Review Article

Economics of Agriculture 1/2013
UDC: 502.131.1:631(497.113Vrbas)

SUSTAINABLE AGRICULTURE AS A BASIS FOR SUSTAINABLE ENVIRONMENTAL DEVELOPMENT OF RURAL MUNICIPALITY VRBAS

Milutin Mrkša[1], Tamara Gajić[2]

Sumarry

Agriculture is the main occupation of the rural population and as such forms the basis of development and progress, not only in rural areas, but also the community as a whole. Like any business, and agriculture has a number of negative environmental impacts, especially on agricultural land which is also the basis of existence and condition of the agricultural population. This paper will be presented to the basic conditions of life and professions in rural parts of the municipality of Vrbas and their relationship and impact on the environment. It will be proposed specific measures to reduce the impact of agriculture on the environment and sustainable improvement in the same context of sustainable development. It also will provide guidelines for development and improvement of settlements in order to improve the environment which would improve the living conditions of indigenous peoples.

Key words: *sustainable agriculture, environment, sustainable rural development.*

JEL: *Q56*

Introduction

Agriculture is the economic activity, including plant and animal production, and therefore can basically say that the two main branches of agricultural and livestock farming, which together with forestry and fishing belong to the so called primary economic sector. Agricultural production is the process of production plant and animal products, fish farming, bees and other forms of cultivation and production taking place on agricultural land (Kusters, 1996). Under agricultural land means land used agricultural production (land, gardens, orchards, vineyards, pastures, meadows, marshes, ponds and swamps) and the corresponding land planning document is intended for agricultural production.

Sustainable development has become a fundamental principle of development policy in a growing number of sectors and organizations from local to state level, the private sector

1 Milutin M. Mrkša, Ph.D., „Right at the first chance", Provincial Secretariat for Science and Technological Development AP Vojvodina, Faculty of Sciences, Novi Sad, E-mail: mmrksa@gmail.com

2 Tamara Gajić, Ph.D., Higher School for Professional Studies, Novi Sad, E-mail: gajic_tamara@yahoo.com

through the shareholder (the practice) to the state organization of the economy. There is much discussion about the development of indicators to determine policy development and evaluation of the level of progress. More in our communities, the term includes the development of economic progress, which is not complete or accurate. Economic progress is just a part of development.

The concept of sustainable rural development based on efficient use of resources, leading to increasing social cohesion in rural areas. This concept has a special role as traditionally the most common farming activity of rural population, but at the same time as the most important factor in rural economy. Insisting on sustainable agriculture is based on commitment to the agricultural population made using existence needs using chemical and technical instruments that have a minimal impact on the environment, to the Agricultural Land Relations homey, which will acquire the strengthening of economic conditions, raising the socio-cultural level in terms of preserved environment (Paraušić et al., 2008).

General characteristics of the municipality of Vrbas

Vrbas is crossing the central and southern Backa along the route of the Great Backa canal, which forms the backbone of a hydro system Danube-Tisa-Danube Canal. While as the centre of the Vrbas municipality has a central position in relation to the back, other settlements are more inclined towards its southern part. In addition to the Vrbas, which is also the centre of the municipality, the municipality of Vrbas consists of the following settlements: Bačko Dobo Polje, Zmajevon, Kucura, Ravno Selo and Savino Selo (Group of authors, 1998).

Vrbas municipality covers an area of two geomorphic units: the loess plateau and loess terrace. These units, although relief is clearly defined as distinct morphological categories have many common features. Height difference between them is not the same everywhere. Most notably in the border area to the tower, where the loess plateau dominating the loess terrace within height of 17 m. Southeast of the Vrbas River that border is less pronounced because the transition from one form to another in the form of gentle slopes. The total dissection of the relief is 24m and ranges from 80 m to 104 m above sea level. Meadow calcareous chernozem soil is most common in the area of the municipality of Vrbas (Group of authors,1998). This is the most common types of soil on loess terrace. The average thickness of the humus horizon of this soil type is 65-70 cm. Meadow calcareous black soil has good structure, water-physical and chemical properties, in particular, is rich in nitrogen, phosphorus and potassium, and an agricultural land of high productive value. Chernozem on loess plateau, meadow black soil is relatively deep humus horizon, very favourable and stable structure loamy texture, is well supplied with plant nutrients in available form, water is good physical and thermal properties. Good physical and chemical properties of the deeper layers of the basic characteristics of production for which it is classified as a land of high productive capacity (Lješevi et al., 2011). Carbonate chernozem - extends also to the loess terrace and the loess plateau. On the loess terrace carbonate chernozem is present in several locations, while the loess plateaus of southern parts of the project. The average thickness of the humus horizon is 40-70 cm. Colour is brown calcareous chernozem-brown on the loess plateau, while the loess terrace brownish-black. Solonchak a type of salty soil. It is a type of brine created during salinization. In the

municipality there is a small territory solonchak. This salty soil can be successfully unsalted lowering of groundwater levels (Lješević, et al., 2008).

Clima has no pronounced specificity compared to other parts of Vojvodina, and has features continental steppe climate. Annual average air temperature is around 11 ° C and annual average rainfall is 560 mm. The value of insolation is about 2003 h per year, while the cloudiness is about 60% per year (Popović et al., 2011). For much of the territory is most frequent north-westerly wind in the summer and spring, while the intensity somewhat weaker southeast wind-wind, which is most frequent in autumn and winter.

The most important hydrographical facility in the territory of the Grand Backa Canal, but no less important and other channels hydro system Danube-Tisa-Danube Canal. Digging of the canal has greatly contributed to the creation of the Vrbas as a strong industrial centre, because the channel was designed primarily for transportation. However, the major waterway channel has today become a major environmental problem Vrbas, because he used the same industry, and still used for wastewater discharge. In addition to DTD hydro system, through the municipality, river flows Jegricka, which is partly protected as a nature park category III. The importance of groundwater, except for water, is reflected in the existence of three thermal spring waters that are both energy and health resort potential.

Flora and fauna are directly related to the geomorphological, soil, climate, hydrological and anthropogenic factors, so that in the community, depending on the type of land, more land - drier and lower, wetter (marsh), and develop adequate wildlife. Forests to a significant extent do not exist, except for some trees near the banks of the canal Jegricka, mostly poplar, black locust and pine. With the roads are chaparral and shrub, while at the site Carnok, a significant number of protected species. The most numerous faunistic groups are over 100 bird species, then fish with more than 20 species, while in the hunting and the domains may encounter deer, rabbit, pheasant, quail and others.

The main activities and living conditions in rural municipalities

Agriculture is the process of intensive relations of man and the environment, where there are more different influences. Intensive farming is related to the destruction of natural vegetation and changes the biological cycle of circulation of matter and the water regime of a certain territory (Katić et al., 2008). If the model in the world today around 1.5 billion hectares of land, this is the history of humanity has gone through so much farming land, which is still not processed. Once the land is now cultivated steppe, forest and natural savannah zone. The farmer who handles some land is not only a direct impact on the field dealt with, but does it in a much broader environment, particularly at the present time the present reclamation, chemicals and machinery in agriculture. The first man was a hunter and collector of modern man cannot imagine my life without agriculture because it provides the basis of his diet.

Unfortunately, humankind throughout its history has not taught us that the rational use of land resources. To this day vast areas of fertile land are subject to degradation, and on the other side of a kidnap has facilities for processing. The first enemy of agriculture - erosion

threatens more than half of the ploughed land. Annual losses reached millions of acres of land, and thousands of acres are subject to secondary salinization due to inadequate irrigation. In particular, the major impact of farming on land cover and hydrological processes leading to sharp changes in the function of the biosphere. The importance of agriculture grows with the increasing number of people on Earth (Breheny, 1994). Its impact on the environment is reflected in the following: destruction of natural vegetation over large areas and replacement of a small number of crops species, the conversion of natural bio-geo-coenosis agro-coenosis, converting fertile and productive ecosystems in a few highly productive farming systems, land reclamation, destruction of natural habitats of animals, land degradation cover in terms of its irrational use: water and wind erosion, soil depletion, salinization, pollution of water-logging and excess pesticides and fertilizers; changes of natural radiation and water balance of vast territories, leading to climate change, changes of the hydrological regime of the territory; accelerate surface erosion; consumption groundwater and lowering their levels, increase groundwater levels in irrigation, to increase sedimentation in river basins and their estuaries, pollution of surface and groundwater resources agrochemical, coating, and organic wastes, pollution of the atmosphere: fertilizing and spraying pesticides, raising large amounts of dust the infield. The spatial impact of agriculture on the appearance of the planet and environment as a whole is especially true as a result of this kind of human activity.

Livestock is closely connected with agriculture, but in certain parts of the world functions as a self-employed (nomadic pastoral farming). Adverse impacts of livestock on the environment occur only in cases of intensification when not provided adequate natural resources and the burden of pastures. The following are the impacts of livestock on the environment: the destruction of vegetation over large expanses, and ecosystem changes, degradation of natural grassland vegetation, pollution of surface and ground water of livestock waste. This is particularly important when it comes to large livestock farms, destruction of vegetation and soil erosion in areas of intensive livestock meeting (pens, wells and persecutions), clearing and burning of forests and conversion to pasture. Pasture farming creates a unique way of life and distinctive environment of farmers, creating the appearance of the end of nomadic in particular in areas with sparse pasture, which has a seasonal character. It is not just a specific natural environment of nomads, but also their social environment.

Housing in the countryside is more similar housing in the city, but can still talk about a number of peculiarities. Primarily rural residential buildings are mostly for family housing (Davidson et al., 1977). Modern living in the countryside has many advantages over living in the city. The main advantage is exactly the environment healthier environment. The choice of sites for construction of rural residential buildings is much better, because the most space on which the building is much larger. More and more are being built spacious home in the conformal villages with water supply, sewage, floor heating. Faults that follow an abrupt development in the countryside as a result of unplanned construction of villages, the appearance of bad taste, excessive competition in the construction of large buildings unnecessary, tasteless buildings that do not correspond to a given area and the traditional style of architecture of this region. There is also a problem and lack of sewage systems and water brought in, so that any septic tank overflows and pollute the soil.

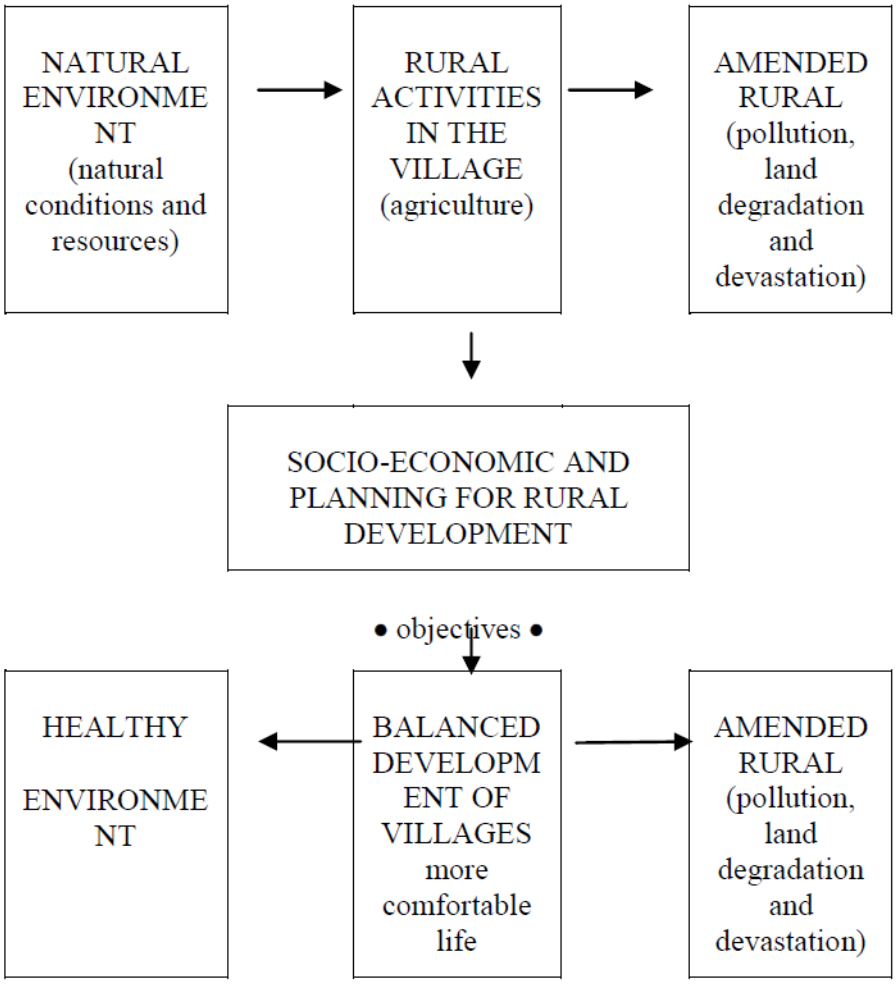
Rural residential building is characterized by much larger hall of the city's housing, and the greater the kitchen, dining room and living room. Larger hall is necessary because it postpones work clothes and shoes, there are disposed the materials to be used in later work. Clothing and footwear as well as materials that bring the outside in a residential building are dirty, so it is necessary to temporarily leave the hall. Some apartment buildings have a covered terrace where you just leave the dirty stuff, especially muddy shoes. In the traditional architecture of the hall are often open to the courtyard in the form of eaves or porch (Vićentijević et al., 2011). Larger kitchens in rural buildings are necessary because they cook food for the cattle, sometimes only keep young hatched chicks (which is not good for broadcasting of ammonia and odors). In the village is an established habit of eating in the kitchen, even though many households today have a special room for it. Large living rooms are needed in rural areas and because of the rural households in the winter conditions in their work (weaving, spinning, sewing, preparing tools for the summer season, etc.). In rural residential storage buildings are larger than those in urban dwellings, often because the food left in them is not only domestic but also some types of animal feed for the cattle, and if there is no basement, and alcoholic and soft drinks in the village which has significantly higher than in urban areas. Basement of the apartment buildings in the village much neater, because they hold open food (potatoes, cabbage, fruits, vegetables, etc.). Bedrooms are the same or similar as in the city, but it is an established habit of using only one, possibly two, while others are left for guests (guest rooms). The village houses are often used attic room or attic. It is commonly used for storage of materials that dry (dry meat, legumes, onions) then the necessary construction materials in the attic too dry (lumber, beams, etc.), then wool, and sometimes other materials, parts and tools that the prepared and dried.

Hygiene in rural buildings is even more important because these areas are exposed to intense biological pollution from the yard (barns, manure, pen), because the insects transmit harmful microorganisms in the house. It is therefore necessary to put on the windows network (insect) for protection against insects. Entrance hall and kitchen water must be monitored at least once a day in summer and autumn months, and twice. Disinfection and rodent control is much more common than in urban homes, and sometimes it has to perform once a month. When designing the farmhouse should strive to reduce square footage kitchens, to changed habits of the kitchen used to living room.

Sustainable agriculture - an ecological basis for sustainable rural development

Based on the foregoing it can be concluded that the management of space on the premises of sustainability (in this case the development of sustainable agriculture) first possible where all the following (environmental, economic and social) conditions. Research opportunities for development of sustainable agriculture must be based on geo system approach that includes consideration of reversible relations of agricultural activity and geographical area (regions) in which it operates.

From uncontrolled to planned Rural Development (Lješević, Mrkša, Milanovic, 2011)



Source: Lješević, Mrkša, Milanovic, 2011.

Research Methodology environmental components of sustainable development implies, first check the current agro ecological zoning of the territory, since it is the result of long periods of practice, and the agricultural population is characterized by a resistance to innovation. In this regard, it is important to study the impact that the current way of farming left in the environment. The main one is exposed to agricultural land, which because of inadequate operation gets degraded. At first it can appear depressions spots (phytogenic result of erosion), and it later changed because of physical (mechanical) and chemical characteristics of being exposed to erosion (denudation). It is therefore necessary to study the intensity of soil erosion as a function of processing method, and the properties of the terrain (slope, soil characteristics, precipitation, temperature, water regime of the territory, population density, etc.). For this in particular are empirical and

hydraulic methods. Inadequate treatment can lead to the activation of landslides, and the feasibility study of potential landslides also necessary. Inadequate farming (particularly excessive use of agro-chemical substances) may lead to contamination of soil, water and air which is why the body of the method which explores the impact of the current methods of cultivation necessary to include chemical, physical, physic-chemical and biological methods.

The economic component of sustainable agriculture - qualitative changes in farming based on the foundations of sustainable and significant economic consequences. Traditional agriculture cannot be considered sustainable, because it is agriculture which is characterized by low productivity and significant pressure on the main resource - land. Such agriculture cannot meet even the social needs of rural populations and as such cannot stop the negative processes related to rural settlements (population decrease due to emigration, aging rural population, changes in the structure of cadastral land in rural areas, land degradation, etc.). Economic consequences of traditional agriculture can be expressed through the differences, which can be given in monetary units, the actual yield, as a result of such business and the potential yield that could be achieved optimal way of farming. Also, this type of business leads to soil degradation (erosion and soil pollution), which in turn leads to a decrease in their productivity and, in extreme cases, to the exclusion of agricultural purposes. Because of this, and to develop sustainable agriculture, it is necessary to take appropriate measures, such as, inter alia, the protection of soil erosion processes, which in turn has a price and become subject to economic analysis.

Analysis of economic implications of the sustainable agriculture can be conducted in light of theories of development thresholds and cost-benefit analysis. In this sense, a lower threshold of development (constraints that lead to increased costs of doing business) may be considered that all investments are made in a given area, but not exceeding a predetermined threshold of profitability. Threshold of development (which eliminates the restriction of a new way of doing business in a particular area) is primarily considered to be all that takes ecological, as well as causing excessive erosion or landslides activate, and accidental pollution of basic environmental media (soil, water and air) , the destruction of indigenous flora and fauna. Also, the thresholds of development are considered and all the investments that exceed the threshold of profitability, that is no excuse to increase profits from a new way of doing business.

Cost-benefit analysis involves preparation of balance where on one side of the data structure of costs (losses and expenses), and the second structure obtained (yield). Traditional agriculture is characterized by a negative balance, causing the population and decides to leave agriculture. Conversely, sustainable agriculture has to have a positive balance. The volume of investment (cost) is determined by the "capacity areas", or optimal (not maximum) throughput. Determination of balance is achieved by introducing an input - output matrices, which show the direct effects of individual measures, the introduction of the sustainability of individual items by the positive balance, and thus on the environment (those elements that can be quantified - to express monetary units).

The social component of sustainable agriculture - Sustainable development as a paradigm that underlies the modern economy, among them agriculture, must be equal to the ecological and economic aspects of sustainability and looks at the man with all his inherent properties, in other words not to neglect any social, psychological, cultural, intellectual, spiritual specifics of the human person. In economic activities, or general management area (on the principles of sustainability) man can be seen as: driver man or management entity, one consumer, one as an indicator of standard of having to use the environment. Viewed in the context of the development of sustainable agriculture first paragraph of this three-type separation can be a man as a farmer in the broadest sense (planners, managers, direct agricultural producers, inventors, etc..) - Simpler work force, which is the most important social geographic potential for development of sustainable agriculture . Even a rough idea of scale attempt at determination of agricultural producers in the preceding sentence leads us to the necessity of studying the demographic structure of the labour force in agriculture, but also its spatial distribution, abundance, population density (general, rural and agricultural), natural and mechanical demographic trends and forecasts. The second paragraph of this division is the subject of discussion around the economic aspects of sustainable development and the inherent right to market the new business model that sets the centre of the market needs (consumer), while the third paragraph of the best shows reversible relationship farming - a landscape in which it operates.

Conclusion

Rural planning must be followed or the consequent socio-economic planning of the village. Need harmony of these two forms of planning stems from the fact that only a developed society, improved farming technology can provide efficient and Rural Development. It should also be borne in mind that a healthy environment today is more expensive and only economically and technically developed societies can “produce” a healthy environment. True natural environment in terms of the initial product of natural processes and cannot be produced whatever the technological level of a society. However, already degraded environment, a large scale case, it can be repaired only if the company is technically and economically developed.

Fundamentals of measures to improve the environmental quality of rural territory in the municipality of Vrbas which must be implemented in the regulation of the village are: reclamation of the territory, water, waste, greening, street paving and sidewalk construction. Sanitary drainage reclamation means rain water, draining wetland territories, especially torrential water regulation. To improve water supply in rural areas should preferably rely on the construction of a single water supply, and if it is not possible to build such wells for which protection is provided hygienic water. Drainage must be provided for the first mass use of social facilities (schools, hospital, local community centre, etc.), and then later to a farm and residential buildings. To improve sanitary conditions, it is necessary to organize the collection, exporting, storage and use of various wastes. For this purpose should be to implement the

following measures: the construction of rational waste collection centres, greater use of composting organic waste, construction of rational landfill, establishing proper hygiene cattle graveyards, use of organic waste for energy purposes, a reorientation of agricultural production to healthy food.

Literature

1. Breheny, M. (1994): *Defining Sustainable Local Development***,** Discusion Paper, No 23. Department of Geography, Universiti of Reading, UK.
2. Davidson, J., Wiberley, G. (1977): *Plannimg an the Rural Development*. Urban and Regional Planning Series. Vol. 18. Pergamon press, Oxsford.
3. Group of authors (1998): *Opština Vrbas*, institut za geografiju, PMF, Novi Sad.
4. Katić, B., Cvijanović, D., Cicea, C. (2008): *Organska proizvodnja u funkciji zaštite životne sredine u Srbiji - stanje i regulativa*, Ekonomika poljoprivrede, vol. LV, no. 3, p. 267-276, Beograd.
5. Kusters, N. (1996): *Eco agro tourism,* The International Conference on natural areas and tourism. Gruppo Planner, Las Palmas.
6. Lješević, A. M. (2003): *Životna sredina sela i nenastanjenih područja*, Geografski fakultet, Beograd.
7. Lješević, A., M., Markićević, M. (2009): *Geografske premise održivog razvoja poljoprivrede*, Glasnik Srpskog geografskog društva, Sveska LXXXIX Br. 2, str. 127-134, Beograd.
8. Lješević, A. M., Mrkša, M. M., Milanović, M. M. (2011): *Ekološki aspekti planiranja ruralnog razvoja*, Glasnik Srpskog geografskog društva, Sveska XSI br. 1, str. 33-50, Beograd.
9. Paraušić, V., Cvijanović, D., Hamović, V. (2008): *Organska proizvodnja Republici Srbiji – analiza stanje i pravci razvoja*, Ekonomika poljoprivrede, vol. LV, no. 4, p. 355-364, Beograd.
10. Popović, V., Katić, B., Savić, M. (2011): *Ruralni razvoj u Srbiji i lokalne zajednice*, Ekonomika poljoprivrede, vol. LVIII, no. 1, p. 33-44, Beograd.
11. *Strategija ruralnog razvoja Srbije* (2009): Ministarstvo poljoprivrede, vodoprivrede i šumarstva, Beograd.
12. Vićentijević, D., Aćimović, LJ., Stevanović, S. (2011): *Uticaj tehnološkog razvoja na održivi razvoj poljoprivrede i zaštitu životne sredine*, Ekonomika poljoprivrede, vol. LVIII, no. 2, p. 191-203, Beograd.

ODRŽIVA POLJOPRIVREDA KAO EKOLOŠKA OSNOVA ODRŽIVOG RURALNOG RAZVOJA OPŠTINE VRBAS

Milutin Mrkša[3], Tamara Gajić[4]

Rezime

Poljoprivreda predstavlja osnovno zanimanje ruralnog stanovništva i kao takva predstavlja osnovu razvoja i napretka,ne samo ruralnih područja, već i lokalnih zajednica u celini. Kao i svaka druga delatnost i poljoprivreda ima niz negativnih uticaja na životnu sredinu, pre svega na poljoprivredno zemljište koje ujedno predstavlja osnov i uslov egistencije poljoprivrednog stanovništva. U ovom radu će biti predstavljani osnovni uslovi života i zanimanja u ruralnim delovima opštine Vrbas, kao i njihov odnos i uticaj na životnu sredinu. Takođe će biti predložene određene mere smanjenja uticaja poljoprivrede na životnu sredinu i održivo unapređenje iste u kontekstu održivog razvoja. Isto tako biće date smernice razvoja i unapređenja naseljenih mesta u cilju unapređenja životne sredine čime bi se poljoboljšali uslovi života domicilnog stanovništva.

***Ključne reči**: održiva poljoprivreda, životna sredina, održivi ruralni razvoj.*

3 Dr Milutin M. Mrkša, „Right at the first chance", Pokrajnski sekretarijat za nauku i tehnološki razvoj AP Vojvodine, Prirodno – matematički fakultet, Novi Sad, E-mail: mmrksa@gmail.com

4 Dr Tamara Gajić, Visoka Poslovna Škola Strukovnih Studija, Novi Sad, E-mail: gajic_tamara@yahoo.com

UDC 338.43:63 **ISSN 0352-3462**

ECONOMICS OF AGRICULTURE

CONTENT