



## **Animal production towards sustainable farm business management**

**J. Deze, L. Ranogajec, D. Kuharic**

University of J.J. Strossmayer, Faculty of Agriculture in Osijek, Trg sv. Trojstva 3, 31000 Osijek, Croatia

### **ABSTRACT**

*Farm management adjustment from centrally planned economy towards market-oriented farm development is difficult, especially in the Baranya region, since it is the agriculture, as the primary sector, on which other economic activities are based, both the secondary (manufacturing) and the tertiary (service trade) sectors. Therefore, agriculture is the way to the stability of national development in the economic integration of all sectors and the balance of development of the Republic of Croatia. Otherwise, tensions and conflicts might arise, which would directly influence the structural adjustment in farm production as the primary sector. A lack of economic resources and knowledge in farm management can be a major obstacle to sustainable development, respectively a dynamic farm production continually adjustable to both internal and external factors. Family farms have a special place in the said processes, because they are the most represented economic subjects in the primary farm production in the Baranya region. Since there is the interaction between animal production and crop growing, the relation between limiting and improving economic resources regarding regional economic development should be closely monitored.*

(Keywords: animal production, sustainable farm management)

### **INTRODUCTION**

The processes and activities in the period of transition with regard to the Croatian application for admission to the European Union influence the increase of competitiveness of animal produces at international markets, and in this way not only the sustainability of natural environment but also the farm management comes into question.

Sustainable growth and development of family farms is closely connected with the sustainable ways of animal production. Family farms managers have to do business economically efficiently, socially acceptable, competitively towards market and responsibly towards environment. Domestic animals represent a link between plants and the human, since animal production enables the human to produce produces of high quality, to speed capital turnover up and to stabilize both his income and business operations.

The terms such as "alternative", "ecological", "biological" or "organic" are used in science, practice and politics to define plant and animal produces that are contrary to the system of traditional or conventional farm production. It is understood that in cases where the new ways of production are applied, the dominant economic principles are as much as possible in accordance with ecological requirements.

The purpose of sustainable production management is to adjust dynamic economic development with ecological requirements of natural environment.

## MATERIALS AND METHODS

Investigation of the basic assumptions in connection with the application of sustainable family farm business was done in 8 municipalities, respectively in totally 32 villages, so that the whole Baranya region was included in the investigation. The investigation was done in 271 family farms, and the data were collected by highly skilled interviewers, for which reason the gained information may be defined as relevant. Afterwards, the collected data were processed in terms of statistics. This investigation was done within frames of the "Programme for Sustainable Development of Family Farms in Baranya", financed by EU CARDS Project – Contract No. 99754. In the paper the methodology according to *Krstić* (2000) was applied, according to which the number of conditional head of cattle was calculated on the basis of the following formula:

$$Z = \frac{U}{P}$$

Z = number of conditional head of cattle per hectare of farmland,

U = number of physical head of cattle,

P = farmland in hectares.

## RESULTS AND DISSUSSION

Animal production is not only directly but also indirectly connected to crop growing. On the one hand, direct connection derives from farmlands used for fodder production; in this way the continuity of both animal feedstuffs and the supply safety of production process in animal production is preserved. On the other, indirect connection is very important in the system of sustainable management of economic resources on the farm. Production of stable litter and manure, as by-products in crop growing and animal production, provide sustainability of farmland and have a special ecological importance in relation to industrially produced mineral fertilizer. Although modern industrial methods are sometimes used in specialized crop growing and animal production, beside higher costs of production, they also lead towards farmland destruction and pollution of the environment, which is not in any case the purpose of sustainable management of family farms. Hence, it is important to monitor the size as well as property structure of farmland per family farm.

**Table 1**

### Arable land and property structure of family farms in Baranya

No.	Municipality	Land size per family farm (ha)	Private land (%)	Land tenure (%)	Leased out land (%)	Average number of parcels per farm	Adjustment to ecological production (%)
1	Bilje	25.47	61.25	38.75	0	12	13.85
2	Čeminac	36.10	57.79	42.21	0	8	11.54
3	Darda	14.38	34.63	64.66	0.71	4	2.04
4	Draž	73.69	38.54	61.46	0	10	15.38
5	Jagodnjak	30.13	36.18	63.82	0	8	0
6	Kneževi Vinogradi	48.61	49.48	50.52	0	13	27.27
7	Petlovac	37.56	46.63	53.37	0	11	27.30
8	Popovac	22.32	38.40	61.60	0	10	3.13
<b>Average</b>		<b>36.03</b>	<b>45.36</b>	<b>54.55</b>	<b>0.71</b>	<b>9.5</b>	<b>12.56</b>

*Source: investigation done by the authors.*

Average arable land per family farm is 36.03 ha (*Table 1*), respectively this number is significantly above national average of 2.9 ha. The size of property varies from municipality to municipality (14.38–73.69 ha) and it results in the possibility to determine what the farmland will be intended for: large farmlands will be used in crop growing (industrial plants), whereas smaller ones will be used in animal production, vegetable crops, fruit or grape growing, or growing of other cultures, for which intensive production large farmlands are not required.

Relation between private land and land tenure, is 45:55%. Not only this data confirms a lack of private arable lands, but it also shows that population has chosen farming for their primary and existential job, since more than a half of arable land has been taken out on a lease from both legal and natural persons.

A large number of small plots of land is a limiting factor in sustainable development, because it increases costs and time necessary to do all required technical and technological measures, which directly influences efficiency and productivity. There is a significant number of family farms oriented towards to ecological production, especially those with bigger arable lands.

**Table 2**

**Property structure according to the land size (%)**

No.	Municipality	1–4.99 ha	5–9.99 ha	More than 10 ha	Total
1	Bilje	37.50	26.56	35.94	100.00
2	Čeminac	18.52	22.22	59.26	100.00
3	Darda	30.61	22.45	46.94	100.00
4	Draž	7.14	21.43	71.43	100.00
5	Jagodnjak	7.69	7.69	84.62	100.00
6	Kneževi Vinogradi	21.21	6.06	72.73	100.00
7	Petlovac	4.55	9.09	86.36	100.00
8	Popovac	15.63	21.88	62.50	100.00
	<b>Average</b>	<b>17.86</b>	<b>17.17</b>	<b>64.97</b>	<b>100.00</b>

*Source: investigation done by the authors.*

The analysis of property structure according to the land size per family farm shows dominance of farms with more than 10 ha farmland, respectively 64.97% (*Table 2*). Smaller farms (up to 5 ha) and medium-size farms (from 5–10 ha) are almost equal in percentage terms, respectively 35.03%. These types of family farms have to adjust their farm management to diversified production orientation, which gives competitive advantage to animal production. (*Clakins, 1983*).

The rate of animal production is expressed by a number of conditional head of cattle per farm, respectively per hectare of farmland, in order to establish the number of cattle per production unit or per area. Conditional head of cattle is a physical indicator, respectively an accounting unit, a result obtained by multiplication of the number of physical head of cattle with coefficients used as a main criterion to place on the same level all breeds and categories of cattle. As the basis a head of cattle of 500 kg body weight is used and it is represented by a coefficient 1.00. All other breeds and cattle categories are amounted to with regard to average weight of the category (*Krstić, 2000*).

Table 3

**Animal production – structure of breeds and categories  
of conditional head of cattle\***

No.	Breed and category of cattle	Coefficient	Bilje	Čeminac	Darda	Draž	Jagodnjak	Kneževi Vinogradi	Petlovac	Popovac	Total
1	Bovine	1.00	41.00	40.00	21.00	85.00	135.00	80.00	90.00	107.00	599.00
2	Calf	0.25	0.75	3.00		5.50	6.50	6.75	15.25	5.50	43.25
3	Fattening cattle	0.50		12.50		29.00	1.50	42.50	12.50		98.00
4	Horse	1.00		4.00		1.00	2.00	28.00		3.00	38.00
5	Sow	0.30	40.20	22.80	16.50	3.60	17.40	10.80	10.20	24.90	146.40
6	Hog	0.30	0.60			0.30	0.60		0.90	1.80	4.20
7	Porker	0.25	162.30	59.50	111.00	23.75	29.75	57.00	43.00	35.75	522.05
8	Hen	0.002	2.11	0.84	1.70	0.35	0.88	1.45	0.68	1.57	9.58
9	Broiler	0.00055	0.42	0.06	0.27	0.08		0.19	0.09	0.08	1.19
10	Turkey	0.01	0.43	0.69				0.09	0.11	0.12	1.44
11	Duck	0.006	0.57	0.15		0.12		0.04	0.16		1.04
12	Goose	0.01	0.52	0.28		1.46			0.26		2.52
13	Rabbit	0.002	0.08	0.13	0.13			0.07	0.69		1.10
14	Sheep and ram	0.10			23.60	14.40	80.00	21.70	45.00	83.50	268.2
15	Lamb and tag	0.05		33.30	10.55	8.20	28.00	3.80	10.00	0.75	94.6
16	F/M goat	0.10	5.40	10.55	1.60	7.00	2.20	2.10	35.80	0.30	64.95
17	Baby goat	0.05	0.55	0.20	1.10	6.25			4.75		12.85
18	Donkey	1.00							1.00		1.00
19	Ostrich	0.25							8.75		8.75
<b>Conditional head of cattle totally</b>			<b>254.93</b>	<b>188.00</b>	<b>187.46</b>	<b>186.01</b>	<b>303.83</b>	<b>254.49</b>	<b>279.14</b>	<b>264.27</b>	<b>1918.12</b>

Source: investigation done by the authors.

\*UG - conditional head of cattle - head of cattle of average body weight (500 kg).

When animal production was analysed and the number of conditional head of cattle was calculated, a number of conditional head of cattle was also calculated in municipalities that had different number of farms. some of which were not oriented towards animal production (Table 3). Therefore, the relationship between the total number of conditional head of cattle and the number of animal production oriented farms was established. In this way, indicators regarding intensity of animal production per farm in different municipalities were obtained. When it comes to analysis of the number of conditional head of cattle in the relation to crop growing in hectares of land per farm, it is possible to establish the intensity of farm production per municipality. Moreover, it is possible to determine unknown resources either for the development of animal production or for primary crop growing for the needs of animal production and manufacturing.

Number of conditional head of cattle per hectare is a significant indicator of the stage of development and intensity of farm production (Table 4). In order to evaluate the presence of animal production. there are 6 levels of intensity:

- Very high: 1 : 1
- High: 0.8 : 1
- Medium: 0.5–0.6 : 1
- Low: 0.4–0.5 : 1
- Weak: 0.25–0.4 : 1
- Very weak up to: 0.25 : 1

Table 4

**Regional sustainability of animal production development in numbers  
(conditional head of cattle)**

Description	Bilje	Čeminac	Darda	Draž	Jagodnjak	Kneževi Vinogradi	Petlovac	Popovac
Number of animal production oriented farms	50	24	36	14	20	26	22	33
Total number of conditional head of cattle	254.93	188.00	187.46	186.01	303.83	254.49	279.14	264.27
Conditional head of cattle per farm	5.10	7.83	5.21	13.29	15.19	9.79	12.69	8.01
Hectares/farms	8.53	9.91	17.44	12.06	27.19	6.96	35.14	7.20
<b>Conditional head of cattle/ hectare</b>	<b>0.60</b>	<b>0.80</b>	<b>0.30</b>	<b>1.10</b>	<b>0.56</b>	<b>1.41</b>	<b>0.36</b>	<b>1.30</b>

According to the data shown in *Table 4*, there are three municipalities characterized with a very high level of intensity of animal production (37.5% of the investigated region), two municipalities with a medium level of intensity (25%), whereas in the remaining two municipalities the level of intensity is weak (25%).

When compared to the national average (0.5 UG/ha), this relationship is favourable because of specific features and possibilities of the Baranya region: economic resources, soil capacity and nearness of unexploited manufacturing capacities. The fact that animal production is insufficiently present in the region shows that despite available possibilities (the changes in animal production and crop growing), the production has not been intensified (UG/ha).

These possibilities should be taken in consideration when preparing measures for future improvement of animal production. Farm managing is one of the factors that leads towards sustainability, but also a means to improve economic efficiency in production and business. This should be realized, if one wants to achieve sustainability and dynamics in business and farm managing.

### CONCLUSION

Long-term sustainable development should be directed towards the growth of land. In this way animal production would be influenced directly. Animal production is the basis of liquidity and economic stability, because of equalizing the possibilities both to gain income and to pay obligations. It influences added value and improves the value of crop growing by closing the manufacturing cycle important for ecological sustainability of production and business on the farm. The results show that there are many possibilities to develop animal production, since 50% of the investigated region is characterized by a medium to low level of intensity of animal production. A lack of animal production reveals up to now unknown economic resources in the Baranya region. If activated, it would be possible to obtain sustainable farm management in natural environment.

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*Corresponding author:*

**Jadranka Deze**

University of J.J. Strossmayer, Faculty of Agriculture in Osijek,  
Department of Management  
HR-31 000 Osijek, Trg sv. Trojstva 3, Croatia  
e-mail: jdeze@pfos.hr