

## INVESTMENTS IN LAND AT FAMILY DAIRY FARMS IN SERBIA

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*In Serbia, cattle breeding development trend goes toward decreasing of dairy farms number with (in the same time) increment of cow's number per farm as well as land size enlargement. For the purpose of analysis of available land utilization as well as investments needed for purchasing of more land, in this paper work we observed only larger farms dealing mainly with milk production.*

*It is established that farms can be categorized into three groups, depending on type of cattle production. For farms, we analyzed land area according to way of utilization, crop structure, agricultural machinery, number of cows and milk production. Based on this research, it is possible to see that farmers must invest in significant land purchasing. That requires significant help of the state in the form of favorable loans. Oppositely to that, state must rent the land to farmers by favorable conditions for a longer period of years.*

**Key words:** milk production, family farms, investments, land

**Introduction.** Considering that 40% of population in Serbia is related to agriculture it is clear that agriculture has great influence on total economy development. The most developed European countries, regarding development of agricultural production (Holland and Denmark), have more than 70% of total income in agriculture. In Serbia, proportion of livestock production in total agricultural production is about 55%. Serbia could be classified into moderately developed countries (income of non-developed countries in livestock production is less than 50%). Cattle breeding, as leading branch in livestock production of developed countries, has about 70% of total livestock production while, in Serbia, cattle breeding has a bit more than 50%. When we observe some other parameters, such as milk production per cow, Serbia is also on pediment of the list of European countries.

In cattle production the most important products for human nutrition are milk and meat. In Serbia, family farms are mainly directed toward milk production while meat production is secondary activity. Today, we have decrement of number of dairy farms and in the same time increment of cows per farm with constant increment of milk production per cow.

Breeding of cows in village households has long tradition in Serbia and milk sale provides main part of the monthly income for house budget. However, today's level of cattle production development in Serbia does not have satisfactory level. Defeating information is that Serbia is on the pediment of European countries regarding number of cattle per available agricultural land.

With aim to point out the present problems we surveyed family agricultural farms dealing in cattle production as main activity. We inquired 42 family farms which have at least 10 cows. Those were serious milk producers in Serbia. Analysis of the questionnaires showed the existence of following types of cattle production:

**Type 1** – Milk production and heifer breeding for replacements.

**Type 2** – Milk production, heifer breeding for replacements, and fattening of remained steers and heifers.

**Type 3** – Milk production, heifer breeding for replacements, fattening of remained steers and heifers, and fattening of purchased steers.

Out of all inquired farms the largest number belongs to type II (20 farms) while a bit smaller number of farms deal in cattle production type I (16 farms). The smallest number of farms, only 6, belongs to the third type of cattle production. Based on collected data using questionnaires it is possible to determine the influence of certain organization and economic characteristics of farms on their business results. More detailed analysis is being done for the

most important indicators of farm business such as available land area, crop structure, agricultural machinery, analysis of milk production and analysis of expected investments in land purchase.

Data collection and analysis of questionnaires are being done in accordance with methodology used for similar researches by Bastajič (2005), Krstič and Smiljanjič (2003) and Krstič et al. (1995).

**Land areas and crop structure analysis.** Observed by type of farms, the largest own land area as well as total land areas belongs to farms of type II (Table 1 and Table 2). Regarding rented land areas the most important are farms of type III. The least land areas (own, rented or total) have farms of type I. In all farm types we can see the dominant participation of arable fields and gardens, while other categories of cultivable area, such as pastures, forests and uncultivable area are irrelevant. It is interesting that farms of type III do not have orchards, vineyards, meadows, pastures or forests.

Observing arable fields crop structure (Table 3) it can be concluded that cereals are dominant in all types of farms (about 67% in type II and III, about 57% for type I). Then, there are fodder crops (31.51% at type I and about 25% at type II and III). Farms of I and II type have approximately the same crop structure in the case of industrial crops and vegetables, while farms of type III have minimal areas under industrial crops and significant areas under vegetable production. Also, farms of type III have the smallest area under arable fields per household member but the largest area of arable field per active household member that works on farm.

Table 1: Structure of own and rented land

Way of use	Own (ha)			Rented (ha)		
	I	II	III	I	II	III
Arable fields and gardens	17.40	22.22	16.78	13.89	16.58	17.42
Orchards	-	0.13	-	-	-	-
Vineyards	0.01	-	-	-	-	-
Meadows	0.11	0.03	-	-	-	-
<b>Cultivable area</b>	<b>17.52</b>	<b>22.38</b>	<b>16.78</b>	<b>13.89</b>	<b>16.58</b>	<b>17.42</b>
Pastures	-	-	-	-	-	-
<b>Agricultural land</b>	<b>17.52</b>	<b>22.38</b>	<b>16.78</b>	<b>13.89</b>	<b>16.58</b>	<b>17.42</b>
Forests	0.16	0.11	-	-	-	-
Uncultivable area	0.18	0.25	0.23	-	-	-
<b>Total area</b>	<b>17.86</b>	<b>22.74</b>	<b>17.01</b>	<b>13.89</b>	<b>16.58</b>	<b>17.42</b>

Source: Questionnaire of family farms and authors' calculations

Table 2: Total land structure

Way of use	Total land area (ha)		
	Type I	Type II	Type III
Arable fields and gardens	31.29	38.80	34.20
Orchards	-	0.13	-
Vineyards	0.01	-	-
Meadows	0.11	0.03	-
<b>Cultivable area</b>	<b>31.41</b>	<b>38.96</b>	<b>34.20</b>
Pastures	-	-	-
<b>Agricultural land</b>	<b>31.41</b>	<b>38.96</b>	<b>34.20</b>
Forests	0.16	0.11	-
Uncultivable area	0.18	0.25	0.23
<b>Total area</b>	<b>31.75</b>	<b>39.32</b>	<b>34.43</b>

Source: Questionnaire of family farms and authors' calculations

Table 3: Crop structure depending on type of cattle production

Type of crop	Type I		Type II		Type III	
	ha	%	ha	%	ha	%
Cereals	17.85	57.05	26.19	67.50	22.73	66.46
Industrial crops	3.27	10.45	3.38	8.71	0.76	2.22
Fodder crops	9.86	31.51	8.81	22.71	8.94	26.14
Vegetables	0.31	0.99	0.42	1.08	1.77	5.18
Total arable field and gardens	<b>31.29</b>	<b>100.00</b>	<b>38.80</b>	<b>100.00</b>	<b>34.20</b>	<b>100.00</b>
Arable field per household member	6.51	-	7.12	-	5.54	-
Arable field per active household member that works on farm	10.64	-	11.94	-	13.68	-

Source: Questionnaire of family farms and authors' calculations

**Analysis of agricultural machinery.** Analysis of various types of surveyed farms showed that between them there is no significant difference in number of tractors (Table 4).

Table 4: Agricultural machinery

Indicators	Type I	Type II	Type III
Number of tractors per farm	2.63	2.50	2.50
Number of hectares of arable fields per tractor	11.90	15.52	13.68
Number of tractors' KW per hectare of arable fields	4.40	3.19	3.49

Source: Questionnaire of family farms and authors' calculations

The largest numbers of tractors as well as number of tractors' KW per hectare of arable fields have farms of type I. However, these farms have the smallest number of hectares of arable fields per tractor. That is why we can say that farms of type I, considering cultivated land areas, invested too much in mechanization (both number of machines as well as their force). It is possible to say that farms of type II use tractors in the most rational way, because they use the same number of tractors as farms of type III for more hectares of arable fields. Besides, farms of type II use less KW per hectare of arable fields than farms of type III.

**Analysis of cows' number and milk production.** If we observe number of cows per farm, the largest number have farms of type II, a bit smaller number of cows have farms of type I and the smallest number have farms of type III (Table 5). However, the differences in number of cows between various types of farms are not large and average number of dairy cows per farm, of all types, is about 20. Also, there is no significant difference in the quantity of produced milk at the farm, in all farm types.

If we observe milk production per cow we can conclude that cows, at farms of type III, have the largest average production, while that indicator is the poorest at farms of type II. We can say that dairy cows have approximately the same production (about 5,000 liters annually) at farms of type I and II while farms of type III have some better results.

Farms of type I showed the best results regarding the number of cows per hectare of arable field as well as concerning milk production per hectare of arable field, which is caused by relatively large number of cows and the smallest land areas.

Table 5: Indicators of cattle production

Indicators	Type I	Type II	Type III
Number of farms in group	16	20	6
Average number of cows per farm	19.63	21.95	17.17
Average milk production per farm (l)	107,341.91	114,487.01	101,776.80
Average annual milk production per cow (l)	5,223.88	4,908.82	5,736.73
Number of cows per hectare of arable field	0.63	0.57	0.50
Milk production per hectare of arable field	3,430.55	2,950.70	2,975.93

Source: Questionnaire of family farms and authors' calculations

**Future investments in land.** In previous analysis is showed that all farms rent large land areas. Namely, farms of type I rent in average 13.89 ha, farms of type II rent in average 16.58 ha and farms of type III rents in average 17.42 ha. If we assume that arable field of farms worth in average 2,500 EUR/ha than farms of type I must invest about 34,725.00 EUR in land purchase, farms of type II 41,450.00 EUR and farms of type III have to invest approximately 43,550.00 EUR.

Investments of such size represent relatively large financial burden for farmers because:

- They do not have their own money for land purchase and they must use loans.
- Because of global economic crisis, loan interest rates of commercial banks increased and also, loan approval costs are very high.
- Profit from milk production is small and production risk, as well as market risk, is large so producers are not sure that they could pay back their loans.

One of the solutions for large milk producers, regarding buying more land, is the help of the state. In Serbia, there are state funds which give loans to farmers but they have small amounts of money to satisfy the needs of all farmers. In Serbia is also not developed leasing system for arable land. Besides, the largest number of milk producers does not have the possibility to rent government land by favorable price.

All above mentioned indicate that large family farms which deal with cattle production are going to be able to buy additional land only if state creates adequate supporting measures.

**Conclusion.** Analysis showed that the largest own land area as well, as total land area, have farms of type II, while the largest rented land areas have farms of type III. Crop structure in farms of all types is directed mainly toward fodder production with cereals and fodder crops as dominant crops. Regarding number of tractors and used land area it can be said that farms of type II use available agricultural machines the most rationally. On the other hand, the best results regarding number of cows per hectare of arable field as well as milk production per hectare of arable field have farms of type I. That is why, from the stand point of land use, advantage should be given to highly specialized farms for milk production (type I), with annotation that these farms have invested in agricultural machinery more than needed, and that this should be corrected in the future.

Farms of all types want to invest in buying of rented land. Investing in land is great financial burden for farmers because they are forced to use expensive loans. Also, there is a constant increment of interest rates and a high risk regarding profit in this economy branch. So, the question is how state can help in this situation. As the best solution there is an increment of money quantities available in state funds under favorable conditions. It is also possible to subsidize agricultural loans taken from commercial banks. The alternative to farmers should be a possibility to rent governmental land under favorable conditions for longer period of time.

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### References

1. Barry, J.P., Ellinger, N.P., Hopkin, A.J., Baker, B.C. (2000): Financial Management in Agriculture. Sixth Edition, Interstate Publishers Inc. Danville, Illinois.
2. Bastajic, L.J. (2005): Optimalna proizvodna usmerenost porodiinih gazdinstava u poljoprivredi. Doktorska disertacija. Poljoprivredni fakultet. Novi Sad.
3. Erickson, P.S., Akridge, J.T., Barnard, F.L., Downey, W.D. (2002): Agribusiness Management. Third edition. McGraw-Hill.
4. Gogic, P. (1982): Ocena ekonomske opravdanosti ulaganja sredstava u hidromelioracione sisteme. Doktorska disertacija, Beograd – Zemun.
5. Ivanovic, S. (2008): Ekonomska efektivnost investicija u govedarsku proizvodnju porodiinih gazdinstava. Doktorska disertacija. Poljoprivredni fakultet, Beograd – Zemun.
6. Kay, R.D., Edwards, W.M., Duffy, P.A. (2004): Farm management. Fifth edition. McGraw-Hill.
7. Krstic, B., Andriju, J., Bajuetiuj, B. (1995): Modeli zemljoradnickih gazdinstava usmerenih na stoiarsku proizvodnju. Aleksandrija. Beograd.
8. Krstic, B., Smiljanij, S. (2003): Teorija i praksa sistemskog pristupa poslovnom menadimentu u poljoprivredi. Consecco institut. Beograd.
9. Markovic, T. (2007): Razvoj osiguranja stoke u Srbiji, Letopis nauinih radova, godina 31, broj 1, Poljoprivredni fakultet u Novom Sadu, Novi Sad, str. 158-166.

### Аннотация

*Саньин Иванович, Тодор Маркович, Ольга Шапошникова. Земельные инвестиции частных молочных ферм Сербии.*

*В статье рассматриваются вопросы, связанные с развитием фермерских землепользований в Сербии. Рассматривается структура земельного фонда Сербии. Проводится сравнение между количеством ферм, организованных на арендованных землях и находящихся в частной собственности.*

**Ключевые слова:** *молочное производство, частные фермы, инвестиции, земля*

### Анотація

*Саньин Иванович, Тодор Маркович, Ольга Шапошникова. Земельні інвестиції приватних молочних ферм Сербії.*

*В статті розглядаються питання щодо розвитку фермерських господарств у Сербії. Розглядається структура земельного фонду у Сербії. Проводиться порівняння між кількістю ферм, які організовані на орендованих землях, і ті, що знаходяться у приватній власності.*

**Ключові слова:** *виробництво молока, приватні ферми, інвестиції, земля*