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ECONOMIC SUSTAINABILITY OF AGRICULTURE – CONCEPTIONS AND INDICATORS

Joanna Wiśniewska
Poznań University of Life Sciences

Abstract. The article presents different concepts of sustainable agriculture. It aims to define an economic sustainability of agriculture and to discuss the possible ways of its assessment. It states criteria of measurement and parameters used by the OECD and the European Commission (EC). The method of system analysis has been applied to study simultaneously different issues of sustainability, i.e. economic, environmental, social and institutional. The very last aspect has been considered because of the role of governmental intervention in the sector. The conclusion is that the opportunity of gaining permanent income parity is, beyond all question, an indicator of an economic and social sustainability of agriculture in the national economy.

Key words: sustainable development, economic sustainability, sustainable agriculture, income parity, multifunctional agriculture

INTRODUCTION

The poverty line in developed countries means satisfying the basic needs of the poorest social strata while it is not equal to satisfying even the basic needs in the developing countries with low social income. Sustainable development is most often described as the need to maintain a permanent income for humankind, generated from non-declining capital stocks. Thus, constant stock of human, man-made, natural and social capital are considered as necessary and often sufficient criteria of sustainable development [Spangenberg 2005]. A question arises, to what degree the conception of sustainable development refers to the population of farmers. What is the range of the present parities or disparities in the farming economy? Do achieved economic conditions enable to implement the conception of sustainable development of rural areas by the subjects of farming economy or is the financing of agricultural development a matter of non-farming subjects of the national economy?

Corresponding author – Adres do korespondencji: Joanna Wiśniewska, Poznań University of Life Sciences, Department of Economics, Wojska Polskiego 28, 60-637 Poznań, Poland, wisniewska@up.poznan.pl

Every society can be described as comprising of four dimensions, the economic, social, environmental and institutional. Each of them is a complex, dynamic, self-organising and evolving entity in its own right, making the coupled system one of tremendous complexity. For this system to be sustainable, each of the four subsystems has to maintain its capability to survive and evolve, while the interlinks of the subsystem must enable a permanent co-evolution [Spangenberg 2005]. This is the context in which the concept of sustainable development has taken root – i.e. that of linking the economic, social and environmental objectives of societies in a balanced way [OECD 2001]. The immense significance of institutional encirclement of agriculture does not allowed to neglect the institutional subsystem in the multi-dimensional evaluation of sustainability in agriculture [Wiśniewska 2009].

ASSESSMENT OF SUSTAINABLE DEVELOPMENT

The concept of sustainable development has already been defined in at least a few dozen times. Some researchers associate it with an identical rate of growth in all the sectors and regions of an economy, others link it with a strive at improving the quality of all people's lives. It is called the conception of eco-development by some other scientists. 'Sustainable development' means that the achieved progress results in the development of a contemporary generation, but at the same time, it creates a potential which is necessary to meet the needs of future generations [Pearce, Barbier, Markandya 2000]. It is, no doubt, a complicated, long-term process, considered in an infinite time horizon. The probability of sustainable growth appearing in economy is little. Sustainable development became the aspiration of the majority of world's economies in the 1990s. It is a key objective of the European Union which aims to continually improve the quality of life and well-being for present and future generations [European's... 2009].

Continuous and indefinitely (or at least long-term) sustained growth is – often implicitly – assumed to be a part of the concept of sustainable development of the economy by most authors. Under the standard assumptions of economic growth, the rate of growth is considered the only relevant parameter [Spangenberg 2005]. On the other hand, economic sustainability refers to the standard of living in the society and the distribution of income as well as the level of poverty while economic growth might be the subject of defining income inequalities within the society [Kuznets 1955]. Income and social inequalities are increasing simultaneously to the upper trend of economic growth, but the trend occurs only initially and then fell – the inverted – U that has become known as the Kuznets Curve [Stiglitz 2001]. A comprehensive studies and statistic reports show growing unequal income distribution and poverty in the OECD countries. According to the latest OECD report the gap between rich and poor has grown in more than three-quarters of the OECD countries over the past two decades [OECD 2008a].

Sustainability means putting into effect all the aspirations within the limitations of the present resources. A particular choice of one of a number of aims often requires maintaining the rest of the aimed values at minimum levels. All the aims may naturally oppose each other or even compete with each other. However, they can also be comparative or complementary, creating a closed unit. While considering the conception of sustainable economic development, a holistic approach is necessary with regard to each of its aspects. Synergetic "win-win-win-win" options can only be identified if all four dimen-

sions of sustainable development are taken into account. These dimensions, economic, environmental, social and institutional, involve complex synergies and trade-offs. The discussions showed that the emphasis should be on the interactions among these four dimensions in order to minimise possible conflicts [OECD 2000].

By examining a diverse set of indicators together, we can begin to understand the conditions and approaches that will support sustainable development. If we do a better job meeting today's needs, while also enhancing the assets and resources we ourselves inherited, we will be a step closer to designing a path of sustainable development [OECD 2000]. Thus far, the main sustainability assessment tools are economic (cost/benefit analysis, modelling, regressions, scenarios), environmental (life-cycle analysis, material flows, resource accounting, ecological footprint) and social (sustainable livelihoods, human and social capital measurement, participatory processes, distributions) (Table 1).

Table 1. Sustainable development: an experimental set of assessment tools of sustainability
Tabela 1. Rozwój zrównoważony: eksperymentalny zestaw narzędzi oceny zrównoważenia

Endowments	Economic	Environmental	Social
	• Capital Assets • Labour Productivity • National Debt to GDP Ratio	• Surface Water Quality • Endangered Ecosystems • Contaminants in Biota • Contaminated Land Area • Storage of Spent Nuclear Fuel • Cropland Converted to Other Uses • Status of Stratospheric Ozone	• Population • Children in Families with One Parent •Teacher Training Level
Driving Forces	Economic	Environmental	Social
	• Investment As a Percentage of GDP • Energy Use per Capita & GDP • Materials Use per Capita & GDP • Inflation • Investment in R&D per GDP	• Water Use to Renewal Ratio • Fisheries Utilisation • Invasive Exotic Species • Cropland Erosion Rates • Timber Growth/ Removals Balance • Greenhouse Gas Emission	• Contributing Time & Money to Charities • Births to Single Mothers • School Enrolment by Level • Participation in Arts & Recreation • People in Census Tracts with 40% or More Poverty
Current Outputs & Results	Economic	Environmental	Social
	• Domestic Product • Income Distribution • Consumption Expenditures per Capita • Unemployment • Home Ownership Rates • % Households in Problem Housing	• Metropolitan Air Nullity Nonattainment • Outdoor Recreational Ac tivities • Greenhouse Climate Re sponse Index	• Crime Rate • Life Expectancy • Educational Achievement Rates

Source: [OECD 2000].
Źródło: [OECD 2000].

Statistical analyses, based on average values, deform the real picture of where the existence of economic and social differences is obvious, to which degree it can be taken into account and considered in different aspects of economic policy and to which degree it constitutes a marginal phenomenon. Significant discrepancies appear among the subjects of economy and the attempt at comparing them results in a number of problems and difficult choices, being often virtually impossible. Strong comparability is based on existence of a single comparative measure like "utility" by which all actions can be ranked [Spangenberg 2005].

Although focussed on sustainability, this brings to a light, the fundamental discrepancies between the participants of sustainable development and of some of their common ground. There are defined a weak and strong comparability and commensurability of assessments in the above mentioned four dimensions: economic, environmental, social and institutional. A common unit of measurement of sustainability is not existing yet. Thereof, a wide set of indicators has been approved and developed recognised as a weak comparability and commensurability of some of the sustainable impacts.

To summarize, principally the sustainability criteria comprise incomparable and incommensurable economic, environmental, social and institutional qualities. The overall sustainability of the economy comprise all four dimensions. A common unit of measurement of sustainability has not been developed yet. In the recent studies and literature mostly economic measures of sustainability of social security systems, environmental protection, institutional potential and economic development have been considered.

CONCEPTION OF SUSTAINABLE AGRICULTURE

Although it represents nowadays only a small % of GDP in most of the countries all over the world, agriculture is very closely linked to the sustainable development. The sector uses environmental inputs such as land and water, and generates many outputs of environmental significance. As production intensity and output have increased, environmental policy issues have risen in importance across the world. Policy challenges facing post-industrial economies include reducing environmental impacts and risks from agriculture, responding to international environmental agreements which often touch on aspects of agriculture, and optimising agriculture's overall contribution to welfare [OECD 2000]. Progress in the farming sector is one of the conditions to be met in order to reach the defined aims of sustainable development. Due to its particular position connected with using natural resources on earth, it is the central point of the theory of sustainable development. Some definitions directly result from the principle saying that it is possible to derive from earth only as much as it is able to offer [Florczak 2008].

There is no generally accepted definition of sustainable agriculture. Conway and Barbier [1990] defined sustainable agriculture as the ability to maintain productivity, whether of a field, farm or nation, in the face of stress or shock (such as increasing salinity, or erosion, or debt, or a new pest, or a rare drought or a sudden massive increase in input prices). A case in point is the definition of the United Kingdom governmental Department of Environment Food and Rural Affairs (DEFRA) signifies several important attributes of sustainable agriculture: availability to the consumers of adequate supplies of wholesome,

varied and reasonably priced food, produced within accordance with generally accepted environmental and social standards, flexible and competitive industry which contributes to an economically viable rural society, effective protection of the environment and prudent use of natural resources, conserved and enhanced landscape, wildlife, cultural and archeological value of agricultural land and respecting of high level of animal welfare, contribute to the long-term sustainability of rural communities [DEFRA 2006].

The OECD definition of sustainable agriculture says that this is agricultural production that is economically viable and does not degrade the environment over the long run [OECD 2000a]. As detailed in a report by the Committee for Agriculture of the Food and Agriculture Organization of the United Nations (FAO) changes in perception in relation to the interpretation of Sustainable Agriculture and Rural Development (SARD) are emerging: "The first is that the concept must extend to social, institutional and economic sustainability and not exclusively environmental sustainability – the conservation and rational utilization of natural resources. Those now working on SARD understand that sustainability means that management practices must be profitable and socially and culturally suitable, and must satisfy local requirements such as property rights over natural resources. The second is a new focus on development as a process which must allow for calculated trade-offs between reductions in the stock of natural capital (forests, unexploited freshwater, etc.) and the generation of resources for investment in human and social capital (healthier and better educated people, technical knowledge and infrastructure). These shifts in perception increase the challenge of implementing SARD, but also open up opportunities for doing so" [The Place… 2001].

In the United States the term 'sustainable agriculture' was defined in 1977 year as an integrated system of plant and animal production practices having a site-specific application that will, over the long-term satisfy human food and fiber needs, enhance environmental quality and the natural resource base upon which the agriculture economy depends, make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls, sustain the economic viability of farm operations and enhance the quality of life for farmers and society as a whole [National… 1977]. The United States Network of Sustainable Agriculture Research and Education (SARE) defines thus sustainable agriculture refers to an agricultural production and distribution system that achieves the integration of natural biological cycles and controls, protects and renews soil fertility and the natural resource base, optimizes the management and use of on-farm resources, reduces the use of non-renewable resources and purchased production inputs, provides an adequate and dependable farm income, promotes opportunity in family farming and farm communities, minimizes adverse impacts on health, safety, wildlife, water quality and the environment [Food… 1990].

In the European Union (EU) interventionism in the farming sector has become a standard rather than an exception, which it is for non-farming sectors of economy. At the beginning of the 21st century, a number of questions have arisen, e.g. whether state interventionism was one of the causes of attenuating eco-development by resulting in an intensification of the farming economy in the former era. Will it presently enable to introduce social and political changes and will it determine farmers to implement the current targets of economic policy, not straining the budget? So far, the main aim of the

Common Agricultural Policy (CAP) has been to favour the economic development of agriculture which aimed to modernise European farming and thereby increase production to achieve European self-sufficiency in food production. This aim was supported by price supports and subsidies that also aimed to increase farm incomes relative to other areas of the economy and took place with little regard for the environment. It is doubtless that raising the efficiency creates an opportunity to preserve the social functions and the development of natural environment, while at the same time, it may result in their degradation and deterioration in capital stock and agricultural land capacity. It is difficult to oppose the thesis that an economic unit, being subject only to market forces and therefore only interested in profit maximisation, will not take into account the areas of its operation which do not favour its efficiency. Therefore, it is also difficult to oppose the view that a sustainable development requires a coordinated and comprehensive approach in planning and implementing economic policy, with the participation of the whole society [Wiśniewska 2010].

The Single European Act, which came into force in 1987, constituted a new legal basis for Community policy on the environment, and had the following objectives: to preserve, protect and improve the quality of the environment, to contribute towards protecting human health, to ensure a prudent and rational utilisation of natural resources The Act went on to state that: "environmental protection requirements shall be a component of the Community's other policies". The integration of common agricultural and environmental policy is an effect of McSharry's Reforms of CAP which was introduced in 1992 year. The impacts of agriculture and agricultural policies on the environment are a major concern in the EU countries, particularly in the context of agricultural policy reform and the achievement of sustainable agriculture. Agricultural policy reform policies to promote sustainable agriculture and address environmental and natural resource issues. The basic long-term challenge for agriculture is to produce food and industrial crops efficiently, profitably and safely, and to meet a growing world demand without degrading natural resources and the environment. While agricultural productivity has improved substantially, it has often been accompanied by resource degradation, such as soil erosion and water depletion. Agriculture also contributes positively to the environment through provision of landscapes, wildlife habitats, and as a sink for greenhouse gases [Łuczka-Bakuła 2007].

The conception of sustainable development in agriculture presented in the paper is, therefore, set on four (not three) dimensions, reflecting the impact of durable development of farming. Sustainability of agriculture can be defined as the state of four co-inherent subsystems within which agriculture is operating. They are economic, social, environmental and institutional (Figure 1).

The subjective and objective scopes of the activities are implemented within the confines of state rural areas policy. They are targeted not only at farmers, but at the whole rural community and labour force, not merely farms, but also capital and natural resources, not just the income from farming, but also the income parity and the standards of living in farmers' families. There are different extents aimed by the sustainable policy linked as a feedback (Table 2). As it results from the above examples, all components of eco-development remain in mutual relations, creating a dynamic system. Thus, the policy of rural areas development requires continual discussion and making difficult decisions, often in

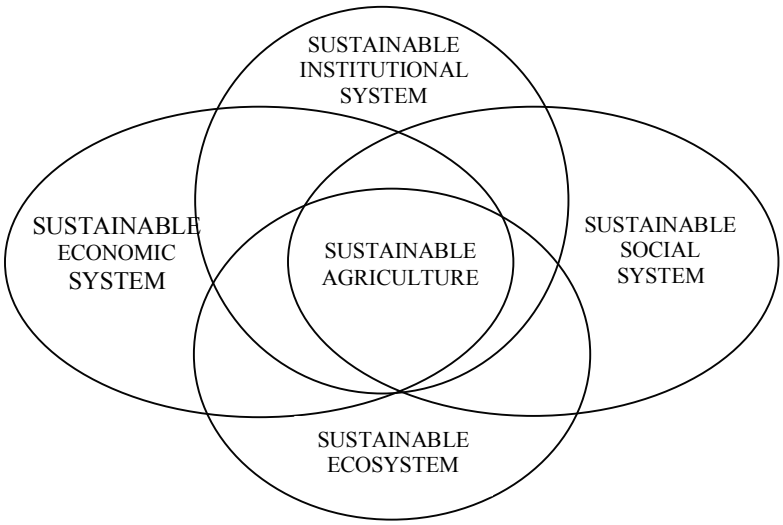

Fig. 1. The sustainable agriculture within co-inherent subsystems
Rys. 1. Zrównoważone rolnictwo w przenikających się subsystemach
Source: Authoress' own compilation.
Źródło: Opracowanie własne.

Table 2. The scope, subject, object and aim of sustainable development in agriculture in the economic, social, environmental and institutional dimension
Tabela 2. Zakres, przedmiot, podmiot i cel zrównoważonego rozwoju w rolnictwie w ekonomicznym, społecznym, ekologicznym i instytucjonalnym wymiarze

Scope	Subject	Object	Aim
Economic	Farm	Efficiency Level	Economic Equilibrium
Social	Rural Community	Level of Justice	Social Welfare
Environmental	Eco-System	Condition of Natural Environment	Environmental Equilibrium
Institutional	Institutional System	Competence Level	Institutional Development

Source: Authoress' own compilation on the basis of: [Indicators… 2000].
Źródło: Opracowanie własne na podstawie: [Indicators… 2000].

circumstances which oppose each other. Defining standards, minimal and maximal limits, and the way of measuring and monitoring the achieved effects becomes a condition to be met in terms of efficient policy. The costs and the subjects bearing them constitute primary concerns. General criteria of durable growth in agriculture should reflect both economic criteria, defined by economic efficiency, social, defined by the achieved level of equality, environmental, signifying improvement of the natural environment and institutional – improvement of institutions (Table 3).

The conception of sustainable agriculture includes the postulate of multifunctional development [Wilkin 2010]. The economic functions of agriculture include, among others, producing raw materials and food, intensification of production, structural

Table 3. An attempt to determine the main goals and results of sustainable agriculture in environmental, economic, social and institutional scope
Tabela 3. Próba określenia podstawowych celów i rezultatów zrównoważonego rolnictwa w wymiarze środowiskowego, ekonomicznego, społecznego i instytucjonalnego

Goal	Environmental	Economic	Social	Institutional
	• Quality of Natural Resources • Ecological Effecti veness • Ecological Innovati veness • Reduction of Ecosys tem Tensions • Reduction of Envi ronmental Degrada tion Effects on People's Lives	• Optimisation of Expenditure Use • Increase in Productivity • Competitive Farming Sector • Economic Efficiency of Farms • Economic Efficiency of Ecological Farms	• Optimal Inter--Generational Alloca tion of Resources • Ensuring Supplies Necessary to Ensure Food Safety of The Population • Ensuring Jobs • The Degree of Satis fying Needs	• Optimal Allocation of Public Goods & Services • Low Transaction Costs • Development of Eco nomic Infrastructure • Effectiveness of Managing Natural Environment • Internalisation of External Costs;
Result	Environmental	Economic	Social	Institutional
	• Implementing Eco--Development Programmes • Participation in Eco logical Initiatives • The Division of Profits & Losses From Ecological Initiatives • Creativity of The Private Sector;	• Maximising Aggregated Wealth • Effective Distribution of Income • Perfect Competition • Just Division of Profits & Losses • Human Capital Development	• Distribution of Incomes • Living Standard of Farmers • Percentage of Popu lation Under Poverty Line • Equal Opportunities for Farmers & Non-Farmers • Unemployment Rate • Demographic Deve lopment • Access to Education	• Development of Social Infrastructure • Universality & Institutional Transparency • Common Access To Public Goods & Services • Access to Information • Efficient System of Intervention • International Cooperation

Source: Authoress' own compilation on the basis of: [A Framework… 2001, Directions... 1999].
Źródło: Opracowanie własne na podstawie: [A Framework… 2001, Directions... 1999].

adaptation, technical and technological progress, efficiency and effectiveness of production and sales, price competitiveness, high quality of products and services, high income, developmental investments and R&D inputs. The environmental functions of sustainable agriculture include: protecting earth's natural resources, protecting the sanitary conditions of food articles, protecting and developing natural environment, including water, soil and air [Directions... 1999]. Important sustainability areas have been defined as regards agriculture, i.e. economic, social and environmental areas, with regard to which the level of economic effectiveness and social justice have been defined as sustainability measures. Basically, the conception of sustainability concerns such categories as: preserving and protecting resources, the effectiveness of transformation processes and intergenerational equilibrium [A framework... 2001]. The social functions agriculture include being a source of households' incomes, a place for professional activity, cultural development and cultivation of national tradition, leisure and recreation, promotion of tourism and healthy lifestyle and ensuring food safety. As well as in the overall sustainable economy, it is impossible not to consider

the institutional approach in the contemporary notion of sustainable agriculture either [Zegar 2005].

To sum up, the conception of sustainable agriculture marks a multi-layer range of growth, taking into account economic, social, ecological and institutional aspects. The aims of sustainable development in national economy are marked by three areas of interaction: social welfare, social justice and respect for natural environment. In order to implement the rules of sustainable development, farms, like non-farming enterprises, cannot solely act basing on the profit criterion, but they also have to take into account ecological criteria and, first of all, social criteria. The contemporary policies of sustainable development of rural areas are determined according to the conception of sustainable agriculture. Therefore, a question arises how to measure the effects of the implemented activities aimed at an integral development of rural areas, especially those immeasurable ones and unquantifiable ones.

ECONOMIC SUSTAINABILITY OF AGRICULTURE

In the macroeconomic debate, a few economic sustainability criteria are mentioned, like: rate of growth of production and income, effectiveness, efficiency, innovativeness, competitiveness, public debt. While criteria like inflation, unemployment rate, trade imbalances are politically prominent, but hardly ever located in sustainability context. Other, traditional criteria like aggregated demand, consumption levels and savings rates play a minor role in the current debate. So whereas there are ideas to be found in the economics literature regarding the environmental, social and sometimes institutional sustainability of the economic system, there is hardly any information available on the economic sustainability of the economy (and thus not on the overall sustainability of the economy, which comprises all four components). Even less so, criteria of economic sustainability have been developed for the other dimensions [Spangenberg 2005].

The parameterisation of sustainable agriculture achievements is considerably more difficult than that of conventional agriculture, as the latter generally aims at intensification and the basic economic criterion allows to quantify the effects with regard to a given value, i.e. efficiency, profit or profitability and to provide their absolute magnitudes [Baum 2003]. Much recent work on measuring progress towards sustainable development has addressed specific issues, such as measuring climate change or the environmental and social impacts of particular sectors (e.g. agriculture, energy and transport). Measuring sustainable development at an aggregate level, however, requires a broad integration of indicators of economic, environmental, and social changes. One way to achieve this integration is to extend the traditional framework used for measuring economic activity – the National Accounts. Extensions of the National Accounts to the environmental area currently underway. These extensions are aimed at recording changes in environmental assets, and at highlighting environment-related transactions (e.g. pollution abatement and control expenditure). Extensions to the social area may also allow the linking of accounts measuring employment, human capital, and the distribution of household income and consumption among various socio-economic groups. Measuring natural and human capital requires both monetary and physical data. While work in these fields has progressed,

the application of a fully extended National Accounts framework remains a medium- to long-term objective. In the shorter term, complementary approaches to achieve such integration are required [OECD 2001].

These are grouped as resource indicators (measuring levels and changes in economic, environmental and social assets and outcome indicators (covering the quantity and quality of development across a broad range of perspectives, including income distribution, health and environmental quality). As a result of the works of the UN Commission on Sustainable Development, started at the beginning of the century, first synthetic indices of sustainability have been designed. They are currently being evaluated and tested. The process of their compilation has not been finished yet. The OECD and the Eurostat also participate in the research. The attempts at an empirical measurement of the durability of economic growth have shown that at present it is impossible to take into account all the aspects of sustainable development by means of just a single index. The majority of the suggested indices of social development or social poverty do not take into account the income differences and ranges, which simplifies the picture of the studied reality. On the one hand, they are transparent, but on the other hand they do not reflect the real structure and the distribution of economic growth effects [Indicators 2001]. Three broad groups of the OECD indicators are being developed:

- Several contextual indicators describing broader economic and social aspects of agriculture that have sustainability implications, such as land use trends, and education levels of producers.
- Another group considers management and use of natural resources, such as indicators of nutrient, pesticide and water use.
- A third group considers agricultural impacts on soil and water quality, land conservation, biodiversity, habitats, landscape and climate change [OECD 2001].

The OECD is developing agri-environmental indicators (AEIs) within the framework which addresses a set of questions related to the linkages between causes, effects and actions. What is causing environmental conditions in agriculture to change, such as, changes in farm chemical input use? What are the effects of agriculture on the environment, such as, the impacts on soil, water, air, and natural habitats? What actions are being taken to respond to the changes in the state of the environment, for example, by farmers, such as promoting sustainable agriculture by community based approaches [OECD 2001]? Among a few dozen of indices currently used in international and national statistics, there most often used include: average use of fertilisers, pollution emission from glasshouse appliances, concentration of pollution in water, ground and air, use level, the condition and quality of natural resources, the area of organic cultivation, the number of eco-farms, price margin of organic products, the expenditure of the state on the implementation of environmental programmes and the degree of production extensification.

Income is the basic category of effect in agriculture. It comprises environmental, economic, social and institutional impacts on agriculture. Therefore, a calculation of the degree of economic development is possible and it comprises all possible income aspects. The calculation of benefits is based on measuring the added value in the national economy, gross and net incomes, incomes earned by farms and incomes of farmers' families. The evaluation of sustainable development has a macroeconomic dimension, as it marks the place of agriculture in national economy, but also a microeconomic one,

defining the stages of sustainable development of a farm. In both attitudes, a number of indexes are required and certain ranges of values referring to the particular aims of sustainable development. They serve as a basis for building synthetic indexes of sustainability (Table 4).

On the other hand, the calculation of losses takes into account not only private costs, born by the producer and the consumer, but also social costs, environmental costs and

Table 4. Economic sustainability of agriculture: an experimental set of aggregated economic indicators

Tabela 4. Ekonomicznie zrównoważone rolnictwo: eksperymentalny zestaw zagregowanych wskaźników ekonomicznych

Balance of Resources	Environmental	Economic	Social	Institutional
	• Net Pro-Ecological Investment	• Net Agricultural Investment	• Net Social Investment	• Net Infrastructural Investment in Rural Areas
Effectiveness, Competitiveness & Efficiency	Environmental	Economic	Social	Institutional
	• Profitability of Ecological Production • Productivity of Labour, Land & Capital • Profitability of Sales of Ecological Products • Terms of Trade of Ecological Agricultural Products;	• Profitability of Agricultural Production • Profitability of Labour, Ground & Capital • Profitability of Sales • Terms of Trade of Agricultural Products	• Profitability of Farm; • Labour Efficiency • Structure of Income in Farmers' Families;	• Expenditure on Supporting Agricultural Production • Expenditure on Supporting Ecological Production • Expenditure on Supporting Price Surcharges
Division & Diversity of Incomes, Redistribution	Environmental	Economic	Social	Institutional
	• Share of Ecological Agriculture in GDP • Income From Farming per Person Employed in Ecological Farm • Share of Incomes from Farming in Total Incomes	• Agricultural GDP Per Capita • Share of Agriculture in GDP • Agricultural Income per Employed Person • Share of Incomes from Agriculture in Total Incomes	• Income Parity of Households • Off Farm Incomes; • Income Distribution • Poverty Line • Expenses on Consumption & Investments;	• Share of Public Support in Final Agricultural Production • Expenditure on Development of Economic & Social Infrastructure • Regional & Sectoral Public Expenditure

Source: Authoress' own compilation on the basis of: [Indicators… 2000 and Indicators… 2001].
Źródło: Opracowanie własne na podstawie: [Indicators… 2000 i Indicators… 2001].

institutional costs paid by the taxpayer. Not only does it include accounting costs, but also broadly understood economic costs, implicit and explicit. Farms create a structurally diversified group of economic subjects, locally determined by a given social and economic environment, directions of production, scale of resources, production specialisation of farms and other features grouping this sort of economic subjects [Income 1985]. Scientific analysis of incomes therefore requires a statistical description of the strength of the connection and the kind of relation between the factors determining the quantity of production and the level of incomes.

The issue of equality in economic sciences relates to the theory of income distribution. Economic policy differentiates between vertical equity and horizontal equity as the rules determining the tax policy. On the other hand, the pay policy may be subject to the rule of equal pay, which assumes that for doing any kind of job, the pay a person receives should be independent from the tender, race, sex or any other features of the person doing the job. The idea of justice is used with reference to the division in welfare economy. It means equality in the sense that everybody should receive what they deserve or the expectations shall remain unsatisfied. The issue of equality in economic sciences relates to the theory of income distribution. Economic policy differentiates between vertical equity and horizontal equity as the rules determining the tax policy [Black 2008].

As far as inequality of incomes are concerned, they can be understood as the differences between particular people, families, groups of people, regions or states. A high diversity of incomes preserves the diversified division of wealth in society. Income discrepancies between regions and countries result from different opportunities to earn and different capital resources. The problems of income disparity are connected with exploring the differences between economic subjects, including households. It is set in the context of social and economic research. In hitherto analyses, the most frequent comparisons included average incomes, defined for particular social and professional groups. The outcomes allow to draw conclusions with respect to average economic inequalities and social inequalities in households.

One of the directions of research on income discrepancies is measuring the distribution of income in a particular group of economic subjects creating national or international economy. Comparing absolute and relative changes in the level of incomes obtained in particular groups of economic subjects, e.g. in the arrangement of demographical features. The statistical analysis of profitability uses the measurements of variation in order to define their deviation from the average value and the measurements of asymmetry, in order to define the degree and direction of irregularity and the measurements of concentration, similarity and the diversity of structures [Sobczyk 2010].

The division of incomes shows how numerous the groups of subjects in particular income ranges are and the distribution of incomes shows the differences between the average and the lowest income level in a following group. The spatial diversity of incomes, in turn, requires a summary statistical analysis. The most frequently used statistical methods include: the Lorenz Curve, Florence Coefficient, Pearson Coefficient and Gini Coefficient as well as Sen Index. The profitability analysis often includes the research of their dynamic variation by means of defining the function of average periodical rate of changes and developmental tendencies or absolute changes, including both nominal and real changes, e.g. by comparing the parities of purchasing power.

The specificity of the income from farming consists in the fact that it constitutes earnings on the engaged production factors in the farming production, i.e. land, capital and farmers' labour, as well as it compensates organisational and managerial efforts and risk bonus in case of farmers. Another important function of the income from farming is serving consumption purposes of households and, simultaneously, serving production and investment processes of farms. The issue of incomes from farming needs to be considered basing on two categories of these incomes, i.e. incomes from farming and personal incomes. The first one is particularly important in the context of developmental needs of a farm, the latter – in the context of consumption needs of a family of farmers'. What is specific for a farm is that the two categories of incomes cannot be discriminated between a priori [Zegar 2005].

The character of a farm constitutes a problem in the statistics of incomes and in the implementation of comparative research concerning income discrepancies in the economy. The income of a farming household is included in the statistical research of household budgets. Disposable income can then serve as a measurement of a household income. At the same time, the income of a farming household is defined by the added value or the farming income. Comparative analyses require a proper description of the range of data being compared and their representativeness for the kept statements. The issue of representativeness of empirical data remains a considerable hindrance, impeding the research on profitability, as in the case of farms, the data is gathered for those farms which approach certain economic results and keep an accounts register.

To sum up, to evaluate the economic sustainability the issue of incomes can be examined with reference to a professional group or a social group. Sociological research deals with the problem in a broad sense of relations between the city and the countryside, and hence, rural areas become the area of comparison for urban areas. Such spatial range of research has been dealt with by different regional studies. One of the issues is the differentiation of municipal and rural households, resulting from the dissimilarity of income sources. Such research context enables to analyse the structure of income creation [Leszczyńska 2007]. In addition to income indicators the quantification of environmental effects remains of major importance. Similarly to the indices measuring the effectiveness, the indices measuring environmental efficiency also have to take into account regional differences appearing in the economy and in natural environmental conditions.

INCOME PARITY IN SUSTAINABLE AGRICULTURE

The inequality of the income distribution within agriculture may be as wide as that within non-agricultural sector but not wider [Kuznets 1955]. The sustainable agriculture in the sustainable economy is constituted by the income parity. An American encyclopaedia of social sciences explains the notion of 'parity' in the section devoted to agriculture, subsection 'income and pricing policy'. The entry mentions 'parity price'. The term is actually an attempt at defining an objective criterion of the policy of price support in agriculture. It is the price of agricultural products ensuring a purchasing power, concerning consumption and production products and services, equal to that of previous periods [Sills 1968]. The parity price is to ensure proper salary and living conditions to farmers

employed in agriculture and a return on the invested capital. Similarly, such understanding of the notion of parity has found its reflection in legal acts in the USA, Great Britain and Germany in the 1950s and 1960s. The definition of parity is broadly discussed in Polish economic and agricultural encyclopaedias. It is described in the section devoted to the profitability of agriculture. It appears as an explanation of the term 'income parity', as a situation of equal incomes of comparable farming and non-farming populations [Woś 1998]. Further encyclopaedias include the term 'income disparity' and explain it as the difference between the incomes per person employed in agriculture and the income per person employed in other, non-agricultural professions [Encyklopedia... 1984]. Parity in agriculture can be considered in a number of aspects. The very claim of a parity indicates that it is a given part of the national economy that is in question. The hitherto research most often includes studies of income disparity between agriculture and non-agricultural part of the economy (exogenous parities) and, less frequently, those concerning the differentiation of incomes in agriculture (endogenous parities).

The present state of knowledge and the scientific research have not succeeded in unifying the parity ratio methodologically, i.e. they have not defined the kinds of incomes to be taken into account in comparisons. Allowing for quantitative and qualitative aspects of the labour factor in agriculture and non-agricultural employment, creating a given character of the labour market is indispensable in comparative research. Defining the professional groups whose incomes are to be compared with farmers – either, as one group of economists suggests, workers – or the self-employed in non-farming industries, as others claim. Also, it needs to be clarified whether the incomes to be compared are to be incomes from all possible sources or from one kind of employment only. Comparing and studying incomes results in defining the level of social justice (income justice) and economic efficiency of production. Justice is associated with a low risk of poverty threat while efficiency is linked with a high motivation to work and efficiency.

The concept of disparity in farmers' incomes in relation to non-farming population is directly connected with the agrarian issue in economic policy. The agrarian issue is considered in the context of a rule of law and the political system, according to which all professional and social layers of the population are equal. The income policy thus assumes that the incomes in farming and outside farming should show the same rate of growth in incomes. The egalitarian tendencies connected with the rule of social justice together create certain expectations of farmers towards the state. There is an increasing pressure of the farming lobby on equalising the incomes not only by means of a proper economic policy, but also by means of a proper social policy [Idczak 2001].

The notions of parity and disparity are the two notions commonly used by economists to evaluate income levels. They function in economic sciences as normative terms describing the situation of some selected economic categories being equal or being different. At the same time, Polish economic dictionaries define the term 'parity' as the one which only concerns monetary values in monetary and currency systems and the purchasing power of money. International dictionaries define the notion of 'parity' similarly, not using the concepts of income parity or disparity. The causes of disparities in agriculture differ from the conditions of income division in non-agricultural parts of the national economy. Despite the common economic features, there are some special circumstances, typical for the agricultural economy, such as the inflexibility of demand

for agricultural products, the prolonged period of return on investment in agricultural production or natural conditions of agricultural production, connected with the ground factor. The differentiation of the notions of exogenous and endogenous disparity can be introduced on the basis of the differences between the phenomena in the national economy and in agriculture. Exogenous disparities will describe the relations between agriculture and the national economy while endogenous disparities will describe the differences within the agricultural sector, defined as differentiation or stratification of farms as regards the levels of incomes or other analysed categories, e.g. households' expenses. Exogenous and endogenous phenomena constitute certain implications for agriculture, the national economy and the society.

Gross national income is the basic indicator of the economic and social efficiency of an economy. The issues of national income are constantly studied in scientific research on the factors of economic growth and the social and economic development. They are also the subject of interests of political groups and parties concerned about the participation of state in the division of national income and willing to optimise the role of state in this area. The sociological dimension of the income issues is present in the research on the basic differences and similarities between different social systems and in research on the features of various areas with dominating conditions of a wider social system. Income categories are for example used in the comparative analysis of the living standard, the social and professional stratification, professional and educational activity, migration and emigration. They also appear in different theories, e.g. in the theories of needs, equal opportunities, social justice and others.

Income issues in agriculture are the subject of economic discussions mainly because of their continual declining tendency in the absolute dimension and in the relative one. Such matters as location, economic potential or the type of production of a farm exert, no doubt, an influence on income discrepancies in agriculture. A reduction in incomes from agriculture is also connected with different patterns of participating in changing economic market mechanisms and in the agricultural policy, both of them being subjects to globalisation. The future of traditional farming is often the topic of discussions. Other frequently appearing topics include: the variety of jobs done in agricultural families and issuing social benefits on behalf of the so-called social farms. Other aspects such as the national economy, the economic infrastructure or alternative sources of income also considerably influence on incomes from farming (Figure 2).

Theoretical analysis of the profitability phenomenon in agriculture is helpful in defining unified rules which are inevitable to formulate the postulates of income policy in order to address its activities to a strictly defined professional-and-social group. These needs are met by a multilayer statistical analysis which uses summary indices describing complex social and economic phenomena influencing the profitability of agriculture. One of the issues discussed in scientific papers is the problem of dynamics and income fluctuations in time. Such issues as the pace of changes, the range of increase or decrease in incomes, the time range or the spatial range of a given income situation, including poverty areas, have a basic meaning in evaluating the economic situation of an economic sector and the economy as a whole.

As the income from farming and its accumulation are the conditions of investments and determine the development of a farm, low incomes result in an impairment of in-

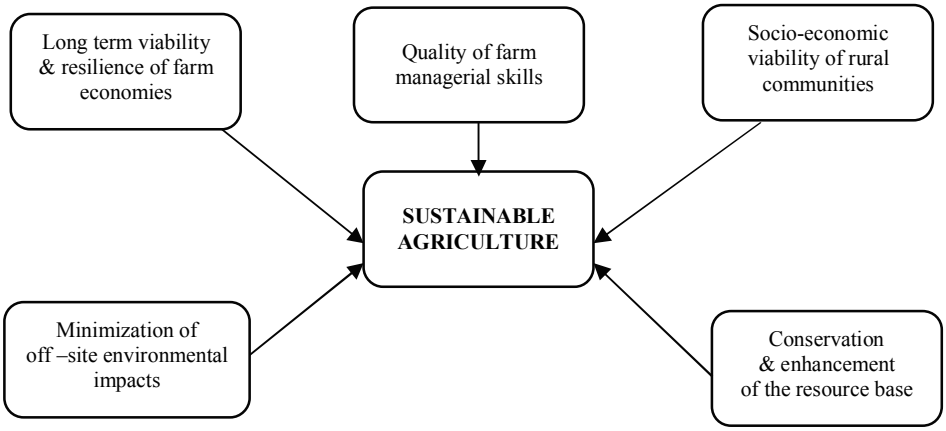

Fig. 2. Basic components of sustainable agriculture in sustainable economy
Rys. 2. Podstawowe składniki zrównoważonego rolnictwa w zrównoważonej gospodarce

Source: [OECD 2000].
Źródło: [OECD 2000].

vesting capacity and the lowering capital of farms. Long-term income disparity leads to migration and depopulation of farming regions, negative selection of the population of farmers, the descent of rural social and cultural societies and endangers the natural environment [Woś 1998].

The postulates concerning the state income policy are a consequence of the research on income differentiations. The disproportions or discrepancies in the economic development in the development of the economic area of a country, almost ignored in the hitherto income policy, have become an important argument for changes in the state agricultural policy towards its regionalisation. Its fundamental rule is a strive for equalising incomes and the standard of living within society. The aims of income policy concerning the farming population were included in European constitutive acts from the 1960s in the Treaties Roma – as an attempt at keeping a proper standard of life of the agricultural population by increasing the incomes of the employees in the farming sector and they were preserved in the EU Treaties – as an attempt at increasing the efficiency in farming and so ensuring a proper standard of rural life, especially by raising an individual income of the employees of the farming sector [Traktat 2006].

The issue of incomes from farming especially concerns preserving income parities in agriculture with regard to other sectors of economy and, therefore, of the incomes earned by farmers and the rest of the population. The problem is that there is no objective criterion which can be used as a basis to define a proper level of parity or the range of incomes [Leszczyńska 2007]. Accepting a given income differentiation originates from a set of historical, cultural and religious assumptions. Under certain circumstances, it can be vital for the political situation of a country. Market economy, based on the functioning of the market mechanism, differentiates the participation of various subjects in profits, according to the criterion of competitiveness and economic efficiency. Therefore, the issues of income parities remain open, especially with respect to social research and the

considerations over the level of social justice and the possible social tensions over income discrepancies. The basic task of income policy is solving the income issue structurally and diminishing the social and economic dysfunctions.

To summarise, in order to describe the state of agricultural sustainability in economy, various parities can be measured, i.e. adequate values regarding time are compared – their conditions, changeability and quality. According to the definition of sustainable agriculture, various elements remain in the state of equilibrium, i.e. they do not create advantages or disadvantages at the expense of other elements of the system, the time being taken into account in analyses. Socio-economic viability of rural communities is one of the most important component of sustainable development of agriculture. Its meaning is to receive incomes comparable to those of non-agricultural sectors.

CONCLUSIONS

The progress evaluation of the policy of sustainable agriculture requires a holistic approach, taking into account the whole of interactions between the farming sector and the national economy, society and the natural environment. Monitoring achievements is incredibly complicated and it requires a constant methodological development. The discussion on farming parity has always been present in relevant literature and the problem remains present. Nowadays, research is more and more commonly multidimensional. Traditional divisions are being replaced by integrative, interdisciplinary research. Income issues particularly link economic and social aspects and there is a tendency to use a methodological approach, characteristic for complex social phenomena.

The presented considerations do explain the complex issue of sustainable development of farming with the use of income parameters. They contribute to further detailed studies on the rules and aims of sustainable development of agriculture and rural areas and the criteria of evaluating the degree of meeting the aims of its multifunctional development. The following issues has been exemplified on measurement of sustainable agriculture:

- Indicators are required at different levels and for different uses. This has important implications for identifying and developing indicators. For example, at local or site specific levels, more detailed indicators may be required than at more aggregate levels.
- There is value in pursuing work to develop and use a core set of agri-environmental indicators, which are broadly comparable at the international level.
- Scale issues are especially important when developing indicators at the national and international levels. Indicators must be sensitive to regional variability in both environmental conditions and farming systems, across and even within countries, because national aggregates by themselves can mask variability and thus be misleading.
- Indicators must be capable of reflecting both negative externalities (e.g. water pollution from nutrients and pesticides) and positive externalities of agriculture (e.g. provision of habitat and carbon sinks).
- A sound analytical framework which clarifies on linkages and policy objectives is required. Indicator sets must also be and remain flexible and adaptive to respond to emerging issues, such as GMOs.

– The level of research and understanding varies across different groups of issues. For example, soil quality has been well researched, but more work is needed to deepen understanding in such areas as biodiversity, habitat and landscape.
– The social aspects of agriculture are presently less developed. This area requires more attention. Such work should start by determining key social issues, policy questions and objectives for these, and understanding the linkages between social and environment issues (e.g the influence of education levels on farm management). Analysis and understanding of possible tradeoffs and synergies between economic, environmental and social aspects of agriculture is also needed [OECD 2001].

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EKONOMICZNIE ZRÓWNOWAŻONE ROLNICTWO – KONCEPCJE I WSKAŹNIKI

Streszczenie. W artykule zaprezentowano różne koncepcje zrównoważonego rolnictwa. Podjęto próbę zdefiniowania ekonomicznego zrównoważenia rolnictwa i dyskusję nad sposobami jego pomiaru. Wskazano na kryteria oceny i mierniki stosowane przez OECD i Komisję Europejską (KE). Zastosowano metodę analizy systemowej dla równoczesnego zbadania różnych przejawów zrównoważenia, tj. ekonomicznego, środowiskowego, społecznego i instytucjonalnego. Ostatni z wymienionych aspektów został włączony ze względu na rolę interwencji państwa w omawianym sektorze. Uznano, że możliwość uzyskiwania trwałego parytetu dochodowego jest przede wszystkim miarą ekonomicznego i społecznego zrównoważenia rolnictwa w gospodarce narodowej.

Słowa kluczowe: rozwój zrównoważony, zrównoważenie ekonomiczne, zrównoważone rolnictwo, parytet dochodowy, rolnictwo wielofunkcyjne

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