It should not be like that because students equipped with those strengths would feel greater empathy and responsibility for themselves and the world around. Instead, the main focus is placed on mistakes and what they do wrong. It turns out, however, that if we are not ready to be wrong and do not allow ourselves and others to make mistakes, which are an integral part of the learning process and a kind of a signpost, we will never create anything new or original (Robinson, 2006).

Moreover, the school usually does not teach us to build good relationships with ourselves, other people or nature. It seldom lifts us up but often discourages by criticism, complaining, threatening, punishing and rewarding, which is a kind of control, instead of caring, listening, supporting, encouraging and trusting (Glasser, 2005). Therefore, the above mentioned lack of knowledge and awareness concerning the importance of ecosystem services and biodiversity for individual people and the environment results from the fact that in the broadly defined education there is not enough time, effort and energy devoted to the things that are most essential for human well-being and survival of the world as we know it.

Conclusion

The issues discussed in the paper are important for building sustainable development and improving the relations between man - ecosystems and man - biodiversity. The agricultural students' survey results should be assessed as the situation where further and broader education is definitely required. The indication of the need to create and implement innovations aimed at protecting ecosystems and biodiversity (less than half of those who responded) gives grounds to believe that at the time the United Nations General Assembly announced the period between 2011-2020 the United Nations Decade of Biodiversity, we must double our efforts to convince people of different professions and ages that ecosystems quality and biodiversity is the basis for our good life now and in the future. As the described assessment of students beliefs shows, it should also apply to the students supervised by the authors of the publication. Therefore, they suggest that every responsible teacher should carry out periodic evaluation of the effect of their actions by identifying the knowledge and attitudes of their students and adjust the conducted educational activities according to the obtained results.

It is urgent to slow down the pace of biodiversity degradation, and it remains in connection with accelerating a well-run and effective education. More emphasis should be put on the local activities, sustainable lifestyles and understanding of the relationship between the state of biodiversity and the welfare of people.

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