

# The Holism Principle in Agriculture Sustainable Development

**Józef St. ZEGAR and Wioletta WRZASZCZ**

**Institute of Agricultural and Food Economics-National Research Institute, Poland**

**Abstract:** The idea of sustainable development, extended at the end of 20th century, takes the form of a strategic concept in the field of socio-economic development in many countries and their regional groupings. It is also being promoted by international organizations, considering the United Nations and NGOs. The concept usually involves three aspects, namely environmental, economic and social, in formulating corresponding goals and ways of achieving them. The implementation of this concept is a huge challenge due to the nature of market mechanism. This concept also applies to agriculture, which is a complex system. Sustainable agriculture should be considered at the different levels of vertical order – in particular at the level of agricultural holdings (microeconomic level), state (macroeconomic level) and global (planetary level). The order determines the hierarchy of objectives for agriculture sustainable development and measures to achieve them. Economic objectives are the most important in the case of farms, while social goals should dominate at the state level. At the global level, environmental objectives are particularly significant, because of biosphere natural limits. Defining socially rational solutions require holistic approach to agriculture sustainable development. This applies both horizontal analysis (different aspects, different purposes, different activities), as well as vertical considerations (taking into account microeconomic, macroeconomic and planetary level). The aim of paper is to present the significance of the holistic approach in the implementation of sustainable development principles at different agriculture levels – farm, sector, global.

**Keywords:** the holism principle, agriculture sustainable development, agricultural holdings, microeconomic, macroeconomic and planetary level

**JEL codes:** Q01, Q10, Q12, Q13, Q56

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## 1. Introduction

The idea of sustainable development, popularised at the end of the 20<sup>th</sup> century, has arisen from the reaction to the emerging environmental barrier to the continuous economic growth. Admittedly,

this barrier has already marked its presence in ancient times, however, on a global scale it started posing a threat to civilisation in the second half of the 20<sup>th</sup> century. A significant contribution to making people aware of the environmental barrier was made particularly by the reports of the Club of Rome, giving the scientific and political communities a stimulus to become interested in this issue. The environmental limitations have been included into a metaphor of the empty world which the humanity has faced for thousands years and of the full world which it faces now. Making people aware of the fact that the Earth has its limitations as a planet and as a global ecosystem (biosphere) resulted in a need to take it into account in the socio-economic (civilisation) development, which was expressed in the idea of ecodevelopment. However, it turned out soon that the development also had to take into account many other factors which affect achieving the objectives of the civilisation development with various relations with the natural environment (pressure on this environment). Therefore, the idea of ecodevelopment has been modified and transformed into the idea of sustainable development.

The idea of sustainable development takes a form of a strategic concept in the field of socio-economic development in many countries and their regional groupings. It is also promoted by international organisations, including the United Nations. This concept usually includes three spheres (aspects) of sustainability, namely, environmental, economic and social and formulates the corresponding objectives and ways of achieving them. Depending on the situation – specific conditions and the level of development – various concepts of sustainable development are formulated, which increasingly often take a form of government programmes covering the entire economy or just its individual segments, and more ambitious programmes try to encompass the entire scope of civilisation development.

The concept of sustainable development is not uniformly understood and defined. The discourse is designated by two lines of thinking. The first takes as a basis the relations between the spheres i.e. a certain equilibrium. The second takes as a basis the meeting of certain criteria – critical thresholds of sustainability in the individual spheres (see Zegar ed., 2005; Toczyński at al., 2013).

The concept of sustainable development also refers to agriculture, whereby agricultural sustainability should be considered at all levels of management of the agricultural system<sup>1</sup>. This

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<sup>1</sup> Agricultural sustainability is defined by four generally agreed upon goals: 1) satisfy human food, feed, and fiber needs, and contribute to biofuel needs; 2) enhance environmental quality and the resource base; 3) sustain the economic viability of agriculture; 4) enhance the quality of life for farmers, farm workers, and society as a whole. To be sustainable, a farming system needs to be

system determines the hierarchy of the objectives of agriculture sustainable development, optimisation criteria and actions to achieve the adopted objectives. In case of agricultural holdings (microeconomic level), overriding are the economic objectives. At the level of states (macroeconomic level), priority belongs to the social objectives, while at the global level (planetary level), the most significant are the environmental objectives due to the natural limits of the biosphere.

Poland, like the entire European Union, has taken a strategic direction towards agriculture sustainable development. Also, development strategies of local government units in Poland are generally oriented towards sustainable development. The general course of development according to the model of sustainable agriculture has been chosen as the one which corresponds to the values and requirements of overall socio-economic development. Owing to the multidimensionality of the agricultural system, there are many options related to the individual dimensions. Essential are the options designating the entire string of choices shaping the direction of agriculture development in the long term. This is the case of technology, for which the choice is determined by industrial technology and agro-environmental (organic) technology. In case of organisations, the choice is determined by collective (social or corporate) holdings and private holdings (family and capitalist). In case of the production orientation, the choice is determined by self-supply and market – either global or local. In case of relations with other entities (links) of the food chain, the choice is determined by the market and vertical integration (*agribusiness*). We may not also ignore the spatial allocation of the agri-food production: the degree of concentration and regional or local specialisation.

Finding socially rational solutions requires a holistic approach to agriculture sustainable development. This applies to both the horizontal range (various aspects, objectives, actions), as well as to the vertical range (taking into account various levels: micro-, macroeconomic and planetary). What is helpful and even necessary in solving problems of agriculture sustainable development is a holistic approach to the concept itself and to a strategy of such development.

The aim of the paper is to present the significance of the holistic approach in the implementation of sustainable development principles at different agriculture levels – farm, sector, global.

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sufficiently productive, robust (i.e. be able to continue to meet the goals in the face of stresses and fluctuating conditions), use resource efficiently, and balance the four goals. See: (National Research Council, 2010).

## **2. From industrial agriculture to sustainable agriculture**

Agriculture development has found itself at the crossroads, whose two main paths are designated by a model of industrial agriculture and a model of sustainable agriculture. The first model results from the process of agriculture industrialisation, started in the 18<sup>th</sup> century, which synthetically includes five phenomena, namely: 1) intensification of agriculture by using industrial means of agricultural production, 2) concentration of the production potential (land and capital) and production, 3) specialisation of holdings and entire regions, 4) commercialisation and, nowadays 5) financialisation. The industrialisation of agriculture was accompanied by implementing the achievements of technical, agronomic and genetic progress while technological changes enabled a simultaneous increase in the land and labour productivity, which, in material terms, is expressed as a metaphor of “cheap and abundant food” referred to industrial agriculture. Industrial agriculture is valued for its abundant production and high labour productivity, while criticised for the low health quality of food, environmental degradation and violation of the rural area viability.

Adverse effects, particularly environmental and social, of industrial agriculture are an important, but not the only one, condition of becoming oriented towards an alternative model of agriculture. Important conditions are also associated with the growing demand for new goods and services provided by agriculture, food security in the broad sense, social cohesion and the criticism of the previous formula of progress. As an alternative to the industrial model, the model of sustainable agriculture is adopted, which takes many forms and is based on four key attributes, namely: multifunctionality, sustainability, inclusion of and the use of policy (institutional factor). Of fundamental importance is the requirement to include full externalities into the cost-benefit account of this model, so as to achieve the compliance between the microeconomic optimum and the social optimum. In conditions of seeking agriculture sustainable development, family holdings are given a new opportunity of development, which they were deprived of at the times of industrialisation, since the economies of scale may be achieved as part of a family holding.

In the model of sustainable agriculture, of importance are all spheres: environmental, economic and social. With regard to the environmental sphere, the most important seem to be the following ranges: 1) protection of biodiversity – striving for stopping a trend of its reduction; 2) soil protection – striving for stopping the degradation and reduction as well as for renewal and even increasing of fertility; 3) climate protection – stopping global climate warming by reducing greenhouse gas emissions and increasing carbon sequestration by soil; 4) protection of freshwater

– prevention of degradation (pollution) of water and its economical (rational) use; 5) protection of mineral resources, especially energy resources for energy generation, chemical fertilisers and pesticides (chemical plant protection products) as well as phosphates and other minerals. With regard to the economic sphere, it is about, first of all: 1) creating value added enabling the parity (satisfactory) labour rate; 2) parity agricultural income and income of a family managing an agricultural holding; 3) profitability of involved capital at a level comparable with other sectors; 4) competitiveness. With regard to the social sphere, it is about: 1) food security; 2) social acceptance; 3) viability of rural areas; 4) social inclusion; 5) elimination of poverty. Owing to the disharmony between the above-mentioned spheres, the problem consists not only in searching for ways to achieve them but also in a possibility of balancing them – finding a lowest common denominator or shared space.

The orientation towards agriculture sustainable development is not the field of the market, which justifies a need to include the political factor. In particular, it is about externalities, which in case of the agricultural activity are particularly important or their sizes are significant. This is directly related to the multifunctionality of agriculture, which produces, in addition to market products, also some goods not being a subject of market transactions. The former include products intended for direct or indirect – via agri-food processing – human consumption, products used in the agricultural production process (seeds, seed potatoes, fodder) and products constituting raw materials in other sectors of the economy. The latter include goods and services relevant to the other due to their impact on the natural and socio-cultural environment. These former products are priced by the market and the farmer is paid for selling them. The latter are not priced by the market, and the farmer is not remunerated for their production (provision).

There are significant differences between agriculture and other economic sectors when it comes to formulate externalities. With regard to negative (environmental) externalities, outside agriculture they are significantly internalised by implementing the *polluter pays principle (PPP)*, while in agriculture this principle has not been virtually applied so far, i.e., agriculture did not experience the effects of environmental pollution or excessive use of its resources (e.g. groundwater). Only recently has this principle been introduced into the legislation on agriculture, directly, or through the code of good agricultural practices which restricts the rights of farmers to use agricultural land so that the costs of avoiding environmental damage were incurred by the

farmers (in accordance with the *PPP*). On the other hand, preferring the requirements to those practices entails the costs for farmers, which should be fully rewarded by the public.

The model of sustainable agriculture is based on a new methodological approach. First of all, it abandons the reductionism to the benefit of holism when it comes to perceiving agriculture. This is expressed, *inter alia*, by questioning the far-reaching detachment of agricultural production processes from the natural environment, as well as relying mainly on exhausted and non-renewable resources. Here, an emphasis is put on the use of the laws of Nature and knowledge – the factor which is not only renewable but also self-multiplying thus practically inexhaustible. The objective of agriculture is not only the process of producing agricultural products (not only technology) and not just a “machine” used to generate added (only market) value, but also many other environmental, social, cultural goods and services. The process understood in this way is not just a conversion of means of production into ready-to-use agricultural products, but rather a complex and not completely recognised mixture of biological, biochemical, economic, social and other processes, as a result of which goods and services of various types to serve the people and nature are created (Woś, Zegar, 2002).

### **3. Research method of agriculture sustainable development**

The complexity of the dilemmas to be settled on our way to sustainability, i.e. those related to the fulfilment of the concept of sustainable development, also poses a great methodological challenge for the science itself.

In the methodology of sciences, especially social ones, two approaches clash – the approach arising from the Euclidean-Cartesian tradition and the approach arising from the Babylonian tradition. The first one refers to the achievements of Euclid, Cartesius and Newton and is based on the axiomatic and deductive approach describing the phenomena as a deterministic system (as a certain mechanism) determined by causes and governed by certain laws. This approach consists in dividing an analysed system (object, phenomenon) into parts (reductionism), analysing these parts and then trying, by way of deduction, to refer the determined standards (rules) to the entire system. In the social sciences, including economic ones, this approach started dominating with the development of Capitalism and classical economic theory. It uses more and more sophisticated quantitative methods both for describing (analysing) structures and for predicting. The second

approach, referred to as the Babylonian tradition and derived from the Babylonian Talmud and the Stoics, was developed by, *inter alia*, Aristotle and Bacon. Its essential feature is that instead of reductionism, it applies holism, i.e. a holistic approach to an analysed system – it explains the world “*in accordance with nature and reason and by stressing the importance of the moral standards in human life*” (Stankiewicz, 2007: 17). This approach, after a few hundred years of being nearly forgotten, is in revival again, as it turned out that the reductionist approach is not sufficient to explain the real world.

The principle of holism<sup>2</sup>, applied in many disciplines of science, is gaining in importance in practical activities. In accordance with this principle, the phenomena approached in the systemic way cannot be reduced to a sum of elements, or in other words – the whole cannot be reduced to a sum of its components. This gives rise to a methodological postulate which states that in explaining social phenomena we should focus on analysing the whole and not just the individual elements thereof, as only then we may determine the rules of the whole which cannot be inferred from the rules governing their elements. Also due to the emergence, i.e. the appearance of new characteristics and properties at the higher levels of the hierarchical structure of systems, *inter alia*, as a result of linkages (interactions) of subsystems and formation of new subsystems in the environment of the given system. The principle of holism is very much appropriate in case of agriculture and all the more programming of agriculture sustainable development. Agriculture, in fact, represents a very complex socio-economic system – a certain whole with the hierarchical structure of various-level subsystems it is composed of, and with many aspects and internal linkages and interactions with the environment. Internal linkages refer to relations among the elements of the system. These elements are, in fact, subsystems, i.e. lower-level (lower-order) systems or systems representing a “smaller” whole. According to the theory of systems, the environment of the agricultural system is the superior system representing a set of other systems.

The complexity of the agricultural system also requires a complex methods of his analysis. This refers to the analysis of the agricultural system in static terms and all the more in dynamic terms. While in statics the point is to analyse structural linkages and components (elements) of the system, in dynamics it is also about analysing driving factors (forces) of its development – changes

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<sup>2</sup> The concept of holism (Gr. *hólos* – entity) was introduced by Jan Smuts in the 20s of the 20th century (Heywood, 2007: 280). Now the holistic approach (the holism principle) returns to the arena – also because of the awareness of the complexity of the socio-economic systems and the increasing planetary consciousness, (see f. i.: Hanson, 2014; Martin 2016).

over time. In particular, it is about avoiding the fallacy of composition and the use of the synergy effect.

In case of agriculture sustainable development, the principle of holism applies both to the systemic formulation of this development and to programming a strategy to control this development. In the first case, it is about reflecting the multifunctionality of agriculture, determining objectives and desired levels of their achieving as well as multidirectional relations among them. In the second case – programming of a strategy to control agriculture sustainable development – it is about establishing the objectives of such development and identifying instruments of impact on the real system so as to achieve the adopted objectives. In fact, it is about a policy or involving an institutional factor in making the adopted objectives be achieved, with as little effort and resources as possible, i.e. in the best manner. And here, the problem of the optimum criterion appears, which expresses the range of using the principle of holism.

In the conditions of Neoliberal Capitalism, the optimum criterion comes down to maximising economic benefits which is done by improving the productivity (efficiency) of management and ignoring externalities in the economic calculation – reducing public goods and transferring external costs to others: taxpayers and future generations. This is stimulated by the requirement for competitiveness, expressed by a maxim: *run faster than others or die*. This criterion corresponds to the reductionist approach – the theory of (Neo)classical economy. The optimum designated in this way deviates from the social optimum, as ignoring externalities gives rise to a discrepancy between the private (microeconomic) calculation and the social (macroeconomic) calculation. The principle of holism is taken into account only by the multicriterion function of the objective, which also includes the externalities.

The application of the principle of holism in programming of agriculture sustainable development is similar to the real rationality<sup>3</sup> – an important praxeological principle<sup>4</sup>, which directly translates into the effectiveness of management<sup>5</sup>. The strictly economic rationality is

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<sup>3</sup> Distinguishing between the real rationality and the methodological rationality was introduced by Kotarbiński (Kotarbiński, 1973: 134).

<sup>4</sup> Praxeology is in search of the conditions for the rationality of action in general, and the economy – of the conditions for the rationality of management (Kotarbiński, 1973: 381). In general sense, the term „rationality” means „*the application of adequate measures to achieve the well-defined objectives...* while for an economist, the rationality means „*making a choice consistent with the ranked set of preferences...maximisation of expected utility*” (Blaug, 1995: 334).

<sup>5</sup> Effectiveness of one of three members of smooth operation, namely *cost-effectiveness*, which is a ratio of a useful result to operating costs. The rest of the members are *efficiency* (action should lead to an effect intended as an objective), and *profitability* (expressed by a difference between the useful result and all operating costs – intended and unintended) (Kieżun, 1977: 44). In the theory of economics, the rationality is associated with the effectiveness of management: “*in the theory the economics, the effectiveness is an expression and a measure of the rationality of management, the more effective is some action, the more rational*

imperfect, although it corresponds to the market needs. The management process is also a social process, which justifies a need to strive for the socio-economic rationality<sup>6</sup> or the social and economic rationality<sup>7</sup>. This rationality appears on a basis of conscious shaping of socio-economic processes. The criteria of this rationality should relate to the objectives of activity and the measures and methods of operation (the allocation of economic resources and systemic and institutional solutions). In this case, a problem of ethics appears: “*taking the paradigm of conscious shaping of development processes makes the economy face a new challenge concerning the inclusion of ethic appraisals into economic considerations*” (Pajestka, 1983: 121). This rationality is akin to the concept of ecological rationality in the sense of V. Smith<sup>8</sup>.

The problem is complicated by the hierarchical structure of the system expressing agriculture sustainable development. It turns out that achieving the optimum at the level of subsystems (elements, parts) does not always mean achieving the optimum at the level of the whole. It is the effect of the fallacy of composition. Therefore, in the strategy of agriculture sustainable development, it is necessary to act for the balance between agriculture functions (horizontal objectives), and for the balance between vertical levels.

The rationality, just like the effectiveness, has a different content at different levels of management. In general, we identify the microeconomic rationality and macroeconomic rationality. The former occurs at the level of economic entities and generally is called the private rationality. The latter occurs at the macro-level and is called the social rationality. Along with the globalisation and the emergence of absolute environmental barriers – the concept of the rationality at the planetary level appeared, known as the global, existential, planetary rationality.

The microeconomic rationality is used to optimise (maximise) the benefits of an economic entity from management and consists in „*application of the principle of economy for achieving the private objective, for maximising private profit; it is not used to serve any purpose including the overall economic activity of the society*” (Lange, 1967: 224). The microeconomic rationality is

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*it is*” (Sadowski, 1980: 88). In the conventional (classical) effectiveness calculation, effects and inputs are quantified. In this situation, each improvement in the effectiveness is profitable – consistent with rational action. This calculation has been challenged due to ignoring externalities, many of which are not quantifiable, as well as due to new objectives and constraints of management. This gave rise to a need for a new approach to the rationality of management (Stacewicz, 1988: 7). In particular, it was accepted that in the formula of the effectiveness calculation, the effects do not need to be fully quantifiable, and it is enough for them to have a form of a value – they may be ordered in terms of valuation: one is bigger than the other, while inputs must be quantified (Lange, 1964: 12-13).

<sup>6</sup> As once indicated by Secomski (Secomski, 1978: 43).

<sup>7</sup> As, in turn, proposed by Pajestka (Pajestka, 1983).

<sup>8</sup> See: (Smith, 2013).

supported by the classic economic calculation based on the neoclassical economic theory. The macroeconomic rationality takes into account the aspect of production and distribution of the social product and „*consists in allocating production factors in a manner which allows to achieve the highest possible rate of the economic growth, acceptable from the point of view of the economic equilibrium*” (Stacewicz, 1988: 16). The social rationality is supported by the social economic calculation based on the theory of ecological economics. This calculation should include the externalities and limited environmental resources, since their inclusion in the macroeconomic calculation creates a basis for the social optimum (Zegar, 2010: 262).

#### **4. Microeconomic level**

The agricultural holding may be taken as a certain organic entity representing a more or less complex system. In practice, we can use either the reductionist or holistic approach and actually it is about the approach closer to reductionism or holism. The agricultural holding may be treated only as a production system, economic system or social system, which, in fact, does not exhaust possible approaches. With regard to family agricultural holdings, it is appropriate to treat the holding as a social system mainly due to family (household) ties. We may find the examples of a systemic approach to the agricultural holding in the organic school of organisation and economics of agricultural holdings<sup>9</sup>, also shared by the Polish agricultural economists<sup>10</sup>. There were also attempts to directly formulate the agricultural holding as a production and economic system<sup>11</sup>. In functional terms, the system of the agricultural holding includes the processes of: production, consumption, circulation, reproduction and control (Zegar, 1985: 49). However, in organisational terms, the system of the agricultural holding includes sections and branches of agricultural production i.e. plant species expressed in the structure of sowings and the animal species i.e. livestock density, for which local natural and economic conditions are the most favourable.

The holistic approach to sustainable development of the agricultural holding requires determining the content and relations among the aspects of sustainability, objectives and optimality criteria under dynamic conditions. The key issue is the way of achieving the objectives by the farmer, and the impact of the policy so that the optimum sought by the farmer deviates, to the

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<sup>9</sup> Cf. e.g. (Blohm, 1965).

<sup>10</sup> Cf. (Manteuffel, 1981).

<sup>11</sup> Cf. (Zegar, 1975; Seuster, 1975).

lowest extent possible, from the optimum established by the superior system (i.e. at the macroeconomic level).

In the economic aspect, the major, so not the only one, objective of the farmer is to achieve income. The optimality criterion may be – depending on a specific situation – either the volume of income or the ratio of income to total inputs or only to labour inputs. Achieving the economic objective entails specific effects in the aspects of sustainability: social and environmental. The income carrier are agricultural products meeting the social need (responding to the demand). In particular, it is about a contribution to an important social objective i.e. food security. The production of agricultural products requires labour inputs and thus creates jobs, which, together with income is an important contribution to the viability of rural areas and to prosperity in general. The production of agricultural products takes place using the forces of nature – in particular, soil and water, but also less tangible factors: biodiversity and air. The farmer does not directly formulate the objectives with regard to the environmental aspect, although is generally interested in the land productivity and maintaining the soil fertility. However, in his calculations he does not take into account externalities – either negative or positive – which accompany the agricultural production and are important for the social (macroeconomic) system. These effects largely depend on the agricultural practices in the agricultural holding. These practices are mainly determined by convergence with the economic objective of the farmer. As a rule, in the static situation, the economic optimum of the holding is achieved by agricultural practices resulting in the excess of negative externalities and shortage of positive externalities, since this positively correlates with the economic objective of the holding. This increases the divergence between the microeconomic optimum and the macroeconomic optimum. In this situation, political institutions come into prominence which by means of administrative-legal instruments may discourage the undesirable practices in the light of the macroeconomic criterion (optimum), and by means economic instruments they discourage (charges, penalties) or encourage (subsidies) specific agricultural practices.

## **5. Macroeconomic level**

At the macroeconomic (state) level, the agricultural system includes, in addition to agricultural holdings, also many other entities involved directly and indirectly in the process of agricultural

production as well as entities of the system regulatory body (policy). The objectives of such a system are social, not strictly economic, as in case of economic entities. The holistic approach requires an integral approach to all spheres of sustainable development of the economy with the priority given to social objectives<sup>12</sup>.

The strategy of sustainable agricultural development, regardless of the country and stage of socio-economic development, should contain at least three generally formulated social objectives related to food security, natural environment and social well-being.

From the ancient time, food security has been a primary and inalienable objective of agriculture as the manufacturing (production) sector. Currently, the issue of food security includes, in addition to the supply of agri-food products, also the economic availability of food, the quality of food, the level of food sovereignty and the impact of the agri-food system on the natural environment. An increase in production of food by means of many new industrial means of production and new technologies in agriculture and by higher “added value” in the food industry did not remain without any effect on the quality of food, which admittedly improved in terms of organoleptic characteristics, but became less natural and often, paradoxically, harmful to health. Improving the economic level of the societies increases the interest in the food quality. Although the lion’s share of the individual demand will be targeted, in the foreseeable period, to industrial agriculture products, which are cheaper, despite the higher prices the segment of the market of organic farming products with high nutritive and health qualities is growing quickly. With the increasing ecological and health awareness, increasing level of income and decreasing share of food expenses in the structure of household expenses, the role of the price gives way to the broadly understood quality.

The turbulence in the market agri-food in the second half of the first decade of the current century undermined the market exclusivity in guaranteeing food security. What is more – the way of producing and sharing food is regarded as an element of the food security system. This is a response to the changing food system – from traditional, local and then national to global, in which the leading role is played by corporations and large commercial chains. Neoliberalism promotes the idea that only this system may guarantee food security in the most efficient way. It is clear, however, that capital subordinates the agri-food system for profit and not for nutrition. This system

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<sup>12</sup> The economy may not be separated from social objectives, particularly on the macroscale (the state implements social objectives) but also on the microscale (Galbraith, 1979).

is economically efficient, but encumbered with externalities which make it socially inefficient. The result of it are emerging alternative food systems, and the return to the concept of food sovereignty<sup>13</sup>. The actions of urban agglomerations for creating urban food systems are also following this direction.

The global ecosystem (biosphere) is finite and contains limited resources both in terms of raw materials which can be used for economic development, as well as possibilities of accepting and disposing emissions resulting from economic development, and the anthropocentric pressure in general. In this regard, apart from the extreme views, there is a consensus as to the conflict between economic development and the environment. This is reflected in the already established facts of exceeding 3 of identified 9 biophysical thresholds (Rockström et al., 2009: 472-475). For this reason, the protection of the natural environment is the undisputed social objective. In this context, we should approach industrial agriculture practices which may not be continued in the long run.

The depletion of non-renewable resources providing raw materials for further processing into agricultural products will limit the volume of these products, but continuous progress may provide effective substitutes for these materials. However, there is no certainty – also as to the environmental effects of possible substitutes. Also, the capacity of the natural environment to absorb (dispose) anthropogenic impacts has been exceeded, a clear example of which is the reduction in biodiversity as well as climate change. It distinctly results from it that the ecosystem of the globe is becoming a barrier to the growth according to industrial technologies. This means that a further increase in the agricultural production will need to be achieved using the growing knowledge and innovation and biomass based on the use of solar energy. Admittedly, these conditionings apply to rural development in general, regardless of the specific model – industrial, sustainable or mixed – but their relevance to the identified models is not identical. In case of agriculture, as essential we must consider limited environmental resources directly involved in the process of agricultural production (land, water, energy minerals), affecting the efficiency of transformation of inputs into agricultural, climate and ecosystem change (biodiversity).

Social well-being in the broad sense of this concept is the primary social objective. The scope of this concept goes beyond the subjective individual sense of happiness and satisfaction

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<sup>13</sup> In this area, numerous social movements act, with La Via Campesina in the lead – promoter of food sovereignty based on small family holdings.

with life (Phillips, 2006). In case of social well-being, this scope includes, *inter alia*, material and immaterial living conditions, social order (social disparities and inequalities, social security, inclusion of social groups into shaping the forms of community life, elimination of unemployment and social exclusion, preservation of the natural environment for future generations, etc. (Auleytner, 2002). A new element in the agri-food system is the demand for goods and services produced by agriculture – accompanying agricultural production – which are not commercial. It is about so-called externalities – in the given case, positive externalities. They are important and even necessary for the continuous functioning of ecosystems and for so-called social well-being. The problem is that the needs in this regard do not translate into the market demand. This demand must be created or these needs must be satisfied in any other way.

Important are also relations within a given community. In particular, this applies to the social cohesion. Capitalist modernisation of agriculture undermined the social cohesion – causing significant social costs, especially in the field of the natural environment, deprivation of peasants and the loss of cultural values. These costs, according to the Orthodox Marxists and Neoliberals, are the “*necessary price of progress*” (Bernstein, 2010: 304).

The achievement of social objectives requires the commitment on the part of the state (policy), which should articulate such objectives and take activities to achieve them. These activities include the redistribution of the generated economic surplus, allocation of providing the agricultural system with means of production and creation of boundary conditions for the operation of autonomous economic entities, so as to make the economic and social optimum closer. To this end, the policy may use economic instruments encouraging the provision of public goods and discouraging the generation of negative externalities, as well as legal-administrative instruments (order or prohibition to take certain activities). It is important for political institutions to follow the criterion of social rationality and the social optimum.

## **6. Global level**

Agriculture at the global level should be perceived as a particularly complex socio-economic and natural system. The complexity of this system results from the diversity of its components and interrelations, specific characteristics, strategic dilemmas, structure of the objective, optimisation criterion and necessary actions.

The scope of the system of agriculture sustainable development at the global level covers agricultural systems of the individual countries, transnational corporations, international institutions with the regional and global coverage, non-governmental organisations, natural resources, in particular, those being common and public goods.

The complexity of this system is stressed by the huge diversity of agriculture in the individual countries and regions in terms of natural and socio-economic conditions, the level of advancement of the agricultural modernisation process, including technological and technical progress, the level of socio-economic development determining the importance of agriculture in the national economy, ways to guarantee food security while reducing the pressure on the natural environment.

The systemic approach to global (planetary) agriculture requires including, apart from national agricultural systems, also global public and common goods and institutions at the global level. It is necessary to take into account the different level of development (productivity, efficiency) of agriculture in the individual countries and regions and, at the same time, the various effects of the emergence of the global agri-food market. It is also necessary to take into account the increasing role of corporations and the phenomenon of financialisation, but, at the same time, the growing social resistance of small producers, consumers and environmentalists. On the one hand, the awareness of a need to protect the environment is growing (imperative), but on the other, the conflicts of interest in this regard are increasing and posing a threat of even armed conflicts. At the planetary level, the absolute limitation of the natural potential for agricultural production (land, water, climate) and the need to intensify agriculture in a sustainable way are becoming visible.

We may identify some specific characteristics of the system of agriculture sustainable development at the global level, namely:

- existence of the absolute limit of using natural resources (land and water) for agriculture and growing restrictions with regard to climate, energy from fossil fuels and biodiversity;
- weakness, if not the absence, of the system regulator at the global level (no global government, defects of law – arrangements according to the common denominator principle, networks of non-governmental organisations – NGOs);
- in the hierarchy of objectives, food security, reducing phenomena of poverty and hunger must be treated equally, while not exceeding the limits of the biosphere with regard to the basic geochemical processes;

- adoption the criterion of ecological (existential, planetary) rationality as the overriding one;
- conflicts of interests among entities (elements) of the system.

At the global level, there are some strategic dilemmas. They relate to:

- the choice of the development path of agriculture in the countries dominated by peasant agriculture: following the industrial path which was covered by highly developed countries or taking a short cut – towards sustainability, taking into account the diversity of conditions of agricultural development and the advisability of limiting the phenomena of poverty and migration to urban slums;

- the establishment of such rules of international trade so that benefits were used by all participants in the market and so as to achieve the planetary optimum;

- determination of the boundary conditions for the activity of transnational corporations, to avoid increasing inequalities and to improve well-being of the planetary community;

- international agreements on the sustainable and optimal use of global common and public goods, to avoid the trap of the lowest common denominator;

- the creation and dissemination of innovation for the benefit of well-being of the planetary community and not just of corporations and highly developed countries.

The possibilities of resolving these dilemmas should be considered in the context of globalisation driven by powerful forces, especially IT technologies, transnational corporations, capital markets, consumerism. The globalisation, by abolishing restrictions for the unhampered operation of the market mechanism, is in opposition to a need for the sustainable use of resources of the biosphere. Corporations, in fact, are guided by the private (corporate) rationality and maximise their function while not taking into account externalities, including global public goods and global common goods, or the scarcity of the biosphere. The globalisation imposes solutions beneficial to the developed countries, in particular, with regard to access to cheap raw materials, new outlet markets, favourable allocation of excess capital. The mechanism of the global market implementing the microeconomic rationality – in this case, the optimum of large corporations – does not properly estimate (understates the prices) many critical resources and does not estimate at all many environmental services.

The excess of negative externalities on a global scale is difficult to control and this is due to the absence or weakness of the institutional (political) factor at the global level – problems with making and enforcing relevant arrangements. At this level, a mechanism of charging for negative

externalities or remunerating for global public goods has not been developed yet. At most, attempts are made to stop the degradation of such goods (prevention of destruction of tropical forests, protection of ocean fisheries, prevention of pollution of the seas and oceans, preservation of traditional varieties of crops and animal species). Actions taken by international organisations are incidental and inconsiderable in relation to the needs. The currently existing financial mechanisms do not handle global problems to a sufficient extent.

The use of the resources of the biosphere at the global level requires following the planetary rationality by analogy to the social rationality at the level of states. In any case, there is a need to approach the category of rationality and its optimisation in global (planetary) terms. Unfortunately, the globalisation in the political sphere does not keep up with the globalisation in the economic sphere, which does not counterweight the corporate power in achieving the private (corporation) optimum. And this does not allow to achieve the planetary optimum. In this regard, agriculture is somehow peculiar.

The governments of many developing countries continue their policy of developed countries from the industrialisation period: cheap food, while protecting the home industry (price rise). Consequently, agriculture develops according to the dual model: on the one hand, capitalist (corporate) farms develop which produce mainly for export (tropical and subtropical products, feed, biomass for biofuels) and for richer urban strata. They use cheap labour force and often overexploit the natural environment. On the other hand, peasant holdings are differentiated: some are subject to proletarianisation (hired agricultural workers – labour force for capitalist farms, migration to cities), some vegetate, some become stronger and move towards farms).

## 7. Conclusion

- The complexity of the issue of agriculture sustainable development invites to apply the holistic approach in programming and managing this development.
- The holistic approach is characterised by the differing scope and method of operationalisation depending on the level of management (microeconomic, macroeconomic, global).

- The absence of the strategy for agriculture sustainable development usually results from a short period (short horizon) followed by political institutions (the aftermath of tenure) and corporate economic entities.
- The strategy for sustainable development at a lower level should be within the limits outlined by the superior system.
- The protection of the global common and public goods is hampered by the absence of global institutions managing these goods, while international agreements are not much effective due to the common denominator rule and insufficient enforcement.

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### *Zasada holizmu w zrównoważonym rozwoju rolnictwa*

#### *Streszczenie*

Idea zrównoważonego rozwoju, upowszechniona pod koniec XX wieku, przyjmuje postać koncepcji strategicznej w zakresie rozwoju społeczno-gospodarczego w wielu krajach i ich ugrupowaniach regionalnych. Jest ona także promowana przez organizacje międzynarodowe, na czele z ONZ. Koncepcja ta zazwyczaj obejmuje trzy aspekty, a mianowicie środowiskowy, ekonomiczny i społeczny, formułując odpowiadające im cele i sposoby ich osiągnięcia. Wdrożenie tej koncepcji stanowi ogromne wyzwanie ze względu na specyfikę mechanizmu rynkowego. Koncepcja ta odnosi się również do rolnictwa, które stanowi złożony system. Zrównoważenie rolnictwa należy rozpatrywać na różnych poziomach układu pionowego – w szczególności na poziomie gospodarstw rolnych (poziom mikroekonomiczny), na poziomie państw (poziom makroekonomiczny) i na poziomie globalnym (poziom planetarny). Układ ten determinuje hierarchię celów zrównoważonego rozwoju rolnictwa oraz działania służące ich osiągnięciu. Cele ekonomiczne są nadrzędne w przypadku podmiotów gospodarczych, zaś cele społeczne powinny dominować na poziomie kraju. Na poziomie globalnym za najistotniejsze należy uznać cele środowiskowe, ze względu na naturalne granice biosfery. Znajdywanie racjonalnych społecznie rozwiązań wymaga holistycznego ujęcia zrównoważonego rozwoju rolnictwa. Dotyczy to zarówno zakresu poziomego (różnych aspektów, różnych celów, różnych działań), jak i układu wertykalnego (uwzględniania różnych poziomów: mikro- i makroekonomicznego, planetarnego). Celem artykułu jest uzasadnienie znaczenia zasady holizmu w zrównoważonym rozwoju rolnictwa na poziomie gospodarstwa rolnego (mikro), sektora rolnego (makro) i globalnym (planetarnym).

**Słowa kluczowe:** zasada holizmu, zrównoważony rozwój rolnictwa, gospodarstwa rolne, mikroekonomiczne, makroekonomiczne i globalne podejście

**Kody JEL:** Q01, Q10, Q12, Q13, Q56

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