

LAND MANAGEMENT IN MODERN FARM PRODUCTION

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Abstract

The food is a basic human need, and as agricultural land is the base for its production, it is considered as the most important category of land. Land management in modern farm production is the key element of agricultural, economic and social development.

The aim of paper is to actualize the issue of the rational agricultural land management, as well as defining the directives, which will help efficiently to use and preserve the most important resource for future generations.

Of the methods that are applied, the key are statistical methods, graphical methods, comparative analysis method, and other standard methods are used (analysis and synthesis, description, logic, etc.)

One of the most important assignments is determining the availability and the state of land capacity, while in order to establish the most adequate management models is important the determining the ownership structure, the size of the property, way of the use and degree of utilization. Law on Agricultural Land is the key of advancement of land management from the macro aspect.

The importance of long-term sustainability and advancement of land management have been recognized by the individual producers, and it is important that state recognizes in them its the most significant strategic partner.

Key words: *land management, farm production, sustainability*

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Introduction

One of the primary resources, which determine the sovereignty degree of some country, is food. The significance of food is constantly increasing in the world, regarding the growth of population and decreasing resources for production. As the agricultural land presents the base for its production, simultaneously, it presents, productively and economically, the most important land category, as a natural resource (Sevarlic, 2015).

Land management in modern farm production forces upon as a one of the most important issues of agricultural production, but also society in whole. The Republic of Serbia disposes with (although in the last half century significantly reduced) significant land resources and their adequate valorization is the holder of complete agricultural production advancement, similar economic activities and striking more significant position in the liberalized world food market.

The Subject of Paper

The subject of paper is modeling the land management in modern farm production, as something of national interest with strategic importance.

All important aspects of farm land management from micro and macro aspects are included with emphasis on sustainability, as a basic parameter which determines success in the long-term.

The Aim and Importance of Paper

The aim of work is to actualize the issue of rational agricultural land management, as well as defining the directives, which will help efficiently to use and preserve the most important resource from various adverse impacts, so that generations, that are coming, could have possibilities for production of quality food in sufficient quantities.

The importance of the paper is reflected in the consideration and connecting the necessary conditions which are needed for rational land management in modern farm production in the long term- as the only way of creating the sustainability of the system.

Methodology

In research, it is used description method, statistical method, graphical method, methods of induction and deduction, comparative analysis and synthesis methods, generalization and abstraction, logical methods.

Land Use in Modern Farm Production

Farm land is the elementary resource, which provide the production of all agricultural products, even cattle, because it depends on land for production of forage (Kay et al., 2012).

During recent 300 years, significant expansion and intensification of farm production are recorded on earth. In the period from the 19th century, major changing in the intensity degree are perceived, where surely the transport revolution should be marked as one of the valuable determiners of development and intensification of agricultural land use (Rankin, 2009).

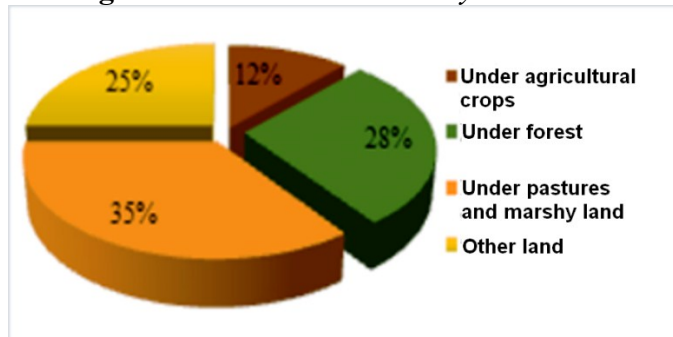
The land is not just the primary production factor, but also the basis of food security of the population and the most valuable natural resource from which crucially depends the development of rural communities and the survival of rural families (Subic et al., 2005).

Contemporary Serbian agriculture is characterized by trends of insufficient investment, which results with the much weaker results comparing to the possible, insufficient utilization of potential, accelerated deagrarianization, huge number of elderly agricultural households, and low level of specialization in production, low average earnings and thus, insufficient motivation. Serbian farm production is characterized by domination of individual agricultural holdings, the relatively small size of land area (4.5 ha), large fracturing, but also lack of agricultural cooperative and inter-cooperative connection (Census of Agriculture, 2012-I; Bozic et al., 2004; Parausic et al., 2007).

Status and Tendency of the Land Availability in the World

The world's land area is 13.2 milliard acres. There from, crop plants are fostered on 12% of the land, 28% is covered by forest, 35% covers systems of pasture and forest ecosystems, while the rest 25% is covered by the rest land (FAO, 2011).

Figure 1. World Land Areas by Territories

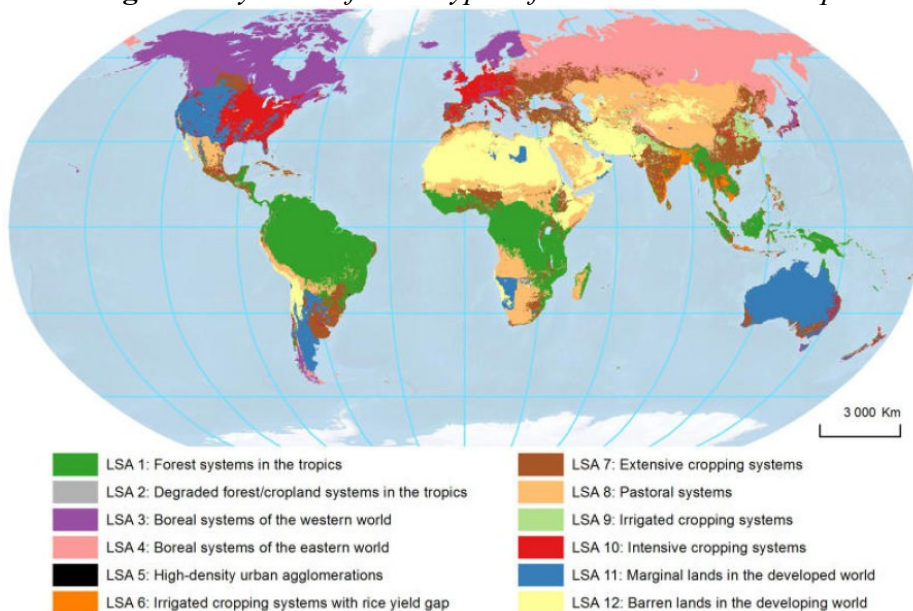


Source: *FAO, 2011*

The world arable lands are increased by 12% over the last 50 years, mainly because of forests, wetlands and grasslands, while the world regions under irrigation have been doubled.

With a goal to assess the global impacts of land use on the environment and the provision appropriate countermeasures, the group of researches has created a map of system of land use at the global level (Figure 2), where the 12 archetypes have been identified, based on numerous parameters (Helmholtz Centre For Environmental Research-UFZ, 2013).

Figure 2. Systems of Archetypes of Land Use: World Map



Source: *Helmholtz Centre For Environmental Research, 2013*

The importance of these researches is reflected in:

- Identification where the unused potential for intensification of farm production is;
- Coordination of the potential of intensification with interests of environment;
- Coordination of potential with socio-economic conditions.

Agricultural Land Status in Republic of Serbia

Disposition of the relevant information presents the starting point of status analysis and tendency of availability in Serbia. Considering that we disposed until 2012 with Census of Agriculture from 1960, Census of Agriculture 2012 presents nationally the most significant and programming the most comprehensive activity. Relatively high methodological and statistical comparability with the definitions and databases in relation to FAOSTAT³ and EUROSTAT⁴ is of great importance for the comparability of the situation, determining the development strategy, as well as the opportunity of positioning Serbian agriculture on a global scale (Sevarlic, 2014).

The Census of Agriculture (2012), following facts are identified:

- In period from 1960-2012, the third of the total agricultural land was spent (over 1.9 million ha) on infrastructure and other non-agrarian purposes, and the estimated economic damage is around 10 milliard euros.
- Total available land covers 68.9% of territory whose structure is made of: 72.2% of agricultural land, 19.1% forest land and other land 8.6%.
- The land suitable for agricultural production makes only: 52.2%, while 47.8% makes the class of land with limited or very limited production capacity (5% in Vojvodina and 95% in Central Serbia).

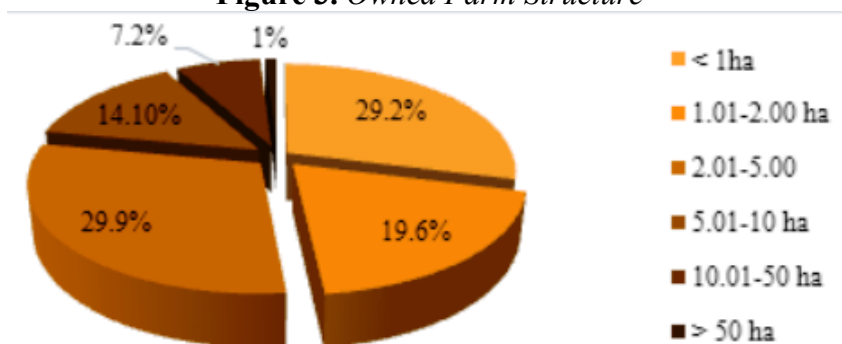
Structure of farms in Serbia is very complex, where small farms parallel exist, subsistence farms, huge family farms, as privatized large enterprises with mixed ownership structure. Decreasing trend of Serbia's agricultural farms is present (Bozic et al., 2004).

³The Statistics Division of the FAO.

⁴The Statistical Office of the European Union.

Average size of farms in Serbia accounts 4.5 hectares, while in area of Vojvodina, that size is over 10 ha. In ownership structure of farms in Serbia, depicted in Figure 2, small farms (up to 5 ha) have the largest share in total number of farms with 48.8%, while the biggest farms are only 1% of total number of farms.

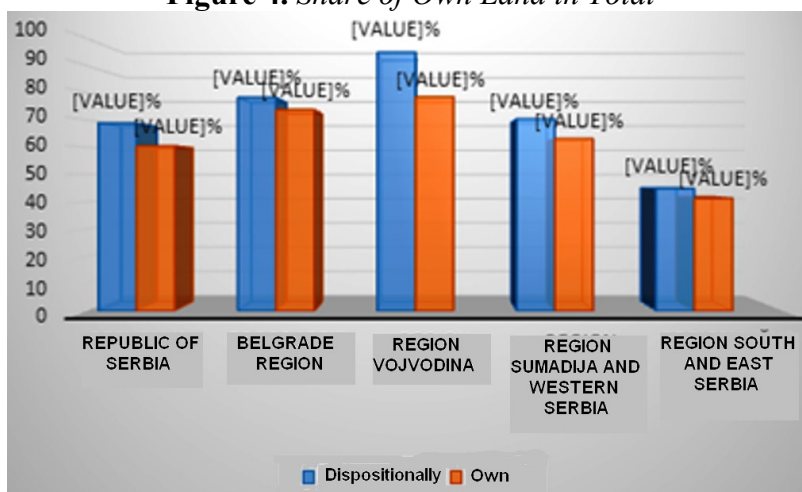
Figure 3. Owned Farm Structure



Source: *Census of Agriculture (2012)*

Family farms are very fragmented, they have conspicuous natural consumption and significantly lower degree of commercialization in comparing with European farms (Bozic et al., 2004). By the Census of Agriculture (2012), it is identified that unused agricultural land includes 12.3%, which certainly is a fact that indicates to the need of arranging that land surface. In total property, own land is dominant (Figure 4).

Figure 4. Share of Own Land in Total



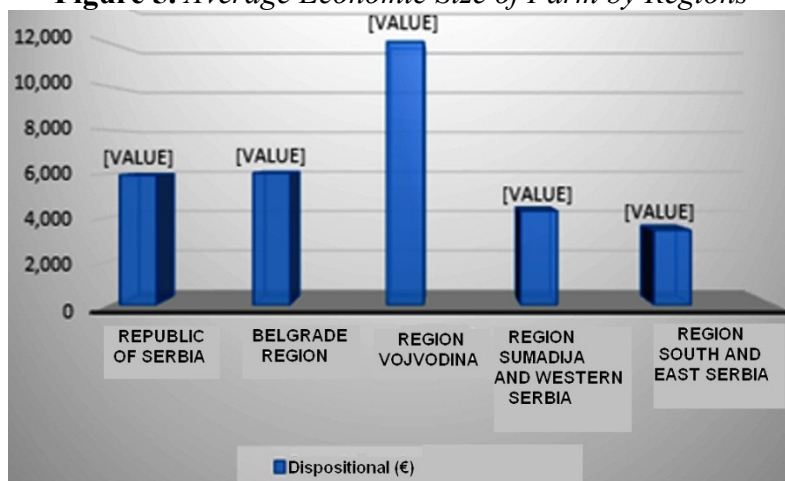
Source: *Census of Agriculture (2012)*

According to data RZS (Cvijanovic et al., 2014), analysis of economic size of agricultural economy in Serbia is conducted, thus it is identified that average economic size accounts 5.939 euros in 2012, and it is mostly determined by large number of family farms, while according to organizational and legal form, this indicator is:

- 1) in sector of family farms - 4.990 euros;
- 2) in sector of legal entities and entrepreneurs - 204.755 euros.

Observed to regions, smaller economic size of farms is in region of South and East Serbia, region of Sumadija and West Serbia, while the stronger economic farms are located in Vojvodina (Figure 5).

Figure 5. *Average Economic Size of Farm by Regions*



Source: *Census of Agriculture (2012); Cvijanovic et al., 2014.*

High participation of population in rural areas and availability of capacity of agricultural land should be the framework of national plan of land management in order to advance complete agricultural sector, and by that increase existing participation of agriculture in gross domestic product (GDP).

Land Management

The land characteristics greatly affect the economy and management by it. The aim of farm land management is to keep its productivity, and if it is possible to improve it. The land could be made inappropriate for agricultural production, if it is not rationally used, and due to floods, erosion and other disasters (Kay et al., 2012).

The population growth and need for food, deagrarization, globalization of agricultural production and market liberalization have caused the necessity of agriculture development, as well as the farm production directed to achieve increasing productivity. By time, conventional access has completely taken over irresponsibly imposing inadequate solutions for numerous issues such as: (1) need for increased use of land; (2) necessity of irrigation; (3) increased need of mineral fertilizers and pesticides; (4) development of highly income models of farm production; (5) secure modification of plants and animals, in order to increase productivity. Sustainability of the entire agricultural system is threatened by solutions which are offered by conventional approach, and which is still dominant today.

The consequences of conventional approach to the agricultural activity and land management are numerous and are reflected in infringed its quality and productivity, which can imply serious environmental and social problems.

Land management is the key issue of sustainability of farm production, satisfying various needs of society, preservation of genetic heritage and degraded ecosystems.

Land management represents systematic assessment:

- Land and water resources,
- Alternative for land use,
- Economic and social conditions with aim of choice and adoption the best options of land use.

At the same time, land management presents planning the farm production in such a level that includes both benefits for farmers and whole community.

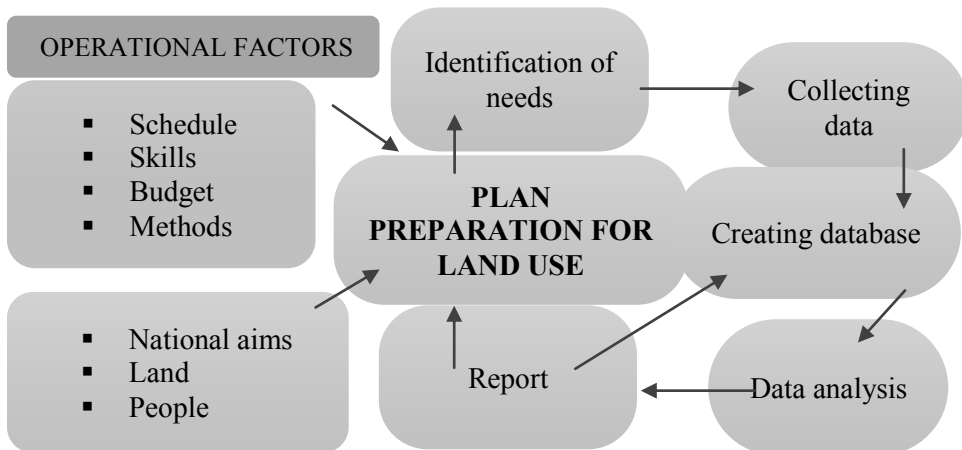
The process of land management defines what is considered as the best use for particular plan project. Planning process starts with establishing the aims and project assignments, then there are work organization, problem analysis, identification of possibility for changes, assessment of sustainability of land, evaluation of alternatives, the choice of the best option, plan preparation of land use, plan implementation, as well as monitoring and audit of plan (FAO, 1996).

The aims of planning of land use are efficiency, equity, acceptability, and sustainability. The agricultural land management is determined by combination of techniques criteria, farmers knowledge and economic principles e.g. profitability (Verheye, 2011).

For farmers, efficiency is the largest return of invested funds that are invested in the form of capital and labor or the greatest possible benefit of available land, while the aims for the state are much more complex.

The plan preparation of land use (Scheme 1) is a complex process which requires primarily to determine what factors are the need (national objectives, land, people) and what the operational factors are available (schedule, training, budget, methods). By identification of needs, we decide whether the plan of land use will be adequate and sustainable. Therefore, it is necessary primarily to dispose with timely and comprehensive information, otherwise, inadequate identification is surely certain, and as such, represents the biggest “brake” of plan success. By collected data, database is formed based on which the analysis is preformed. The reports of conducted analysis make the base for creating the plan of land use, thus it is necessary to include them into the database, in order to follow results in a long-term level.

Scheme 1. *Plan Preparation for Land Use*



Source: *FAO, 1996*

In order to achieve synchronization of the planning land management, it is necessary to be applied at three levels: national, regional and local.

Land use planning at the national level starts with establishing the priorities at the regional level and includes: balanced policy of management with different sectors, which have competitive requirements for land, national developmental plan and budget, as well as the laws that regulate the areas as the lease of land, water resources, deforestation etc.

Considering that agricultural land presents natural resource of national importance, the Law on Agricultural Land presents one of the most important laws for managing the agricultural policy. It will contribute to the planning management of land in long-term, and should protect:

- farm land from irresponsible management solely for the aim of gaining profit,
- farm producers,
- complete agricultural activities.

As the most important aspects that could be regulated by the Law on Agricultural land, we exclude:

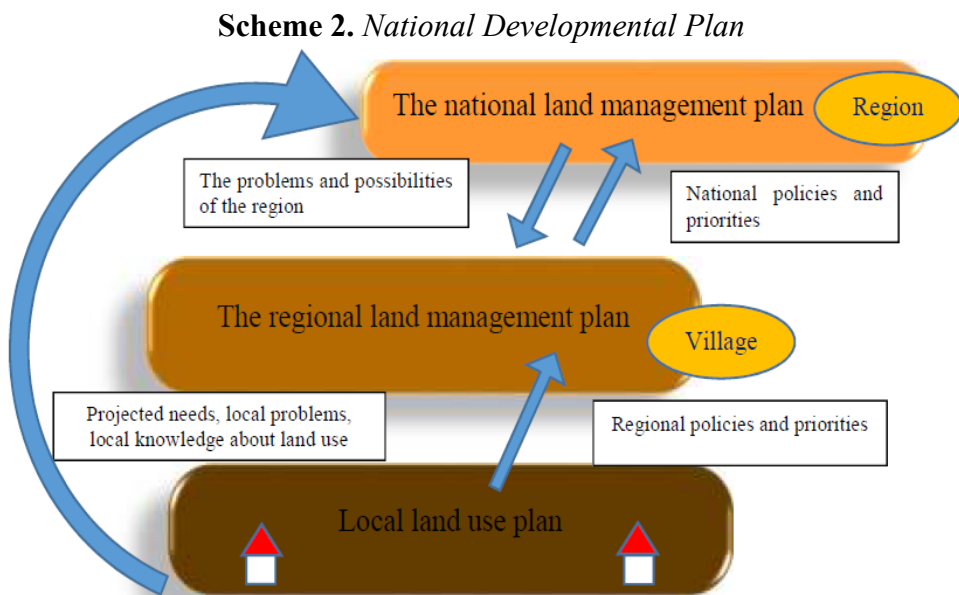
- Carefully regulating the conditions of land sale to foreigners, whereby normalizing the rigorous conditions of purchase plays a significant role. The conditions should be related to the necessity of previous long residence in the country, but also to the necessity of registered long engaging with farm production.
- Regulating in area of acquisition of ownership right in the long-term lease (lease of state land, equal access to the same, pre-emptive rights, etc.) It is unfavorably to allow the priority right to lease on long period, exclusively based on investment, because in that way the family farms are put in the unfortunate situation comparing to great investors. Precisely because the state of Serbia disposes with almost half a million hectares of land, it has an instrument by which it can provide competitive capabilities of small and medium-sized farmers.
- Regulating the maintenance of soil fertility by the tenants, by which the all would be conditioned by obligation to return the land's same or greater fertility after the expiry of the lease.
- Regulating the issue of obligatory land use. Enabling the access to the land that was not used for production for certain number of years to the persons who want to be engaged in the same, with unchanged ownership of the land with the consent of the amenable services.
- Regulating providing unemployed agricultural experts to advance significantly the agricultural production by self-employment on state land.
- Expansion of land ownership aimed to achieve economics of scale.

- Development of organic agriculture.
- Retention and return of population to the mountains area by exemption of tax of al agricultural lands above 600m, as well as land of V-VIII class.

The regional planning level of land use has a task to take across the national developmental plan on the local level, so that the same will coordinate with the diversities of land and its suitability for the purposes of project.

The essence of planning of land use on local level is the aims implementation of developmental national plan. On the local level, it is identified what is necessary to do, how, where, when, who, and on what ways it takes responsibility. Implementation of local developmental plan largely relies on individual farm producers, so the state should recognize in them the most important partner. Acceptability and applicability of plan on local level are the key element of national plan success.

Essentially, plan concept of land use presents bi-directional relations between planning on various levels (Scheme 2).



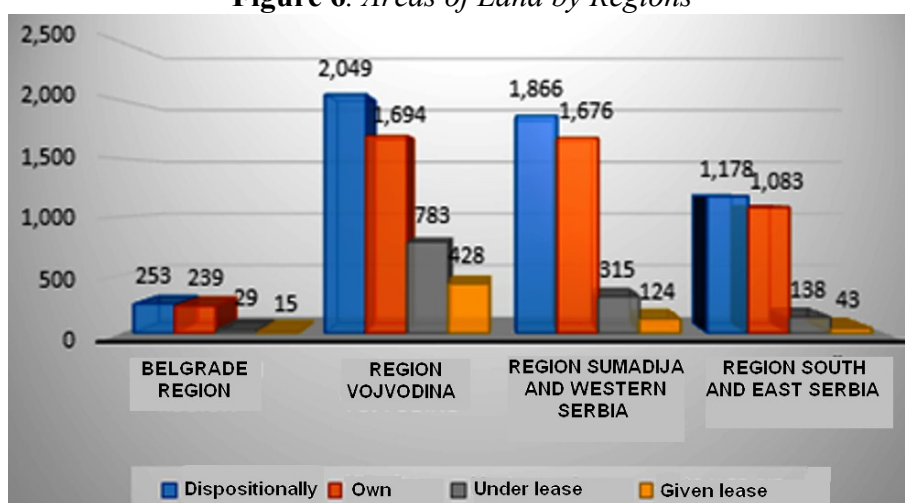
Source: FAO, 2011

The Ways of Providing Agricultural Land Ownership or Lease

Two the most important decisions which farmer must make refer to the issues about what land capacity should be managed and how reach it. If it is disposed with too small land capacities, there is a possibility that too small business can not completely use other resources. Too much land capacities can condition need for huge investment of money, which can outgo the possibility of management, too.

Farm production can be conducted on the place, which can be in own property, on a land under the lease or land of combined structure of ownership and the lease (Figure 6) (Census of Agriculture, 2012).

Figure 6. *Areas of Land by Regions*



Source: *Census of Agriculture (2012)*

Advantages of production on land in ownership, comparing to production on land under the lease are (Kay et al., 2012):

- Property safeness provides long-term production planning without fear of area reduction;
- Providing credit capability at bancs, because the own land is the one of the best stock funds;
- Long-term of inflation, considering that the growth rate of land prices tend to be equal or above the rate of inflation;
- Independent and free decision-making in all aspects of production;
- Larger part of investing as well as the larger level conservation and improvement of quality and fertility of plots.

Productions exclusively on own land can be a disadvantage, and which is reflected in limited availability of capital (Kay et al., 2012):

- Land purchase by credit can cause the excessive mortgage, so imperil the capital trend, in deed there is a possibility that the profit is not enough for settling the received obligations;
- Alternative investments can have higher annual rate of income from capital invested in land;
- Ultra capital investing in land purchase can negatively affect input investment, thus on profitability.

The agricultural land lease is recommended to those who dispose with limited financial resources, whether it is about beginning of farm production or advancement of existing by increasing the land capacities.

Some of advantages of the land lease (Kay et al., 2012):

- Larger volume of disposable working capital;
- Possibility of engaging lessor for expert advice;
- Greater flexibility of agricultural areas compared to changes;
- Greater flexibility of financial obligations compared to many years fixed-rate credit. The agreed rent in advance is not flexible, but the negotiation about the lease on annual level in relation to the current economic conditions is possible.

As disadvantages of the lease land, we can mark off:

- Insecurity in long-term planning business, because the lease agreement are concluded for a short period from one to several years;
- Insufficient interest of the leaseholder for more serious investing on land an therefore lower incomes;
- Lower possibility of gaining the credit, because the farmers do not have land in ownership, which they can offer as stocks.

The optimal solution in modern conditions of farm business presents appropriate combination of own and leased land, because it provides avoiding huge financial risk. Farmers should be motivated for the lease or redemption of neighboring parcels, which are uncultivated, thus with this linking up, they enlarge their properties, by which the scale economy is achieved.

Necessity of Sustainable Practices in Farm Land Management

The consequences of conventional approach in land resources management are reflected in the degradation of the same (contamination of mineral fertilizers, pesticides, etc.) and production of insecure food (pesticides residues, genetically modified organisms, etc.). The significance and value of sustainable land management have been already recognized in seventies of the last century, period for which the beginning of IFOAM⁵ and organic production are being attached.

In order to decrease negative effect of land farm degradation, practices are brought into such as mulching, plowing the outline, the cultivation of legumes, agroforestry, etc. (Thapa et al., 2012). Organic production presents one of the ways of land preservation or sustainable managing of it, and implies the huge limitations in terms of using of mineral fertilizers, pesticides, heavy machinery, fossil fuels, etc. (Lazic et al., 2008).

Given that the society has interest in preserving farm land, in order to provide food security, it must take care and put set of measures, which will influence that fund, can have productivity in a long-term (Prodanovic, 2015). It is more important to maximize the profit in a long-term, than take relatively higher rate of profit in a short-term. Often lower profit in a short-term can be condition to achieve higher profit in the future, for instance, when it is necessary to invest in investments such as making terraces, drainage and so on (Kay et al., 2012). From that reason, many farmers apply crop rotation and farm fertilizers, although the same rejects a lower level of profit. By farm production, productivity and land quality should be maintained (Thapa et al., 2012).

Using and advancement of agricultural land, through the concept of sustainable agricultural and rural development, as well as the measures of management of it, should have priority in domestic agricultural policy (Subic et al., 2005).

Sustainable housewifery of land resources means:

- The maintenance of desirable pH land value;
- The application of adequate ameliorative measures;
- The reduction of transit of hard mechanization;
- The reduction and restrictions of use of mineral fertilizers and pesticides.

⁵International Federation of Organic Agriculture Movements.

Conclusion

Land management in modern farm production is imposed as one of the most important questions of agricultural production. It presents planning and farm production organizing, which will bring the advantage for farmers, but also for society as a whole.

Strategic management of farm land refers to:

- Preservation of existing areas by preventing repurposing;
- Maintaining its productivity;
- Establishing the unused potential due to intensification of production in accordance with the interests of society and the environment;
- Regulation of the lease and land redemption;
- Increasing the landed property and decreasing the number of parcels, in order to achieve economy of scale.

Essentially, planning concept of land use presents bi-directional relations between planning at different levels: national, regional and local. High involvement of rural population and availability of farm land should be the framework of national plan for land management with aim of advancement complete agricultural sector.

The Law on Agricultural Land could contribute to more efficient land management in long-term, and the most important is to protect it from irresponsible management, encourage economy of scale and development and sustainable agriculture, what the main principles of modern concept modern rural development are.

Conventional approach in farm land management provided efficient using the same, but also led to the numerous problems. Sustainability of agricultural system is imperiled, so intention is on introduction of sustainable practices of management, which will mean the efficiency in the long-term. The aim is to establish the farm production which will maximize the current value of land in long-term, respectively, enabling the farm production, which is focused on maintaining the productivity and land quality during the time, by the realization of profit.

Our chance is that we retain everything that values from traditional land management and traditional farm production, but provide farmers with access to new knowledge.

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