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Extensive versus modern animal husbandry – pros and cons

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ABSTRACT

Food industry has significantly started affecting eco-system and it is more and more clear that we cannot only produce. It has become more important how we produce, as well as how to produce food with economical usage of row materials and energy with respect to the environment. Nowadays, we face many facts that prove the intensive animal husbandry (IAH) is not so modern anymore and that we have to search back for certain elements from the extensive animal husbandry (EAH) in order to reactivate them in cost-efficient way and with regard to preserving biodiversity, rural development, protection of natural heritage, traditions and animal welfare. It has been identified that upraising of EAH in the future depends much on land support, land-use management, climate, economical development of each country, education and motivation of farmers, as well as on the possibilities to be competitive on the market. The maintenance system has to be cost-effective for the owner to enjoy the occupation of EAH and companionship of the animals. Therefore, EAH could be sustainable only where public attitudes are positive and appropriate premiums can be justified so that the systems remain viable. Product quality and origin should give added value to such production. Research and development should support such advancements and the adoption of new reasonable production systems serving animal welfare.
(Keywords: extensive, intensive, animal husbandry, model, farming)

INTRODUCTION

Animal husbandry (AH), stockbreeding, or simply husbandry, is usually defined as the agricultural practice of breeding and raising livestock. It has been practiced for thousands of years, since the first domestication of sheep around 9000 B.C. Extensive animal husbandry (EAH) has its origin in pastoralism, which refers to methods of conducting herds to natural pasturage, and therefore to systems where livestock raising is practiced in an extensive manner with little input and without the cultivation of fodder crops. It involves extensive exploitation of natural grazing lands entailing moves over varying distances. Actually, pastoralism has formed an intermediate stage between hunting and farming. Because of that, *Alvard and Kuznar* (2001) name AH „prey conservation". Later on, integration of cultivation has developed pastoralism into agropastoralism. Selective breeding for the improvement of livestock was already practiced in Roman times. However, continuing systematic development and improvement of domestic livestock breeds was encouraged just in 18th century by Robert Bakewell, an English agriculturalist, who introduced modern

stockbreeding methods that transformed the quality of cattle, horses and sheep. Subsequently, integration of science into AH has introduced a new term – animal science. It should include controlled cultivation, management, and production of domestic animals, including improvement of the qualities considered desirable by humans by means of breeding.

However, after decades of improvements, which qualities do we consider desirable? And are they considered desirable by animals, as well? And how are we going to achieve them? Do we really care enough about ecology and welfare of domestic animals, or "breeding for money" has taken the main place? Are we capable to avoid abuse and ethically unacceptable conditions in so-called modern animal husbandry? And how could we motivate farmers to provide animals with things that they were faced to in their past, in the time of their wildlife? Finally, is the intensive animal husbandry (IAH) still modern and how big are the chances for the EAH to compete with it?

TRENDS IN ANIMAL HUSBANDRIES MODELS

Generally, we have been used to distinguish the two models of AH; extensive animal husbandry (EAH), which is related to lower number of animals, extensive conditions and family farming and intensive animal husbandry (IAH), related to higher number of animals with higher productivity and industrial farming that supports high productivity.

The decision on which AH model to implement is much depending of land or climate that each country has got. For instance, in Ireland, United Kingdom, or France, agricultural area is much suitable for the production of forage, which is the precondition for the EAH. Generally, lowlands are more suited to crop production, while hilly areas often have high proportion of natural grassland. Furthermore, grazing is more usual in the west of Europe, while feeding based on cereals is found in the more southerly parts of Europe and this also enables fattening and finishing. This has caused differences in models of AH between north and south, so that farming systems that put the greatest emphasis on productivity are concentrated in the north and centre of Europe. They are characterised by high productivity of land, capital and labour, as well as wide variety of farming systems. In these parts of Europe, grassland farming has been for a long time extensive providing grazing for up to two cows per hectare. However, today even most of these farms are using more intensive methods through cooperation, usage of high producing breeds, artificial insemination, concentrates, artificial fertilizers etc. Farmer-producers that use crop production to provide most of the forage needed for livestock production are becoming relatively labour-intensive with over two cows per hectare. Mixed farms can be distinguished, as well, as the farms that are giving roughly equal importance to livestock and crop production, but productivity varies according to the region.

Due to the low amount of grasslands in south Europe, those countries can hardly compete in beef production to the north and central European countries and, therefore, they often have to import meet from those countries in order to satisfy their consumption habits. Other option is to fatten their animals on cereals, which is, for instance, situation in Italy, where forage area is relatively restricted and there are not so many grasslands, which has resulted with increased number of IAHs. Intensification of farming in lowland areas of southern Europe was carried out by introducing high productivity, reduction in numbers of dairy herds and shifting to cattle breeds that can be used for fast fattening and finishing. Feeding commercial concentrates which make animals grow faster and produce more has taken place of natural diet appropriate to the requirements of the animal. These large farms usually work under contract to major agri-food firms, cooperatives or private companies. This tend to be a rule in the EU as the total main forage area has receded falling from 55

million hectares in Europe (EU-15) in 1988 to 41 million hectares in 2001, i.e. a drop of 20% in thirteen years (*BioVision,* 2010). This trend is not welcome as EAH plays an important role in the protection of nature, mainly through preventing proliferation of invasive plants and subsequent gradual revert to woodland and reducing risks of fire. EAH, thus, helps to preserve biological balance. Furthermore, it is frequently the only way to maintain economic activity and population levels in some rural areas, especially in mountain areas. However, despite of ecological benefits of EAH, these systems have to be controlled concerning overgrazing that can cause erosion which is difficult to re-cultivate. For instance, the agro-pastoral farming zones in China have been seriously damaged due to overgrazing and reclamation disturbances, thus endangering the development of farming and AH, as well as threatening national ecological security (*Ding et al.,* 2007). Semi-natural grasslands resulting from traditional land use practices (mowing and grazing) are severely endangered throughout Europe, as well, due to the intensification of agriculture (*Saarinen and Jantunen,* 2005). Therefore, a combination of shed feeding and grazing in a fenced area may be an ideal combination of high productivity and animal friendly husbandry.

THE CROSS-FIRE BETWEEN ECONOMIC, HEALTH AND WELFARE CONSTRAINTS

Through the years, the IAH has been called modern animal husbandry (MAH). In last 60 years, world number of inhabitants has increased from 2.5 to 6.8 milliards. However, agricultural lands are today covering nearly the same surface as before. Food industry has significantly started affecting eco-system and it is more and more clear that we cannot only produce. It has become more important how we produce, as well as how to produce food with economical usage of row materials and energy with respect to the environment. Nowadays, we face the many facts that prove the IAH is not so modern anymore and that we have to search back for certain elements from the EAH in order to reactivate them in cost-efficient way. It has to be taken in consideration while integrating those elements into the IAH that high producing breeds require controlled living conditions that are hardly achievable in the EAH. Therefore, breeding strategy in such cases should be directed in strengthening disease resistance, often by sacrificing productivity of the animal. Benefits could be found in multifunctional usage of animal, for instance meat and eggs, and longer life with continuous production.

MAH managers are expected to confine populations of animals in compliance with economic, health and welfare constraints, while at the same time facing the strict scrutiny of public opinion that demands effective intervention and control strategies for production diseases. However, the cross-fire between economic, health and welfare constraints and the need for effective interventions in complex systems that cannot be resolved by human intuition alone represents the paradox of modern animal health management (*Döpfer and Morlán,* 2008). The IAH systems, however, are not necessarily balanced ecosystems and may develop dynamics that may not be predicted by intuition alone (*Edelstein-Keshet,* 1988). The scientific problems related to the well-being of animals reduced a complicated social critique of industrial systems for raising livestock to a matter of adapting animals to the living conditions imposed by these systems (*Porcher,* 2003). This swept out of view questions about the working conditions for farmers and wage-earners. However, people and animals tend to share living conditions in these systems that often cause suffering. Given the intensified pace of work, as people tend an ever larger number of animals, and the mounting pressure on both people and livestock, affects are repressed, and communication breaks down.

Relations to one's self and to others are altered, and the relation to death is "pathologized" at the workplace - thus providing further evidence of a failed relation to life and to others in AH. The public opinion is sceptical with regard to modern IAH (*Fuchs,* 2001). Society asks much more for production systems with high standards in animal welfare with grazing, straw beds and outdoor climate housing.

The competitiveness of IAH versus higher standards in animal welfare and the economic differences is becoming more present today. According to *Brambell* (1967) the provision of pig welfare on farms is dependent on the well-being and motivation of a farmer. Five freedoms: freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express normal behaviour; and freedom from fear and distress, are becoming more stressed today than ever (*FAWC,* 2007). Different production systems reveal different welfare problems. For instance, according to the results of investigation carried out in Croatia (*Wellbrock et al.,* 2009), from the perspective of resources pig welfare is better ensured on farm enterprises but from the perspective of animal-based welfare indicators no difference was found between the different pig production systems. The research findings indicate that modernisation of production systems is not likely to significantly improve pig welfare because a number of outlined welfare problems are related to lacking knowledge and education and cannot be overcome by modernising farming premises. Furthermore, allowing animals to express natural behaviour does not guarantee their welfare. In fact, natural behaviour can sometimes reduce welfare. According to *Matthews* (1996), there is a need to develop integrated measures of welfare that take account of longevity, disease, reproductive success, nutritional and thermal challenges, pain and behavioural freedom. Only with the help of such measures can acceptable practices be defended, unacceptable systems phased out and the consumer assured that EAH is animal friendly. Intensification of farming has put the question of how to keep animals healthy and new diseases have been occurring frequently (*Antunović,* 2000). In old European member states the intensification of pig production has led to ethical concerns regarding the welfare of pigs on farms (*Veissier et al*., 2008). In Croatia, the EAHs are not interested in improving pig welfare because they do not want to increase productivity, but fear for their existence. As Croatia is today counting 31.845 small producing units covering 75% of whole pig production, these results represent considerably important indicators of necessity to approach this population of farmers.

Preventive measures in order to keep animals healthy, rather than on curative methods are taking place in every god managed system, no matter if EAH or IAH. However, preventive and unauthorised usage of veterinary drugs has raised potential risk to human and animal health through bacterial resistance (*Banović et al.,* 2008). Due to potentially huge looses in cases of diseases, as well as higher susceptibility on diseases (lower disease resistance), IAH farmers have been practicing prophylactic usage of antibiotics for many years. On other side, EAH farmers have been used to buy the medicaments by themselves and treat the animals. Large worldwide surveillance studies report that resistance to nearly all classes of antimicrobials are increasing, as is the emergence of what have been termed pan-drug-resistant and extremely drug-resistant pathogens (*Owens,* 2008). This indicates necessary to sacrifice part of productivity, improve the living conditions and hygiene of animals, allow animals to practise their natural behaviour and avoid social stress in order to gain human and animal health. For instance, the main principal for veterinary treatment in the organic animal husbandry (OAH) is: get to know the causes of (or factors that favour) diseases in order to enhance the natural defence mechanisms of the animal. The principle of changing management practices in order to prevent disease outbreaks should be applied more especially in the

IAH, as well. Often, the problem of investments in such changes presents a problem to producers and governmental financial help in certain percentage is always welcome. Good example is governmental support for egg producers in Croatia in order to increase cage area per hen according to the EU rules (*EC,* 1999). Yet, little effort has been shown to implement the EU welfare directives on farms in Croatia (*EC,* 2006).

SMALLHOLDINGS AS A WIDESPREAD TRADITION IN SOUTH AND EAST EUROPE

Contrary to the central and west Europe, where many EAHs have been intensified, there is less emphasis on productivity in EAH of southern Europe, characterised by low productivity of capital and labour, variable productivity of land, wide variety of farming systems and location in areas where GDP is below the European average. In south upland areas of Europe, EAH with low land productivity tend to be the rule. This type of traditional farming is hardly industrialized at all. Smallholdings are a wide-spread tradition in new South-Eastern and Eastern European member and candidate countries but often neglected in the European alignment process (*Thurston,* 2008). They serve, however, a social safety net function for many rural inhabitants in new European and EU candidate countries with socialist and communist histories (*Vira and Narnicka,* 2003). An example could be found in Romania, where a dramatic decline in the economic situation of the rural population in mountainous regions has been determined, resulting in far reaching ecological consequences (*Pfeuffer and Sambraus,* 2006). Here, consideration was given as to which steps should be taken in order to improve the economic situation of the population and therefore preventing further ecological changes. Solutions were sought as to how AH could be improved quantitatively and qualitatively. However, it would appear that improvements could only be realised if the broader situation changes. This model can have cultural or religious significance, but often cannot contribute much in increasing of GDP from agriculture or export of a country. What is more, we often find such EAH producers to be hardly competitive on the market, which can result with giving up the production.

The Croatian Agriculture and Rural Development Plan (MAFWM, 2006) has predicted family AHs to become leading producers in agriculture. Croatian agriculture is participating in GDP by 10%, or 13.5% of total number of employed. Small-scale farming, especially for own consumption, is deeply rooted in Croatian rural culture. Croatian officials aim to create favourable conditions for social-economic development in its most backward regions and to maintain traditional features of the Croatian EAH. However, lacks of processing industry, as well as high import of food have resulted in slow development of AH and often giving up the business by the farmers. It has been estimated that 2–4 AHs are giving up the business daily in Croatia. While milk production in 2009 has increased for 20 million litres compared to 2008, number of producers decreased for 4,000. Compared to 2002, number of milk producers in 2009 in Croatia decreased from 65,000 to 23,690. Number of swine decreased from 200,000 in 2005 to 132,000 in 2009. On the other side, many big producers have decided to base their management on import rather than on investments in own production, clusters and marketing, which is ruining competitiveness of small farmers. Import is much disturbing swine market in Croatia as for instance only from Chile 1,400 tons of frozen pork has been imported in Croatia in three months. Annually, Croatia is importing food worth 15 milliards Euro, which has significantly reduced marketing possibilities for Croatian farmers. Often, food processing industry (like meat products etc.) that would bring extra value to the primary production is missing.

The Croatian AHs received from the Government 180 million Euros of subsidies in 2009 and it has been planned to direct another 95 million Euros in 2010. This decision to decrease annual amount of subsidies for 40% has caused farmers' rebellion with obstruction of roads with tractors etc. Farmers are mostly used to see subsidies as a social category, rather than development measure. From the total number of 190,000 registered farmers in Croatia, 90,000 are receiving subsidies, but in the same time 70% of them do not have any agricultural education background. For comparation, in Germany that has 17 million ha of agriculture land only 140,000 of farmers are receiving subsidies. Now we have situation in Croatia that non-educated farmers often cannot produce quantity and quality to become competitive and cannot give back credits to the banks, so they rely on subsidies. It has been shown that a lack of communication efforts by public administration officers results in a lack of knowledge amongst EAHs concerning EU accession changes and production standards (*Wellbrock et al.,* 2010). Furthermore, many properties are not registered by the Government. Currently, from the total number of 800,000 ha of agriculture land, 545,000 ha are governmental, but in the same time 360,000 ha of land are not registered and so unknown if and who is working on these properties. Without legalisation of these properties, they would not be able to go to the market after the EU accession of Croatia. Subsidies from EU for Croatian agriculture should start in 2012. The politics of EU subsidies is different than current politics of subsidies in Croatia. It is less purposed for direct payments and more purposed for rural development, respect to ecological issues etc. Consequently, in order to get subsidies in the future, the AH will have to register their properties and go through the education program.

Land properties and AHs in Croatia are relatively small compared to the EU average. Currently, 135,000 AHs are active in Croatia. However, only 5,000 of Croatian AHs have 10 to 20 ha of land and only 1,000 AHs have more than 20 ha of land. All the others are small producers. Around 50% of AHs that produce milk have up to 4 cows and 98% of AHs that produce pork have up to 10 swine. From the total number of Croatian pig farms, 75% of production has been organised in small production units (1–5 sows) accounting for within the activities of the mixed family holdings. Croatian pig production systems are thus comparatively smaller than in older EU member states where 67% of all family farms own between 100 and 200 breeding sows (*Antunovic et al.,* 2004a). Not many farms in Croatia are specialised production units with up-to-date technologies and complying with the EU standards. To choose whether farms should modernise their production or terminate their production, the Croatian Government has distinguished pig farms into commercial and non-commercial farms. The distinguishing criteria for being considered a commercial or non-commercial farm is the amount of pigs produced. Commercial production units have to be registered and can ask for financial support from modernisation and production funds, capital investments or rural development funds. Non-commercial production units, however, do not have to be registered as producers and can only ask for financial support through rural development funds. So, the question is how the family AHs with such small land properties per AH, that Croatian Government is in favour (*MAFWM,* 2006), and with such a big food import is going to compete on the EU market where there is tendency to form properties of 80 ha.

POSSIBILITIES OF UPRISING EXTENSIVE ANIMAL HUSBANDRY IN THE FUTURE

To circumvent welfare impairments for smallholders in Croatia and other new European member and candidate countries, it appears necessary for the EU to recognise

smallholding as a type of farming in legislation. This way, one can argue, smallholders are more likely to be addressed with financial aid and education measures in the future. It is therefore necessary to invest in further research regarding the ways in which smallholders can be supported in the future (*Wellbrock et al.,* 2010).

The EAHs show tendencies for economic disadvantages due to higher labour costs, additional handling of straw and especially if performance declines for the production systems with higher animal standards. It requires more land, dung is spread on the pastures and it is often resulting with lower productivity. So, it is crucial to select the right kind and number of farm animals that he can support with land, labour and health care. In warmer seasons, grazing can save labour costs and enable animals better movement and exercise, resulting with better health condition. There are low cost production systems under development. One example is outdoor climate housing for pork production which seems to be economically competitive (*Antunović et al.,* 2004b). The benefit of EAH could be found in by-products such as straw, biomass from field margins or kitchen wastes that can be used as cheap and easily available fodder, as well as in the dung that should be returned to the fields in the most efficient way in order to increase the fertility of the soil. Animal products such as milk, eggs, and meat can both be used for home consumption in the family as well as for selling, thus generating additional income for the farmer.

The results of such attitude are standards given through the Good Agricultural Praxis (GAP) that represent a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economical, social and environmental sustainability. They provide the opportunity to assess and decide on which farming practices to follow at each step in the production process. For each agricultural production system, they aim at allowing a comprehensive management strategy, providing for the capability for tactical adjustments in response to changes. The implementation of such a management strategy requires knowing, understanding, planning, measuring, monitoring, and record-keeping at each step of the production process. Adoption of GAP may result in higher production, transformation and marketing costs, hence finally higher costs for the consumer. AH advisors, a profession which supplies advice to animal owners on matters of husbandry, are becoming important for EAH owners who are not supported with multidisciplinary management as IAH owners.

Nowadays, organic animal husbandry (OAH) is increasingly being seen as one sustainable option to farmers, among the alternatives to conventional input of IAH. Term OAH means integration of AH into crop producing farms with a central focus on the welfare and health of the animals and it is often being wrongly called EAH, which is different in meaning of fewer demands on environmental conditions. There is a range of standards for OAH regulating the management, shedding, feeding, veterinary treatment, breeding, purchase, transport, and slaughter of farm animals in detail (*IFOAM,* 2005). OAH offers especially good conditions to farmers with high activity in marketing. However, it requires an intensive education of farmers in agrarian ecology (*Schumacher,* 1998) and land support. Its development is different and often slow, depending on each country. Organic producing in Croatia started in 2002 with two husbandries registered on 54 ha of land, while today there are 817 husbandries registered on 14,193 ha of land. However, with 1.3% of land with organic husbandry, Croatia is still far away from the EU average (4.1%). For instance, Italy or Spain have more than 1 million ha of land with organic husbandry and Austria has 15% of such land. Currently, 14 millions of

husbandries on 7.2 million ha in EU are organic. Farm tourism cold be recognised as a model of choice, as well, which makes possible to combine farming and the protection of the environment with the development of quality products. It has expanded in last decades and has been recognised as a model which preserves biodiversity.

CONCLUSIONS

Extensive animal husbandry is becoming modern again, especially concerning preserving biodiversity, rural development, protection of natural heritage, traditions and animal welfare. However, it depends much on land support, land-use management, climate, economical development of each country, education and motivation of farmers and possibilities to be competitive on the market. It could be sustainable only where public attitudes are positive and appropriate premiums can be justified so that the systems remain viable. The maintenance system has to be cost-effective for the owner to enjoy the occupation of AH and companionship of the animals. Product quality and origin should give added value to such production. Research and development should support such advancements and the adoption of new reasonable production systems serving animal welfare.

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