

Bioeconomy – Opportunities and Dilemmas in the Context of Human Rights Protection and Environmental Resource Management

Biogospodarka – szanse i dylematy w kontekście ochrony praw człowieka i dbałości o zasoby środowiska

Piotr Krajewski

*Faculty of Law and Administration, University of Warmia and Mazury in Olsztyn, Poland
E-mail: piotr529@wp.pl*

Abstract

The notion of bioeconomy, appearing in publications, usually carries positive connotations, even to those less informed. It signifies a new approach towards economic development that is rather not perceived through the prism of unavoidable losses in the environment and reaching for further deposits of required raw materials. It turns out that – at least according to the assumptions and quite probably also in practice – it can be done differently, i.e. at the same level of efficiency, yet without negative effects on people and the environment. The idea of bioeconomy is one of the strategic conceptions of sustainable development, i.e. the method of implementing current economic objectives due to the new technological solutions with reduced use of natural resources and impact on the environment, having in mind future generations; this is an intention to adjust, to the maximum possible degree, developmental activities to absorption capacity of natural and man-made ecosystems.

The weakest point in these attempts, as it may seem, is the lack of knowledge concerning the long-term results of creating social perception for bioeconomy development, and consequently, dilemmas concerning possible sanitary-epidemiological and demographical changes evoked by (slightly different, but reaching as far as those in the present time) interference with the environment.

Key words: bioeconomy, human rights, environmental resources, ecological crisis, risk of environmental changes

Streszczenie

Pojawiające się w publikacjach pojęcie biogospodarki, nawet bliżej niezorientowanym, zwykle kojarzy się z czymś pozytywnym. Chodzi bowiem o nowe podejście do rozwoju gospodarczego postrzeganego już nie koniecz- nie przez pryzmat nieuniknionych strat w środowisku i sięgania po kolejne złoża niezbędnych surowców. Okazuje się, że – przynajmniej w założeniach, a całkiem prawdopodobne, że i praktyce również – można inaczej, tzn. tak samo efektywnie, ale bez negatywnych skutków dla ludzi i otoczenia. Idea biogospodarki jest jedną ze strategicz- nych koncepcji zrównoważonego rozwoju, tj. sposobu na realizację dotychczasowych celów gospodarczych przy zminimalizowanym zużyciu zasobów naturalnych i oddziaływania na środowisko dzięki nowym rozwiązaniom technologicznym z myślą o przyszłych pokoleniach; to zamiar maksymalnego dopasowania działań rozwojowych do możliwości absorpcyjnych ekosystemów naturalnych i zantropomorfizowanych.

Najsłabszym punktem w tych dążeniach – jak się wydaje – jest brak wiedzy na temat dalekosiężnych, przyszłych skutków kreowania percepcji społecznej budowania biogospodarki, a wraz nimi dylematy możliwych zmian epi- demiologiczno-sanitarnych i demograficznych wywoływanych (nieco innymi, ale podobnie głęboko sięgającymi jak w mijającej terażniejszości) ingerencjami w środowisko.

Słowa kluczowe: biogospodarka, prawa człowieka, zasoby środowiska, kryzys ekologiczny, ryzyko zmian śro- dowiskowych

Introduction

The notion of bioeconomy includes those areas of economic activity which use the renewable biological resources of soils and waters. The areas involved are mainly related to plant cultivation and animal breeding, forest resources and microorganisms used for the production of food, materials and energy (Pajewski, 2014). Therefore, a part of the bioeconomy is made up of the primarily production sector (agriculture, fishery and aquaculture) and branches of industry that use and process biological resources, which include, among others, the food and paper industry, along with a part of the chemical, biotechnological and power industries. These sectors of economy make up the heart of sustainability, which leads more industrialized communities to more eco-friendly economic solutions characterized by reduced dependence on fossil fuels and non-renewable resources (Kośmicki, Pieńkowski, 2013). The objective and the essence of bioeconomy is therefore to reduce the rate of biodiversity loss and negative changes in the use of land, i.e. general improvement of environmental conditions, which would provide the bases for new economic growth and an increase in employment rate, based on local human and natural potential, taking into account its specificity and traditions, particularly in strongly industrialized and rural areas (including peripheral, depopulated and deserted areas).

The dynamics of population growth in the world, combined with climatic changes and a loss of the natural and agricultural ecosystem efficiency, is a signal for the strong need to turn towards technologies using renewable energy sources and biological resources in the sustainable production of basic products and towards more efficient processing systems capable of producing food, in particular, but also fibre or other semi-finished products based on biological systems and with the minimum share of technological factors, the minimum amount of waste and emission of hazardous gases, and yet to the benefit of the man and the environment. To create a system of economy based on circular use of components, we need, first of all, an efficient system for evaluating, managing and use of waste produced in manufacturing processes, which would be able to safely absorb this waste.

The assumptions of modern bioeconomy and bioeconomy itself, is not a new concept in most developed countries. There are plans aimed at increasing production based on renewable biological resources and processing those resources, and even using waste produced in manufacturing cycles, processing them into goods with a high added value, e.g. in food, fodder, bioproducts and bioenergy. This strategy is aimed at developing a commonly shared vision of profitability of using economic, social and environment-friendly opportunities in view of challenges related to the need to build a bioeconomy ad-

justed to the potential and capabilities of every country. It also provides a considerable opportunity for strengthening its position as regards the promotion of sustainable development in the region and in the world. The national strategy for (national and global) bioeconomy should therefore become a part of a wider plan (*nota bene* including all three generations of human rights), the so-called smart specialisation in individual subject areas, mainly health, food safety and life quality, besides smart and sustainable industry, power safety and environmental protection. All of this should be achieved in accordance with regulations (L) and rules, the role of which is to guarantee safe economic growth combined with ecological safety and respect for the rights of an individual and the community.

The aim of this paper is to present some details and to indicate the potential of bioeconomy, its role in sustainable development and efforts for the benefit of the man and environmental protection.

Bioeconomy in the global and Euro-regional context

Food safety, management and sustainable use of farming areas, forests, animals and plants living in land and sea or inland waters, together with industry sectors based on biotechnologies, are the most significant issues forming the life of societies, which refers not only to economically developed Europe, but also to the world. The bioeconomy is understood as all domains of human economic activity related to inventions, development, production and use of products and biological processes in three macroareas (S): agro-food, forestry and industry based on biotechnologies and the bioeconomy of marine and inland water resources.

Those sectors present two specific, different but mutually related features. The first feature is the production based on renewable input materials. The second one is the re-use and recycling of biological waste. In both cases, bioeconomy is based on local resources and possibilities (T) and the best possible cooperation and integration of production sectors involved into technological chains, public and private stakeholders (U), conducted policies at the international, European and national level. Undertaking tasks and sharing experiences from operations carried out at the global, regional and local level requires the setting of common legal and task frameworks for keeping control, supervision and management of the currently existing and future technologies and market needs (M).

Understanding the need to follow this direction, many countries all over the world assume strategies and undertake operations merely to strengthen their own bioeconomy, showing everywhere a significant growth (mainly in the agricultural, forestry and food processing industries, bioenergy, biotechnology and biological chemistry products). The point is to un-

leash still unused production potential, therefore not only an increase in the number of products, but also, among others, improving its quality or increasing employment rate. In the EU bioeconomy, the food industry occupies the principal position, and it is still developing, winning new markets, incorporating subsequent branches of production, both traditional and entirely new. The European strategy for bioeconomy is targeted at releasing new possibilities in each of the biomarket sectors involved, in a sustainable and socially accepted manner (Mölders, Szumelda, Winterfeld, 2014).

This is not an easy task, because the direction taken during the industrial revolution (which is still dominant) has led to many irreversible changes. This ongoing progress is accompanied by serious hydrological stress. Along with more strongly emphasized climatic changes in some regions of the world, it has a particularly adverse effect on agricultural production, mainly due to the impossibility to continue cultivation and to obtain crops regularly, securing the minimum of existence. This, in turn, leads to serious economic and social difficulties, e.g. upsetting ownership relations in the property market. In effect, we have to deal with more or less visible climatic migrations, from the rural areas to cities and from the poorest countries of Africa and Asia to Europe. In order to secure a satisfactory amount of food and water for those people, its sustainable use is necessary, preceded by its management and supply. It must be equally sustainable as profitable and, first of all, efficient enough to solve existing from very long and deepening problems of hunger and poverty or diseases caused by those problems. Directly and indirectly this will translate into increasing the level of welfare of local societies and, in effect, withdrawal from the invariably risky decision on emigration.

Bioeconomy, as a whole, does not omit the use of seas: fishery, sea transport, extractive industry and the serious impact of tourism and recreation. This should be completed with observed climatic changes, over-fishing of fixed asset livestock, emergence of foreign species on a mass scale, an increased risk of ecological disasters, development of coastal areas, construction of ports and handling terminals or water contamination. On the other hand, the same tourism, energy production, aquaculture, local biodiversity and marine resources could offer important opportunities for local market development and an increase in employment rate, still underestimated in some places and by some people.

In this way, bioeconomy can significantly affect renewal and sustainable economic development and, at the same time, the political stability of the region. In other words, besides economic and political issues, the point is to handle social problems, among others, controlled movement of migration masses, for instance, by conducting local investment programmes with high infrastructural and social impact (A).

A global or regional perspective on the effects of supporting bioeconomy initiatives is certainly interesting and encouraging. But from the point of view of caring for the interests of an individual, attempts to guarantee to him or her so numerous and important – looking through the prism of all generations of human rights – needs and safety, it seems that the local approach, and certainly the national one, might be more important, since typically appropriate policies and reasonable projects are coordinated at the central level. Therefore, developing bioeconomy in particular countries usually starts with agro-food production and forestry. To a various extent, it also refers to fishing, fishery, wood pulp and paper industry, tobacco, textile, pharmaceutical and bioenergy sectors. The share of the “bio” elements in each of those sectors continues to grow, although it is difficult to describe what share they make up overall, due to divergent methods used for evaluation purposes. What is certain is that the contribution of the renewable share in each sector of the national economy can be significantly increased. Of course, the economic and environmental policies will determine the size of the difference between potential possibilities and actual activities for increasing the effectiveness and eco-friendliness of new technologies (H).

Bioeconomy at the national and regional level

There is an enormous diversity in Europe in any consideration. This makes it a unique place to experiment and develop pro-environmental technologies. Agriculture seems to be the most predisposed branch of bioeconomy for the majority of the concerned countries. Rural development is one of the highest priorities. This concerns, in particular, peripheral regions still experiencing difficulties (towards higher centres and even smaller cities) with the access to civilizational improvements. Diversification of rural investments is very important; balancing production, infrastructural investments and media, access to data, information and the latest technologies can significantly change the previous image of the province and give a new dimension to less attractive (at least for young people) rural living. Apart from that, due to high diversification of the land, long and rich cultural tradition, in combination with still preserved (at least in some countries) natural and usable biodiversity, Europe maintains, now uncommon nowhere else, natural and social wealth. This strong pressure towards progress, while preserving traditions, is an extremely desirable symptom of respect for the individual in society and the cultivation of collective values in the individual (art. 2 C; Q). This feature, today rare in the industrialized world, should be considered the most distinguished element of the countryside, acting for its benefit in the highly competitive, internationalized world of agricultural producers.

In the categories of bioeconomy, next to agriculture, a particular place is taken by the strongly-related food industry. Apart from large producers, there exist a range of micro-enterprises employing only a few workers. Despite that, this is the sector of economy capable of resisting market fluctuations, mainly due to its simplified structure and added value, since regional products, revealing its specific *cultural and ecological load* are recognizable. The food industry therefore still holds unexplored possibilities. Innovation and development of rural areas therefore aims towards:

- producing new food products and fodders, bio-active components of high nutritional values, obtained from components obtained in industrial processing processes;
- adjusting innovative processes for using production waste to launch processing technology and redirecting them to the market as new food and fodder products;
- reducing costs of utilization of agro-food waste and obtaining benefits from this;
- evaluating the efficiency of applied technologies in terms of the possibilities of recovering valuable components from production waste in order to minimize their negative environmental impact.

Forests in our climatic and geographical zone unfortunately are classified as more or less distorted natural formations. Nevertheless, they are still the form of land use ensuring biological production of goods and services of a significant market value. They also constitute, at the same time, the public good, affecting the quality of human life (Mizerski, 2015). They are the part of various ecosystems. However, their efficient use requires improvement of procedures and management.

What is significant is the fact that forests and forestry are of high importance in binding and storing carbon dioxide from the atmosphere – the main cause (it is claimed) of excessively rapid climatic changes. This task – which is even more important – is performed virtually without any costs, and with substantial economic benefit mainly in the form of wood, i.e. the basic raw material for furniture and wood pulp and paper industry, not to mention other benefits in the form of the so-called dendromass (Piszczalka, Koronko, Rutkowski, 2007) and various ecological goods and services. It is difficult to point out all branches and sectors using the forest resources; how many people find related employment, how many work in technologically related companies and institutions, how many find health and relaxation, etc. Measurable profits from wood production can be certainly significantly increased, without restraining only to its preliminary processing and export, but focusing on its advanced processing until the final product. The value of wood, traditionally used mainly in furniture production, can be increased at least by its wider application in bioconstruction and

creating structurally new materials with the use of nanotechnology and composites of high added value. A still significant discrepancy between the primary production and advanced processing and modification of wood or producing wood-based materials, clearly limits economic development.

Biotechnological industry, in turn, gathers those branches of industry which use biological resources and processes operating on the base of lignocellulose obtained from biomass, starch, protein and fats, used in the production of chemical compounds, plastics, biofuel, but also fodders or fertilizers. In this area still there is more to do. It should not be forgotten that the industrial era is ending and the biotechnology era is beginning. The level, and in particular the number of innovations and patents in this regard could certainly be higher, particularly in chemical industry and in the industrial use of biotechnology in production chains. This would probably significantly increase production level and efficiency, while reducing the negative environmental impact. As for today, there are many hopes related to the development of efficient technological formulas for low-carbon biofuels and biodegradable packaging biomaterials. Further on, the needs are related towards obtaining cheap electricity, heat and organic compounds satisfying the expectations of pharmaceutical and cosmetic industries. Very specific expectations towards biotechnology are held by environmental protection, particularly in relation to organic waste (processed in aerobic or anaerobic processes) and water purification after its passage through large urban communities, industry and farming production cycles. Troublesome pollutions may become a source of ecologically pure biomethane, biofertilizers, biogreases, etc. The chemical industry, based on biological resources, belongs to those branches of our economy which expect the particularly strong support of biotechnology and investments, mainly when it comes to constructing biorefineries or modern production lines for biodegradable packages and recovery. Therefore, it is about such cooperation between private and public specialized academic institutions and small, medium and large producers in specific branches which, to a significant extent, would be based on sustainable energy and material economy, effective use of biomass in cascade agricultural production of high added value input, with full respect for local biodiversity and human potential (U).

Marine bioeconomy so far has not proved particularly successful; it would be easier to indicate numerous examples of negligence and the scale of destruction. Perhaps this resulted from the fact that seas and oceans, still up to recently, were considered to be limitless reservoirs of food and raw materials. However, these evaluations proved erroneous. Today, we have an opportunity to revise our way of thinking, and even more, our behaviour. And this is already taking place.

The coast is, first of all, an area of sensitive ecological structures of economic importance. The observable carelessness of previous decades in the protection of water purity provides an evidence of this sensitivity. It is also seen in fishing limitations of economic impact, which enforce minimum exploitation of overfished fish stocks. But marine bioeconomy is not only about pure water and fishing. This is also a possibility to make the economy more dynamic through the development of cheap transport, the construction of safer ports and terminals, the development of aquaculture, tourism and obtaining pure energy. The latter seems to be exceptionally important and attractive (X). What is important, first of all, is the protection of marine ecosystems with their coastal zones, due to which the marine bioeconomy can exist at all, since dysfunctional coastal states provide the threat to marine environment and everything related to this environment (Szafruga, 2013). The availability of basic biological materials at competitive prices in the region makes the starting point for the development of the local bioeconomy. Generally, each of the regions is characterized by a different natural and agricultural landscape, has its own cultural specificity, biodiversity of cultivated plants and bred animals, a different *set* of ecological services offered by the natural environment. Each of them is run by specific motivations and care for maintaining operational agricultural economy, and even more for preserving its specificity, with significant potential still unrevealed. Farmers strive for competitiveness of their own work effects and balancing the local production systems by investing into modern solutions to reduce (also ecological) production costs resulting from the need to apply fertilizers, crop protection products and irrigation. This mainly concerns a wider use of ecosystem services, maintaining and restoring soil fertility, increasing food safety, increasing quality of products and animal welfare and counteracting climatic changes. These efforts are directed towards attempts to use agricultural waste in a broader and purposeful manner and, in peripheral areas, towards the development of specialized crops intended for industry and energy production. It is about promoting innovation and increasing the competition of local production systems.

From the perspective of the local economy, the development of smart specialization strategies, establishing directions for development of most important branches, sectors and areas, should include, first of all, the involvement of local human and natural reserves. Due to their clear diversification, stock-taking of those resources – with a view of cooperation opportunities – is of particular importance for neighbouring regions. Data collected in this way are invaluable in the dialogue with appropriate government authorities responsible for planning and implementing strategies at the central level. In those projects, it

would be good to think also about restoring investments and production structures affected by the crisis. However, this should be done according to new rules and based on local resources in order to improve employment rates, competitiveness and GDP at the regional level, always with an intention to improve the protection level for the environment of the people inhabiting these areas.

Primary raw materials and the use of waste – impact of bioeconomy on the environment and preserving natural capital

Bioeconomy, from the perspective of environmental protection, brings opportunities and challenges. Benefits are generally expected in relation to a systematic shift (as regards production processes) from using non-renewable resources to renewable ones. In this way, the pressure on ecosystems decreases and their efficiency increases. They deserve protection not only because of their own value or their value related to ecosystem services, as they are natural mechanisms impeding anthropogenic climatic and hydrogeological changes, but also because they are the source of services providing measurable economic benefits, e.g. by becoming independent from expensive and hardly available raw materials (Gałuszka, Migaszewski, 2009). Additionally, the development of production possibilities based on renewable sources makes it easier to manage the waste, since it is, to a higher degree, included again into the cycles.

The development of bioeconomy brings not only benefits but also involves challenges. A basic condition is, of course, to balance profits with costs for obtaining products and biological processes applied. The examples of the imbalance in managing environmental goods striving to improve human welfare (particularly in food production and management of living marine resources) are still too numerous. In fact, sometimes there is no actual need to increase the production of primary goods, but only improving their usefulness by increasing their quality. However, it should begin with balancing out economic development with requirements of environmental protection on the local and global scale. The point is to refrain from increasing the value of products in processes using renewable raw materials, but imported from states with less restrictive environmental regulations. This is a quite common way of *transferring* ecological loss from developed states to developing ones.

The heritage of renewable natural resources, including forest, water and soil resources, landscape, plants and animals, and not only food supply, primary raw materials, drinking water and medicinal products, generally constitutes natural capital. Qualitative and quantitative preservation of this heritage provides a huge chance for humanity and environment, as this

will make it possible to use ecological services, with their regulatory functions, supporting and culture-forming (B), which fully deserve to be included in evaluation and planning (at least due to the fact that they are *sine qua non* condition for the existence of every present and future human being). Therefore, it should not be allowed to leave an excessively heavy ecological footprint, i.e. over-exploitation of the environment and unhealthy compromises between marketing and conservation of natural resources. Contemporary agriculture, supported by modern methods for running sustainable and eco-friendly economic activities, apart from placing the emphasis on water purification and soil protection, should contribute to preserving genetic variety (J). This could be achieved, e.g. by improving the existing, and still undervalued local diversity of cultivars from the areas that have been so far neglected or overlooked in economic or infrastructural terms.

Promotion of ecological products in the market increases the demand for local and regional products. With dissemination of knowledge about the impact of logistic processes on natural environment, the structure of the supply chain changes, observable economic, social and economic changes become an impulse for creating short chains of food product supply. It seems that constructing alternative supply chains of this type becomes a developmental tendency in the EU. Following this direction should be conducive to soil protection, preservation of agriculturally used diversity, improving local economies and protection of ecosystems in developing countries.

According to the logic of bioeconomy, protection must go together with economy, therefore using everything that represents any value by restoring it for exploitation. Organic waste is an example of this idea. Generally, it is created mainly through intensification of agricultural production (production of cereal and animal breeding), forestry and wood processing. Particular attention is paid to waste originating from food processing and municipal waste, both in view of its increasing amount and the fact that most of it reaches the landfills, and therefore all that could be reclaimed from it is lost, with a great loss to the environment and consequently, mankind. Obviously, in bioeconomy, recycling opportunities and possibilities change depending on the sources of biomass used in specific branches according to the principle claiming that *it is better to use something that is already being used than to effectively use something that has not been used yet*.

Social aspect of bioeconomy

For creating a mechanism efficiently protecting mankind, i.e. a system integrating economic, ecological and social objectives, it is not enough to process all available biomass and replace fossil raw materials

with the renewable ones. Broad application of biological knowledge in industrial processes is also not enough. The point is that all those transformations should take place at the same time with in-depth changes in social awareness. It is about creating an internal belief about the need to search for new solutions to old problems, paying greater attention to the difficulties encountered by an individual in the anomic environment of an individualized society – encouraging innovative, pro-social thinking in view of difficulties generated by technological progress and the development of science: increasing food quality promotes health and change of life styles, and those in turn stimulate innovation in sustainable manufacturing technologies. Only such thinking can become automatically a kind of pro-ecological thinking. However, in order to properly take advantage of the current transformations, what is needed is a holistic, comprehensive approach to economy. Only then can man – as a citizen, become a real protagonist of social transformations, which he is able to implement by applying bioeconomy principles.

Bioeconomy is, first of all, the challenge-chance-method to integrate activities for solving the current problems of economy, environmental protection and human rights; it is about reaching new economic values through strengthening – and if necessary, also building – new values in the sphere of individual and collective life culture. This requires starting a social dialogue to revive in the individual the ability to build the consensus in public and private life, Sustainability of operations is required from companies and enterprises (through inclusion of clients, employees, users and stakeholders). Bioeconomy will present its possibilities to satisfy social expectations (improving welfare, while strengthening the importance and possibilities of individual activities) through the emergence of new bioproducts, launching bioservices and bioinvestments and an increase in employment rate and intensified cooperation.

On the other hand, in the public sphere, one can expect reorientation of the approach towards development from the perspective of thinking in local categories, i.e. developing investments based on local material and non-material, public and private resources. With this aim in view, monitoring the amounts and availability of renewable resources, strengths and weaknesses of the planned investments, specific needs and limitations, will make it possible to evaluate competence of local capital and/or need to refer to the principle of subsidiarity of central authorities. Developing bioeconomy according to this key will also contribute to strengthening territorial identity (Vergari, 2010).

Legal frameworks and market development

The strategy of bioeconomy is strongly related to national and EU plans and to financing regulations and

rules, making it possible to strengthen specific activities that are to build it. The most important component (in European reality) is certainly the EU legislation. In 2015, the European Commission adopted an ambitious package concerning the development of a circular economy, making it easier for European enterprises and consumers to shift towards a more sustainable method for using resources. This concerns activities supporting *closing the loop* of the life cycle of products by increased recycling and reuse. This is expected to bring profits both for the environment and the economy. It should cause the increase the efficiency of material, product and waste use, and the decrease of energy demand and the emission of greenhouse gases. The proposal is to cover the entire life cycle: from the production and consumption to waste management and secondary raw-materials market. The transformation is financed with EU structural and investment funds, under the *Horizon 2020* programme and with structural funds intended for waste management; also national funds should contribute to investments into the circular economy (S).

The shift towards the circular economy, i.e. the system in which the value of products, materials and resources is maintained as long as it is possible and waste production is limited to minimum, is still a certain ideal of the EU policy aiming at creating sustainable, low-carbon, resource-efficient and competitive economy (N). For implementation of this assumption, a relevant document has been adopted – *Closing the loop – An EU action plan for the circular economy* (W), specifying the objectives and the timeframe for their implementation in order to reduce the rate of resource exploitation and market intensification. The knowledge about the fact that all products affect natural environment during their life cycle, i.e. from the stage of obtaining raw materials and natural resources, through production, packaging, transport, use, recycling until the final neutralization of those products, should be applied even at the stage of the product design. To reach this aim, the EU adopted *Ecodesign Directive 2009/125/EC* (F). This document, with subsequent regulations and other documents important for this issue (e.g.: F, H, G, H), provides the main determinant of the EU policy concerning improvement of energy efficiency of devices and eco-friendliness of products.

Activities aimed at maintaining natural and agriculturally-used biodiversity make an important area for changes at the Euroregional level. This is achieved by the national (P) and EU strategy for protecting biodiversity until 2020 (V). Its task is to standardize and integrate aims of biodiversity protection and sustainable use of natural resources within sector policies. This project is reinforced by the need to fit the global initiatives, as inherently convergent with national and local initiatives, referring to the principles of accessing genetic resources and fair sharing of advantages resulting from their use (R).

Conclusions

Publications increasingly often appearing on the subject of bioeconomy seem promising, especially when they are preceded by numerous reports describing the catastrophic condition of the natural environment caused by the development of agriculture and other industries. However, numerous questions emerge when analysing the situation: if the basic assumptions of bioeconomy have been known and practiced for ages and they are so simple and effective, then why are the postulates for introducing bioeconomy emerging only now, when the environment is pushed to the verge of its abilities and the future existence of the human species is at risk? Is bioeconomy really so human and environmentally friendly, as it is suggested?

Certainly, the need for changes exists. Many objectives, particularly those indicated by the EU, are aimed to be reached through increasing the production of biomass as the raw material for production of biofuel, biodegradable packages and plastics, since energy is always the foundation of each economy, and packages and plastics pose today the greatest ecological problem. However, is it possible that strictly following this approach will bring results that are opposite to the assumed ones, i.e. will we not create in this way an additional ecological and social threat?

The dramatically deteriorating condition of natural environment in developed states forces certain political and legislative activities, which translate into specific investment and economic decisions. Departure from fossil fuels for those obtained from biological matter would need to involve a change in the intended use of some lands used so far for agricultural purposes – from food production to biomass. Without wanting to resign from one's own food security, their production must be *commissioned* to other states, almost certainly outside Europe. Most probably this will be Asia and Africa. In view of low production costs and rather limited possibilities of crop intensification, food production will be reduced there for the sake of non-food but economically more attractive products of European bioeconomy. Probably these countries will mostly suffer ecological and social results of such economy reorganising. In the first place, they are at risk of reducing the production for their own market, degradation of environment, use of chemicals in soils and upsetting hydrological conditions, which undoubtedly will also affect climate changes. Those processes will be accompanied by irrational management of areas so far not intended for agriculture, uncontrolled water acquisition, increased application of fertilizers and plant protection products to increase efficiency – therefore clear, and perhaps even incommensurate, losses for the environment. Where it is still possible, the areas occupied by wild nature will be reduced, as well as places inhabited by the weakest social groups, most often na-

tives and local communities of farmers producing mainly for their own subsistence, who are generally not able to establish their legal status, have no knowledge about the existing possibilities for regulating the access to land; where principles of land use are undisclosed, non-existing or at least are unclear. In effect, the living conditions and food safety of those people is at risk, and economic inefficiency, typically intensified with severe climatic changes, usually results in one thing – a humanitarian disaster and mass migration to other regions of the country, to suburbs or further on (Sodano, 2013).

Will an over-optimistic idea of economically developed states concerning the shift towards biofuel, bioplastics and biological raw materials therefore become nothing more than only a short-term and elusive (exclusively theirs) achievement, the non-economic costs of which (born mainly by others) will be prove incommensurate to the benefits? Will they not reduce emission of greenhouse gasses, pollution with waste and water consumption at the cost of other states and communities already in the disadvantaged position? By developing bioeconomy in an overly spontaneous manner and clearly contrary to principles of intragenerational (and perhaps also inter-generational) justice, will all of humanity bear additional social and ecologic costs, the value of which remains unpredictable?

References

1. GAŁUSZKA A., Z. MIGASZEWSKI, 2009, Problemy zrównoważonego użytkowania surowców mineralnych, *Problemy Ekorozwoju/ Problems of Sustainable Development*, 4(1), p. 123-130.
2. KOŚMICKI E., D. PIENKOWSKI, 2013, In Search of the Present Economy and Society Modernisation Concept (An Attempt to Explain the Main Problems), in: *Problemy Ekorozwoju/ Problems of Sustainable Development*, 8(1), p. 115-123.
3. MIZERSKI R., 2015, Prawa człowieka a ekonomia, in: *Prawo i Więź*, 3(13), p. 16-44.
4. MÖLDERS T., A. SZUMELDA, U. von WINTERFELD, 2014, Sufficiency and subsistence – on two important concepts for sustainable development, in: *Problemy Ekorozwoju/ Problems of Sustainable Development*, 9(1), p. 21-27.
5. PAJEWSKI T., 2014, Biogospodarka jako strategiczny element zrównoważonego rolnictwa, in: *Roczniki Naukowe*, t. XVI, z. 5, p. 179-184.
6. PISZCZALKA J., M. KORENKO, K. RUTKOWSKI, 2007, Ocena energetyczno-ekonomiczna ogrzewania dendromasą, in: *Inżynieria Rolnicza*, 6(94), p. 189-196.
7. SODANO V. (2013), Una valutazione di alcuni documenti pubblici sulla bioeconomia attraverso l'Analisi Critica del Discorso, in: *Agriregionieuropa anno 9 n°34, Set 2013*, <https://agiregionieuropa.univpm.it/it/content/article/31/34/una-valutazione-di-alcuni-documenti-pubblici-sulla-bioeconomia-attra-verso?page=0%25252C0%25252C1%252C0%252C2&qt-eventi=0> (1.12.2018).
8. SZAFRUGA P., 2013, Nadbrzeżne państwa dysfunkcyjne jako źródła zagrożeń dla środowiska, in: R. Kłosowicz (red.), *Państwa dysfunkcyjne i ich destabilizujący wpływ na stosunki międzynarodowe*, ed. Kłosowicz R. ed., Kraków, p. 167-194.
9. VERGARI U. (2010), *Governare la vita. Tra biopotere e biopolitica*, Trento.

Discussed legal acts

- (A) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Innovating for Sustainable Growth: A Bioeconomy for Europe*, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52012DC0060> (1.12.2018).
- (B) UN, 1992, Convention on Biological Diversity, Rio de Janeiro.
- (C) UNESCO, 2005, Convention on the Protection and Promotion of the Diversity of Cultural Expressions.
- (D) *Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009, establishing a framework for the setting of eco-design requirements for energy-related products*, <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0125> (1.12.2018).
- (E) *Directive 2008/98/EC of the European Parliament and the Council of 19 November 2008 on waste and repealing certain Directives*, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098> (1.12.2018).
- (F) *Directive 2004/12/EC of the European Parliament and of the Council of 11 February 2004 amending Directive 94/62/EC on packaging and packaging waste - Statement by the Council, the Commission and the European Parliament*, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32004L0012> (1.12.2018).
- (G) *Directive 2012/19/EU of The European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)*, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0019> (1.12.2018).
- (H) *Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste*, <https://eur-lex.europa.eu/eli/dir/1999/31/oj> (1.12.2018).
- (I) European Commission, 2011, *The European Bioeconomy in 2030, a White Paper*, <http://www.epsoweb.org/file/560> (1.12.2018).
- (J) *International Treaty on Plant Genetic Resources for Food and Agriculture*, Madrid.
- (K) *Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions, Closing the loop – A EU action plan for the Circular Economy*, <https://www.eea.europa.eu/policy-documents/com-2015-0614-final> (1.12.2018).
- (L) *Konstytucja Rzeczypospolitej Polskiej/ Constitution of the Republic of Poland*, Dz. U. z 1997 r. Nr 78, poz. 483, z 2001 r. Nr 28, poz. 319, z 2006 r. Nr 200, poz. 1471, z 2009 r., Nr 114, poz. 946.
- (M) *Regulation (EU) No 511/2014 of the European Parliament and of the Council of 16 April 2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and*

- Equitable Sharing of Benefits Arising from their Utilization in the Union*, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014R05> 11 (1.12.2018).
- (N) *Report on innovating for sustainable growth: a bioeconomy for Europe*, 2013, <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A7-2013-0201+0+DOC+XML+V0//EN> (1.12.2018).
- (O) *Tools for evaluating and monitoring the EU bioeconomy: Indicators*, 2013, http://www3.lei.wur.nl/SAT-BBE_Publications/SAT-BBE%20-%20WP2%20-%20Deliverable%202.2_FINAL_20140116.pdf (1.12.2018).
- (P) *Uchwała Nr 213 Rady Ministrów z 6.11.2015 r. w sprawie zatwierdzenia Programu ochrony i zrównoważonego użytkowania różnorodności biologicznej wraz z Planem działań na lata 2015–2020*, in: *Monitor Polski*, <https://www.cbd.int/doc/world/pl/pl-nbsp-v3-pl.pdf> (1.12.2018).
- (Q) UNESCO, 2001, *Universal Declaration on Cultural Diversity*.
- (R) *Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions, Closing the loop - An EU action plan for the Circular Economy*, 2015, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614> (1.12.2018).
- (S) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Innovating for Sustainable Growth: A Bioeconomy for Europe*, 2015, http://ec.europa.eu/research/bioeconomy/pdf/official-strategy_en.pdf (1.12.2018).
- (T) *Łódzka Deklaracja Bioregionów*, Łódź, 6 października 2016, <http://bioeconomy.lodzkie.pl/wp-content/uploads/sites/5/2017/11/LODZ-BIOCOMMUNITIES-DECLARATIONfinalPL33.pdf> (1.12.2018).
- (U) *BIOTECHNOLOGIA.PL III Międzynarodowy Kongres Bioekonomii*, <http://biotechnologia.pl/biotechnologia/iii-miedzynarodowy-kongres-bioekonomii>, 1456 9 (1.12.2018).
- (V) *The EU Biodiversity Strategy to 2020*, 2011, <http://ec.europa.eu/environment/nature/info/pubs/docs/brochures/2020%20Biod%20brochure%20final%20lores.pdf> (1.12.2018).
- (W) *Closing the loop: Commission adopts ambitious new Circular Economy Package to boost competitiveness, create jobs and generate sustainable growth*, 2015, http://europa.eu/rapid/press-release_IP-15-6203_pl.htm (1.12.2018).
- (X) *PULS BIZNESU*, 2018, *Czas złapać wiatr od morza*, <https://www.pb.pl/czas-zlapac-wiatr-od-morza-902816> (1.12.2018).

