

THE CONTRIBUTION OF ENVIRONMENTAL ECONOMICS TO UNDERSTANDING AND SOLVING THE PROBLEMS OF THE SCARCITY OF GOODS

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Abstract: Scarcity of goods is the main subject of traditional and environmental economics. They both investigate why scarcity of goods emerges and how the issue of scarcity can be solved. There are several reasons causing scarcity, resulting in the increasing gap between human needs and the available resources. Environmental economics puts attention to the interaction between humans and natural environment. Thus, it investigates how humans are transforming their natural environment, both by their activities (technology, scale, location, externalities), as well as by their attitude to the nature, in general. It can be seen in the so-called commodifying of natural environment and over-consumption of natural resources. Environmental economics treats natural environment as a resource, which offers different types of services, being of life-importance not only to humans but to all beings. In this context additional reasons why human needs remain unsatisfied and the quality of life, as well as future of humans and the whole planet, are threatened, can be identified. The paper presents some views on scarcity and shortly mentions some related concepts contributing to the solving of the problems, being both of economic and environmental nature. As an evolving scientific discipline environmental economics explores the ways for far-reaching environment-friendly and, at the same time, economically sound decisions, on both macro and micro level, and, recently, on global level.

Key words: concepts for problem solving, ecosystem services, environmental economics, human needs, natural environment, scarcity

PRISPEVEK OKOLJSKE EKONOMIKE K RAZUMEVANJU IN REŠEVANJU PROBLEMA REDKOSTI DOBRIN

Povzetek: Redkost dobrin je osrednja tema tradicionalne in okoljske ekonomike. Obe raziskujeta, zakaj se pojavlja redkost dobrin in kako se da razrešiti. Razlogov za redkost je več in pokažejo se v porastu prepada med človeškimi potrebami in razpoložljivimi viri. Okoljska ekonomika je pozorna na interakcijo med ljudmi in naravnim okoljem. Tako raziskuje, kako ljudje spreminjajo svoje naravno okolje s svojimi dejavnostmi (tehnologija, obseg, lokacija, stranski vplivi) in s svojim odnosom do narave nasploh. To se da videti v tem, da postaja naravno okolje blago, in v prekomerni porabi naravnih virov. Okoljska ekonomika obravnava naravno okolje kot vir, ki nudi razne vrste storitev življenjskega pomena za ljudi in vsa bitja. V takem kontekstu se da identificirati dodatne razloge, zakaj ostajajo človeške potrebe nezadovoljene in je kakovost življenja pa tudi bodočnost ljudi in vsega planeta v nevarnosti. Prispevek prikaže nekaj pogledov na redkost in na kratko omenja nekaj s tem povezanih zamisli, ki prispevajo k reševanju problemov in so hkrati ekonomske in okoljske narave. Okoljska ekonomika je veda v razvoju, proučuje zato poti do odločitev, ki so hkrati dolgoročno prijazne do narave in ekonomsko zdrave, in to na mikro in makro ravni, zadnje čase pa tudi na globalni.

Ključne besede: zamisli za reševanje problemov, eko-sistemske storitve, okoljska ekonomika, človeške potrebe, naravno okolje, redkost

1. Introduction

Traditional business economics, as well as traditional theories of a firm have been subject of severe critique because of many reasons. Among shortcomings, especially too narrow treatment of human as well as neglecting the fact of limited and, at the same time, exhausted natural resources, are emphasised. Because of radical changes and modifications of conventional views on economics in general environmental economics gradually evolved into scientific discipline. The concept of *Homo economicus*, as a basis for traditional economics, is one-sided and too narrow to explain contemporary questions referring to business, environment and society in their interaction (Knez-Riedl, 2008a).

In spite of impressive technical development man still depends on nature. But alienation from nature cannot be overseen, as well. It reflects in many facets of anthropocentric behaviour, stirs up illusive impression that man can live in a self-made, quasi natural environment. Man directly and indirectly influences the natural environment - not only by economic activity, but by the way of living (including everyday life and leisure), caused by the prevailing consumption patterns. One of the dominant reasons for human neglecting of natural environment is influenced by illusive sufficiency of goods. That is why some of goods still have been categorized as free, being available to everyone.

According to a number of studies the availability of natural resources is in decline, that is just opposite to the population growth. The world's human population is currently increasing by about 90 million people a year, requiring food, water, energy and other goods from environment, besides healthcare, education and employment. On the other hand, population causes pollution and waste. The *WWF (2009)* reports that the global population's demand for natural resources exceeds 30% the planet's capacity to regenerate those resources. Not only population in developing countries is suffering from discrepancy between human needs and scarcity of goods. This is evident from the problem of unsatisfied human needs, e. g. scarce food results in hunger, malnutrition, causing diseases, poverty, conflicts and violence.

Heightened awareness of the delicate balance between population growth and environmental resources, technology and global environment efforts (*Vahlsing, 2010*) additionally emphasises scarcity of both non-renewable and renewable resource. Thus, the views on scarcity are different, even then, when only the human needs are taken into account. But other beings have they basic needs to survive, too.

2. Different views on scarcity

Scarcity of goods is the main subject of both traditional and environmental economics. To better understand it researchers approach the topic from different viewpoints. Thus, defining scarcity results in several classifications of both scarcity and needs. Before we explain some of different views on scarcity, we should shortly discuss human needs and wants.

2.1 Human needs and wants

There are different typologies of human needs, varying across time and cultures. Some of them, elementary ones, are constant and present everywhere. From this point of view we distinguish elementary needs from imaginary ones, or in other words, between basic and non-basic needs.

By elementary needs everything that is urgent for human survival is understood (needs related to food, drink, shelter, clothes, etc.). Humans have elementary and non-substitutable needs like e.g. needs for water, food, fresh air. By imaginary needs everything beyond elementary needs is understood. In general, in the case of elementary needs we can speak about absolute scarcity, while in the case of imaginary needs about relative scarcity. *Baumgaertner et al. (2006)* give examples of needs for human rights, freedom and justice, where typical absolute scarcity occurs.

Both needs and wants might be characterized as desires of individuals to satisfy their quest for acquiring goods and services (*Raiklin and Uyar, 1996*).¹ For them needs are desires which must be urgently satisfied. They are basic organic parts of wants. Authors (*Ibid.*) distinguish the biological and the socio-cultural components of needs. The first component stems from the biological origin of species. In this context humans are treated as biological organisms, requiring food, medicine, clothing, and shelter. But as a social and cultural being man has a range of additional needs and wants, like identity, understanding, even leisure.

The so-called socio-cultural component of needs depends on three factors (*Ibid*):

1. Different forms of society existing in a certain time,
2. Cultural differences between contemporary societies, and
3. Developmental differences between countries.

Wants are more than needs as they include also some additional desires that do not correspond to needs. Instead of word "additional" the word "residual" is sometimes used, what means that they are affordable only by some (*Ibid*). We call them luxuries.

Needs are extremely subjective, as they depend on human characteristics like age, gender, health, human character (temper), background, cultural and natural environment, activity (including business activity and those related to leisure), and some other factors like experiences and ambitions. The needs are varying, especially in the life span of early childhood across adulthood and maturity to the retirement. Each of these phases of human life cycle has special characteristics regarding needs. Dynamics of needs satisfaction is also very different.

Generally, needs shift regarding specific needs dependent on different consumption patterns. *Webley et al. (2001)* find the problem of modern society that more and more activities are organized in an exchange way, pushing away e.g. voluntary systems. Additionally, more and more goods, among them also ecosystem services are becoming commodities.

Shift in human needs consideration can be seen from the modification of the *Maslow's* original five-stage model. It ranks needs as a hierarchy (www.businessballs.com):

1. Biological and physiological needs,
2. Safety needs,
3. Belongingness and love needs,
4. Esteem needs, and

¹ They distinguish goods and services. But services can be seen as a kind of so-called non-material goods, too.

5. Self-actualization needs.

At the beginning of nineties three additional levels of needs were added. The adapted hierarchy of needs includes eight levels (Ibid.):

1. Biological and physiological needs,
2. Safety needs,
3. Belongingness and love needs,
4. Esteem needs,
5. Cognitive needs (knowledge, meaning, etc.),
6. Aesthetic needs,
7. Self-actualization needs, and
8. Transcendent needs (helping others to achieve self-actualization).

The economic downturn exposes also some other needs like financial literacy, job training or mental health services (*Guide to Funding Basic Human Needs*, 2009). On the other hand, because of ecological degradation ecological literacy, awareness and environmentally sound behavior are urgently needed. It sounds quite reasonable that “the need for needs theory” is not exaggerated, at all (Rubenstein, http://www.gmu.edu/programs/icar/ijps/vol6_1/Rubenstein.htm). There are some additional attempts to develop the theory of needs (e.g. of fundamental, universal human needs).

2.2. Scarcity

It is well known that scarcity drives economy and encourage economic and other innovations (environmental and social ones). In economic sense scarcity is based on supply and demand. Everybody and the whole society are confronted with the problem of scarcity in everyday decision-making, either short or long termed.

Due to *Samuelson and Northouse* (1989) economics studies how societies use scarce resources to produce valuable commodities and distribute them among different groups. In classical economic thought the notion of scarcity was linked to limited natural resources and faster population growth (*Malthus*) and later to declining of land quality (*Ricardo*).

In neoclassical economics the view on scarcity became broader, being based on gap between wider spectrum of human needs, desires and wants, preferences, on one hand, and possibilities to satisfy them, on the other. The shift from human's dependency on nature and toward exchange to produced goods (commodities) is evident (*Baumgaertner et al.* 2006).

Many scientists emphasize that we are entering an age of scarcity – especially in food, water and energy (*Green*, 2008). On the other hand, a paradox occurs, the richer the society becomes, the scarcer are the resources, needed for production of goods and services for the satisfaction of wants (*Ibid*). The limited resources are confronted with unlimited needs and wants. This tension is intensified by myths about scarcity. Because we believe that most things are scarce, we try to get the most of them, to hoard them (*Twist*, 2003).

The three myths about scarcity are very strongly embedded in everyday thinking and acting. These myths are (*Ibid*):

- "There's just not enough",
- "More is better", and
- "That's just the way it is".

More and more people are obsessed by ad hoc shopping, being victims of the “*tyranny of things*”. The consequence is so-called *throw away society* resulting in increase of the *mountains of waste*, besides *mountains of trash* and *mountains of damaged goods*. As a society we tolerate and even encourage consumerism addiction. “*Dictatorship of consumerism*” breaks through all strata of society, e.g. it can be found in infrastructure, even in cultural institutions like museums, opera houses, and cathedrals (*Knez-Riedl*, 2008b).

According to *Twist* (*Ibid.*) scarcity is fear-based, and as a consequence we act fearfully, creating in that way more and more scarcity. *Bauman* (2007) writes about many fears jeopardizing modern living in a society with changing social structures and unstable welfare economy.

2.2.1 Relative and absolute scarcity

Daly's (1977) distinction between absolute and relative scarcity enriched the views on scarcity. It stems from the purposeful human behaviour involving utilization of means to achieve ends (*Baumgaertner*, 2006). A good is scarce in relation to the other scarce goods. To obtain one additional unit of the good some other good must be sacrificed. The idea of relative scarcity presupposes the subjective preferences of *Homo economicus* and substitutability. There is a possibility of substitution and a room for choice when we determine some goods as scarce ones (*Ibid*). In the case of absolute scarcity there is no possibility for substitution and choice. While the concept of relative scarcity is within the scope of economics, the absolute scarcity is not considered as an economic problem. But it is very relevant for the issue of natural conservation, including the needs of humans as biological species and biodiversity.

As a matter of fact, there is no clear-cut between relative and absolute scarcity. By technical progress new substitutes for previously absolutely scarce goods are developed (just to mention organs transplantation). Aspects like nature, technology, preferences and institutions dynamically change and evolve over time (*Ibid*).

2.2.2 Ecological and environmental scarcity

According to UN data (*De Baker, 2009*) by 2025 about 1800 million people will be living in countries or regions with absolute water scarcity, two-third of the world population could be under stress conditions, and conflicts over fresh water will occur in the Middle East. This is only one case of a severe scarcity of natural resources, not to mention extinction of species in a broader context. Increasing ecological scarcity occurs from pollution, depletion and ecological disruption. Increasing, unwise treating and exploiting of natural environment causes relative scarcity of ecosystem services (explained more in detail in chapter 3).

Environmental scarcity refers to the declining availability of renewable natural resources (*Kennedy, Jr., 2010*). In this context the author (*Ibid.*) distinguishes demand-induced scarcity (because of increased population), supply-induced scarcity (because of environmental degradation), and structural scarcity (because of unequal access to resources). The connection between environmental scarcity and civil violence is indirect but important. Environmental scarcity is never the sole cause of conflict, but it is often an aggravating or contributing factor (*Ibid*).

The various forms of environmental scarcity can lead to potentially destabilizing social effects, like: lower agricultural production, economic stagnation or decline, migrations from areas of resource scarcity to areas of perceived opportunity and weakened governing institutions (*Ibid.*).

2.2.3 Some additional considerations of scarcity

Many resources are unevenly distributed and badly managed (*Vaknin, 2010*). We can speak also about so-called manufactured scarcity. It is the case of programmed obsolescence and apoptosis (self-destruction). Manufacturers often intentionally produce scarcity by limiting their input or by restricting access to their goods – so-called “limited editions” (*Ibid*). But the manufactured scarcity or artificial scarcity is a short-term way to gain profit. Producers causing such kind of scarcity should be aware that this is very risky decision. Either they are breaking the law (in the case of monopolists) or encouraging producers of substitutes to enter the niche and offer their products.

Scarcity of commodities relates not only to tangible goods (like timber, food, water and fish), but also to ecosystem services and the loss of biodiversity (*Koelner, 2008*).

Scarcity viewed from other aspects can be seen also as a material scarcity and psychological scarcity (*Dobkowski, Wallman, 2001*).

2.2.4 Some other scarce goods

As a society we lack some goods of subtle nature, like attention, trust, besides time and skills.

Loose attention can be explained by information overload, sometimes described as information pollution or shortly *infosmog* (*Knez-Riedl, 2008a*). As a result loss of concentration of people in their intentions and activities, overseeing important facts, among them early warning signs of several kinds of crises and disasters, can be mentioned. Thus, so-called attention economics is treating human attention as a scarce recourse (*Lanham, 2006*).

Lack of trust decreases efficiency, causes higher cost of control and bureaucracy, and it hampers especially civic activities. Trust is typical intangible asset, which is treated as an important scarce resource, taken into account by modern economics. It is very fragile, and once restored it can be very hard renewed (*Knez-Riedl, 2000*).

Time as a scarce resource has been discussed recently more and more intensively. It raises not only relevance of different perspectives of time, but the question of durability of several goods and especially the question of the regeneration capability of renewable resources. Each activity and process, either economic or non-economic, takes time. It becomes evident that time horizons are shortened. Because of that actions and measures should not be shifted and postponed (*Knez-Riedl, 2008a*).

Scarce skills occur when there is a lack of trained people. Deficit of suitably skilled people presents absolute scarcity. The case of relative scarcity occurs when suitably skilled people are available in sufficient number, but do not meet other employment criteria (*workinfo.com, 2010*).

3. Nature as a scarce resource – importance of ecosystem services

Ecological economists see ecosystem services as essential for human life (*Knez-Riedl, 2008a*). We can define them as components of nature, directly enjoyed, consumed or used to yield human well-being (*Boyd, Banzhaf, 2006*). Among several ecosystem services there are biomass production, nitrogen fixation, nutrient cycling, water runoff control, air and water purification, soil regeneration, pollination of crops and natural vegetation, even partial climate stabilization (*Ibid*). No man-made substitutes are known which could replace ecosystem services

mentioned, till now. Thus, we can conclude that biodiversity safeguards ecosystem functioning and the provision of a range of essential life-supporting ecosystem services for humankind.

Ecosystem services are diverse, protecting people from e.g. ultraviolet rays, maintaining biodiversity, etc. They are more or less interconnected and therefore it is rather difficult to classify them. E.g. *Costanza et al. (1997)* grouped ecosystem services into 17 categories, consisting of renewable services (non-renewable fuel, minerals and atmosphere are excluded):

1. Gas regulation,
2. Climate regulation,
3. Disturbance regulation,
4. Water regulation,
5. Water supply,
6. Erosion control and sediment retention,
7. Soil formation,
8. Nutrient cycling,
9. Waste treatment,
10. Pollination,
11. Biological control,
12. Refugia²,
13. Food production,
14. Raw materials,
15. Genetic resources,
16. Recreation,
17. Cultural³.

The *Millennium Ecosystem Assessment (MA)* distinguishes four categories of ecosystem services (WWF, 2008):

- Supporting services (e.g. Nutrient cycling, soil formation, primary production),
- Provisioning services (e.g. Production of food, freshwater, material, fuels),
- Regulating services (climate and flood regulation, water purification, pollination and pest control),
- Cultural services (aesthetic, spiritual, educational and recreational).

Only a part of these services are bought or sold commercially. Because of that they have no market value. They are often taken as granted and therefore very badly managed. Treated as “free” they are threatened by e.g. deforestation, over-harvesting, spread of invasive (not-native) species, by fertilizers and pesticides, destruction of wetlands, soil erosion, urban sprawl, population growth and consumption. Last, but not least, they are threatened also because of short-term needs, which are not in accordance with long-term societal well-being. Thus, ecosystem services bring indispensable benefits, on one hand, while their degradation and misuse present severe risks for humankind and other beings, on the other. From both aspects the consequences for future sustainability are fatal and the necessity of careful management of ecosystem services is indispensable. Without appropriate activities the functioning of ecosystem is dramatically endangered.

4. Some possible approaches to overcome scarcity

When we are aware of so many facets of scarcity, it is obvious that there are several possible approaches to solve the issue of scarce resources. There are plenty of facts, not in the phase of early signs anymore that resources run out, that earth cannot absorb the waste in such enormous quantities, and that exploiting of habitats causes species to vanish (*Levine, 2009*). To solve this problem knowledge, atmosphere, and willingness not to mismanage finite or non-renewable resources are indispensable. The attitude to consumption should be altered, in general, but especially the attitude to the consumption of natural resources.

We do not intend to mention or to describe all the approaches possible to solve the issue of scarce resources. Some selected approaches helping to overcome tension between needs and rational ways of meeting them in the context of environmental-economic issues have been already known and discussed, as well as criticized (e.g. Pareto efficiency, externalities, property rights). Some concepts are relatively seldom taken into account (like shadow prices) or being rather new (e.g. strategic choice approach). Many of the concepts are constantly evolving.

Because of scarcity the choice is indispensable. Recently the strategic choice approach is relevant for solving the problem of scarce resources.

Special attention is given to the precautionary principle, in the context of uncertainty and risk management methods.

² Location of an isolated or relict population of once widespread species.

³ Aesthetic, artistic, educational, spiritual and/or scientific values of ecosystems (*Ib.*)

Broad spectrum of different methods refers to the valuing of natural resources. Setting price to resources being treated as free contributes considerably to the rational use of those resources. Among methods contingent valuation, travel cost method, and hedonic analysis are often in use. Another group of methods is based on cost estimation. Methods that are frequently taken into account are: replacement cost, relocation cost, avoidance cost, opportunity cost, and restoration cost.

Only a part of available methods is mentioned⁴ in the paper. The main purpose of it was to give a deeper view of scarcity, human needs and ecosystem services, being critical for all beings. Critical views on the concepts for solving the scarcity issue will be subject of further research.

5. CONCLUSION

We are living in the so-called sustainability age, in which the limits cannot be overseen anymore. Nowadays we are confronted with the scarcity as a consequence not only of the tension between unlimited wants and needs, on the one hand, and limited resources, on the other. Scarcity occurs also because of lack of norms, alienation from the natural environment, injustice, etc.

In the paper we presented contemporary understanding of scarcity, after explaining different views on human needs. Special attention is paid to the natural environment as a scarce resource and to the spectrum of ecosystem services being of vital importance for all beings, not only for humans.

Understanding how natural resources are endangered is a precondition to make environmental and economic sound decisions. For this purpose environmental literacy, as well as choice of appropriate concept, solving at the same time - directly or indirectly - both environmental and economic dimensions of the problem of scarcity is needed. In this way the quality of ecosystem services, which is critical for the quality of life, is much more possible to sustain.

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⁴ More in detail they are described in *Knez-Riedl (2008a)*, where the original references are cited.