

## **Resources and Models of Beekeeping Exploitations in the North West Region of Romania**

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**Abstract.** The present paper presents some of the results obtained within the post-doctoral research project entitled “Technical and economic analysis of beekeeping in the North West Region of Romania for the ensurance of the sustainable development of the beekeeping chain”. The quantitative study conducted in early 2011 was aimed to analyze the beekeeping chain in the North West Region of Romania, both at the macroeconomic and microeconomic levels. The research method was the survey and the instrument used in this stage of research was the questionnaire. The analysis of the collected data provides substantial information regarding the size of the beekeeping exploitations, the type of beekeeping that is practiced (conventional/organic), the melliferous resources used and information regarding production, costs and usage of bee products. An equally important aspect pursued in the investigation referred to the role of associating in accessing various forms of support, knowledge of organic beekeeping principles and bee products traceability.

**Keywords:** region, resources, beekeeping exploitations, models

### INTRODUCTION

The study of the beekeeping sector at a regional level is beneficial not only in terms of upgrading technical and economic data, but also by identifying solutions that should enhance the opportunities for the sector development and promote consumption. The post-doctoral research project which includes the present study aims at achieving, during a two-year time frame, a complex analysis of the beekeeping chain in the North West of Romania, the purpose being to achieve a representative and evolutionary database of the beekeeping sector in the region that is meant to assist beekeepers. Researches on the bee chain are numerous in the academic literature, being conducted regularly by statistical institutes in some countries (Institute for Statistics, Quebec, 2009), and being focused on general issues - number of beekeepers, number of hives, the production achieved, quantity and value of production, its estimation for the following year, crop pollination services (Pocol *et al.*, 2011). The importance of carrying out such analyses on food products chains derives from the fact that the survey is compulsory for beekeepers, in the case of developed countries. To these general surveys, customized investigations are added, undertaken by each region separately. The bee chain analysis is also present in Europe, the European Union countries being advised to conduct such analyses in order to improve conditions regarding the production and marketing of bee products (Reg. EC no. 1234/2007). Complex analyses are performed regularly in France, Sweden and the United Kingdom. The most significant studies regarding the bee chain are carried out in France and they follow the evolving data regarding the number of beekeepers, bees, the regional distribution of beekeepers and beehives, production, foreign trade, distribution channels, the stakeholders, production costs and marketing (GEM-ONIFLHOR, 2005). Studies on the economic efficiency of beekeeping are also found in Croatia, demonstrating, as in Romania, the discrepancy between increased domestic

production and very low domestic consumption. Because data on economic parameters of beekeeping are very fragmented, researchers in this country have conducted studies in order to identify possible solutions to increase the economic efficiency, more precisely, an increase in the number of beehives, the minimum threshold for high productivity and for gaining profit is considered to be 50 (Barlovic *et al.*, 2009). Similar studies concerning the present and future situation of beekeeping were carried out in Hungary (Nyárs, 2003), the main direction identified for the development of the sector being the mechanization of production, providing consultancy services to beekeepers, in order to penetrate the domestic and external markets. Hungarian researchers identified the minimum threshold for running a profitable activity to be of at least 100 colonies of bees. Bulgarian researchers conducted a SWOT analysis of beekeeping in Bulgaria, the development of this sector being perceived in terms of improving the quality of the products and hence increasing competitiveness on international markets and the development of the marketing of bee products (Nikolov, 2005).

Studies regarding the economic efficiency of beekeeping in Romania are scarce (Bodescu, 2009), despite the fact that beekeeping is seen as a vector of economic growth by pollination of entomophile plants, a way of improving the welfare of the rural population as a source of additional income, a pollution sensor and a factor that maintains biodiversity. The main purpose of the author mentioned previously is the analysis of specific beekeeping production factors and the identification of ways to increase their economic efficiency. Studies on upstream and downstream market, analysis of distribution channels, the influence of imports and exports on bee products trade are non-existent in Romania. Moreover, the assessment of the role of local beekeeping associations in promoting beekeeping products and accessing various forms of financing by the beekeepers are not found in the academic literature, being only accounted for in terms of numbers in various reports of the Ministry of Agriculture and Rural Development. In this context, an analysis of the bee chain at a regional level, that would afterwards be extended nationwide, represents a priority and a necessity within the national scientific research.

## MATERIALS AND METHODS

In order to study the beekeeping chain in the North West Region of Romania, a research plan was developed and it was used both for collection and analysis of the data. The research area was represented by the six counties of the region, namely: Cluj, Salaj, Bihor, Satu Mare, Baia Mare and Bistrita Nasaud. The research method used was the survey and the working tool was the questionnaire. The elaboration of the survey that was conducted involved the following steps: determining the target population, determining the sampling method, sampling points, sample size and its validation. Furthermore, the questionnaire was designed, developed and pre-tested, as it is the most important tool used in carrying out the survey. The sampling scheme proposed for the survey conducted among beekeepers from the North West Region was the following:

The investigated sample was represented by beekeepers from the North West Region. The sample size was of 250 subjects. The theoretical maximum permissible error was  $\pm 6.0\%$  at a 95% probability level. The sample was representative for the population investigated. Type sample was probabilistic, stratified, stadial, with stratification in: stage 1, according to the counties from the North West Development Region, the stratification of the beekeepers' population being made according to the six counties of the region: Bihor, Bistrita Nasaud, Cluj, Maramures, Satu Mare and Salaj and stage 2, the number of bee colonies owned, beekeepers' stratification being made in five categories: up to 10 hives, between 11-50

hives, between 51-80 hives, between 81-150 hives, more than 150 hives. The primary unit of selection was the beekeeper. The selection method of the units in the sample was as follows: the selection of beekeepers was done through a probabilistic manner, at the level of each county, from a database of beekeepers in that county. It was verified that each beekeeper is active.

Regarding the interviewing method, the questionnaires were applied by several means of contact: face-to-face, during meetings with beekeepers and auto-completion, questionnaires being also sent by post to beekeepers. A minimum of three returns at different hours and days was required, if the subjects could not be contacted at the first visit. The average application time of a questionnaire was 20 minutes. In terms of the response rate, the sample and the data collection procedures have provided a general response rate of 40%.

Weighting the data: after completion of the data collection, due to the distortions caused by unequal probabilities of selection or non-uniform response rates, the data had to be weighted. The variables proposed for weighing were: the county from the development region and the number of bee colonies. The weighting was performed on cells (component county\*number of bee colonies) using the RAKING method and WESVAR software. Weighting the samples was done after the most recent statistical data.

The quality assurance of the data collection was done by following a quality standard comparable to similar research (ESS, GSS, NES). The validation procedure of the questionnaires was performed multi-sequenced, from the moment of their collection by the project manager, who checked in detail each questionnaire. The incomplete questionnaires, damaged, or whose information was not readable were included in a process of „data recovery”, by getting in touch again with the respondents, by telephone or face-to-face and completing again the missing items. After each questionnaire has passed the internal quality control filter, it was introduced in electronic format. Data entry was performed using a form with double conditions, relative to each question and to the questions logically related to it.

The strategies used to ensure the number of questionnaires to be applied were: imposing a minimum number of return visits (minimum three return visits) for the subjects that could not be contacted at the first visit, pre-contact by phone or by e-mail of the subjects in order to establish a time for visiting, rescheduling visits depending on the program/agenda of the subjects and the availability of travelling to other locations for the application of the questionnaire.

The applied questionnaire included questions regarding the following aspects: place of the beekeeping exploitation, county, name of company/manufacturer, farm size (number of bee colonies), full name of manager, age, education level, experience in beekeeping; specific resources, type of beekeeping practiced - conventional/organic, stationary/pastoral, melliferous resource, the number of colonies taken to the pastoral, the amount of honey and other bee products obtained in 2009 and 2010, production and capitalization costs, the quantities sold, way of capitalization, obtaining certain forms of support, obtaining loans for beekeeping, association, practicing organic beekeeping and the costs involved, traceability of beekeeping products.

The design of the questionnaire involved a deep analysis of information from the beekeeping field, and also from that of psychology, sociology, statistics and informatics. The present research tried, through the construction of the questionnaire, to answer both the research objectives and the requirements that should be met for a questionnaire to be considered good, namely to be as short as possible, but also to include all the necessary questions in order to obtain relevant information. The period of application of the questionnaires was the first part of 2011, because at that time, the data concerning the

production in prior periods, the quantities sold, the production costs and the sale prices were known.

The present article illustrates the preliminary results of the research that was undertaken, namely, resources of the beekeeping exploitations in North West Region of Romania and models of beekeeping exploitations that can be found in the region.

## RESULTS AND DISCUSSION

The resources of the beekeeping exploitation:

The qualitative analysis of the human resource in beekeeping in the North West Development Region was meant to identify demographic, educational and experiential characteristics of beekeepers and to correlate these data with management and development strategies of their own business.

91% of beekeepers are man and only 9% women. The average age of beekeepers from the North-West Region is 48 years, close to the average age of the population, 46 years. However, the share of young beekeepers is small, about 15%, which can be interpreted as an indicator of the depreciation of the attractiveness of this occupation among new generations. The average age of women practicing beekeeping is 39 years, 10 years less than in the case of men. There is therefore the premise of a tendency to practice beekeeping more intensely by women and that rules out the stereotype according to which “beekeeping is eminently a masculine occupation”.

Over 40% of beekeepers have higher education, only 17% have a low education level (10 years of formal education or less). The vast majority (79%) of the young, up to 30 years, have a degree in higher education and this level of training does not fall below 33% for any age category. In this way, the study analysis a well-trained professional body with a high level of understanding of the finer details of the occupation, able to assimilate new innovations that can influence the development of beekeeping, and which, through the new generations that compose it, provides the premises for a continuous professionalization.

The average number of years of experience in beekeeping is 16 years. The distribution according to experience is quite balanced; though there is a dominant category, those with 5 years experience or less (29%).

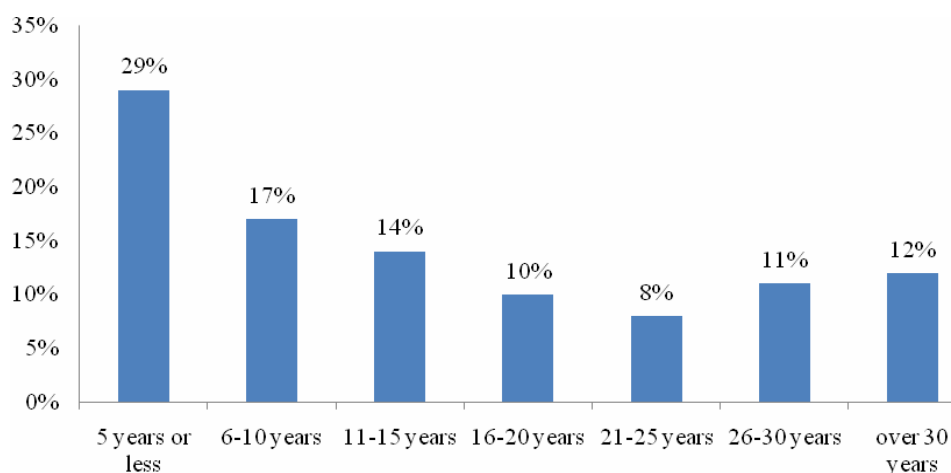


Fig. 1. Distribution according to experience in beekeeping  
Source: own processing data

This aspect can be, as previously stated, both the consequence of a greater impact of beekeeping upon new generations, and the natural consequence of the selection in time of those who practice beekeeping. Naturally, by starting beekeeping later, the average experience of women is 9 years, half the average experience of a man beekeeper (18 years).

The association between age and experience, on the one hand, and the size of the beekeeping exploitation, shows the fact that maximum age and maximum experience are not associated with large beekeeping exploitations, but rather with the medium ones. Instead, there is a high association between the age at which beekeeping was started and the size of the beekeeping exploitation:

Tab. 1

Average age, average experience and average age  
for starting beekeeping, depending on the size of the beekeeping exploitation.

Size of the beekeeping exploitation (number of colonies of bees)	Age	Experience in beekeeping	Age for starting beekeeping
10 hives or less	40	2	37
Between 11-50 hives	50	16	34
Between 51-80 hives	51	21	31
Between 81-150 hives	48	21	27
over 150 hives	41	19	22
Total	48	16	32

Source: own processing data

Therefore, an early start in beekeeping and the resources of those who practice it since youth can be considered predictors of the size of the beekeeping exploitation.

The quantitative analysis of the human resources was meant to find out the provenance of those involved in the activities undertaken within the beekeeping exploitation. The data indicate an average of 1.81 persons “inside the household” and 0.33 “outside the household” involved in agricultural activities in 2009 and 1.84 persons “inside the household” and 0.31 persons “outside the household” in 2010. In this way, there is a small growth (but statistically significant) of the number of people inside the household and a small decrease (not statistically significant) of those outside the household.

Within the beekeeping exploitations, the share of the persons outside the household is 15% -16%, while 85% are members of the household. By analyzing the data in relation to the size of the beekeeping exploitations, significant differences concerning the internal and external contributions can be observed (table 2).

Therefore, in addition to the prevalent correlation between the number of persons practicing beekeeping and the size of the beekeeping exploitation, it can be observed that there is a greater contribution of human resources outside the household in the case of small beekeeping exploitations, up to 10 hives (22% of persons outside the household) than in the case of medium and large beekeeping exploitations (15%-19% of persons outside the household). Consequently, the development of the beekeeping exploitations does not entail, at least in this period, employing persons from the outside, but rather accessing internal resources.

Tab. 2

Average number of persons inside and outside the household involved in beekeeping, depending on the size of the beekeeping exploitation.

Size of the beekeeping exploitation (number of colonies of bees)	Persons inside the household	persons outside the household	Persons inside the household	persons outside the household
	2009	2009	2010	2010
10 hives or less	1,17	,33	1,12	,36
Between 11-50 hives	1,67	,25	1,67	,26
Between 51-80 hives	1,73	,35	1,79	,30
Between 81-150 hives	2,37	,57	2,40	,53
over 150 hives	2,52	,43	2,52	,40
<b>Total</b>	<b>1,81</b>	<b>,33</b>	<b>1,84</b>	<b>,31</b>

Source: own processing data

#### Models of beekeeping exploitations:

Over three quarters (77%) of those surveyed said they practice “conventional beekeeping”, while only 23% said they practice organic beekeeping. However, those who do not practice organic beekeeping (77%) declared that they agree with the principles of organic beekeeping. In contrast, only 33% of those who chose conventional beekeeping know the costs of organic beekeeping, while those who chose organic production are more informed (79% are aware of these costs).

As age, the level of education and the experience are not predictors of the orientation versus organic beekeeping, the explanation for choosing conventional beekeeping to the detriment of organic beekeeping should be searched in the area of habits of practice rather than a rational calculation based on costs and benefits.

Concerning the mobility of the beekeeping exploitations, 43% are stationary, while 20% are pastoral and 37% mixed. There is an association between the size of the beekeeping exploitation and the orientation versus pastoral beekeeping. Therefore, if 85% of the small beekeeping exploitations (less than 10 hives) are stationary, 50% of those with 11-50 hives are stationary and only slightly more than a quarter of those over 50 are stationary hives.

Moreover, orientation versus organic beekeeping is associated with transhumant beekeeping. In this way, if 47% of conventional beekeeping exploitations are stationary, only 32% of the organic ones are in the same situation. On the contrary, experience is associated with the mixed model rather than one of the pure models: those who practice mixed beekeeping have, on average, 19 years of experience, while those who practice traditional beekeeping have only 13 years of experience.

The average distance covered in the case of transhumant beekeeping is about 170 km, being carried, on average, about 60 families. There is a high association between the distance covered, the number of bee colonies transported and the size of the beekeeping exploitation. In this way, small beekeeping exploitations cover short distances in transhumance, while bigger ones cover larger distances:

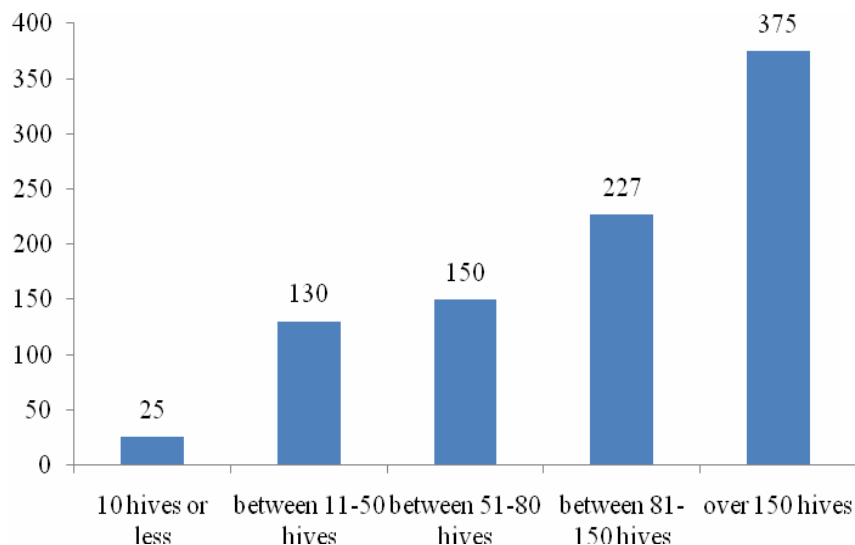


Fig. 2. The average distance covered in transhumant beekeeping according to the size of the beekeeping exploitation.  
Source: own processing data

There is therefore a model of cost-benefit according to which the parameters for transhumance are established, model in which resources play an important role.

## CONCLUSIONS

Beekeeping represents a practice well anchored between traditional and modern, between autarkic and mercantile. Moreover, a new wave of beekeepers can be observed, with higher education and resources that are specific for the young age. Beekeeping surpasses certain stereotypical representations, present even in the collective mind, moving from a purely male practice to one in which the female beekeeper is more and more present, from a practice of the old age to one in which young people have an important share.

Beekeeping is still an occupation “inside the household”, the share of employees outside the household being reduced. The economic crisis has discouraged the employment of external human resources, constraining beekeeping exploitations to adopt an austere regime in this regard.

Organic beekeeping, although approved, it is not yet a model followed by the majority of beekeepers, as most of them still prefer a conventional way of practice. The data indicate the potential socio-demographic determinants of the choice for conventional beekeeping, leaving room for other possible explanations.

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