

## ECONOMIC ASPECTS OF GAME MANAGEMENT IN LATVIA

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### Abstract

At different points in the history there have been attempts to evaluate the volume and value of separate game-related goods and services in Latvia; however, so far there have been no comprehensive studies covering the role of the game management and its impact on Latvia's economy. Such data would be necessary not only to evaluate the impact of the game management on Latvia's economy, but also to set appropriate priorities in cases where game animals cause damage to other sectors of economy. In order to evaluate the role of the game management in the national economy, lists of the game-related goods and services have been drafted, sources of information have been identified to determine the volume and monetary value of the goods and services in the 2009/2010 hunting season, as well as a methodology has been developed to acquire the missing information. It has been determined that the total monetary value of the game-related products was 3.66 million LVL, while the game-related services accounted for 18.86 million LVL. The total contribution of the game management to Latvia's economy in the 2009/2010 hunting season has been estimated at 22.52 million LVL. Among the game-related products the most significant product is the game meat total amount (sales and own consumption) of which has been estimated at 2.8 thousand tons, while total value accounted for 3.6 million LVL. Among the game-related services the most significant contributors are the following: sales of hunting equipment (6.7 million LVL) and game-related transportation costs (4.7 million LVL).

**Key words:** game management, game products and services, economical impact, market value.

### Introduction

Game management is a system that is aimed at a balanced use of natural resources not only by engaging in acquisition of game products, but also ensures the permissible number of the game animals and preserves the natural habitats of such animals. Hunting, as well as game management is directly linked with other sectors of economy, such as forestry and agriculture, for instance, unlimited reproduction of the game animals may cause significant damages to the aforementioned sectors. Forests and forestry play an important role in Latvia's economy; however, the concept of "forest value" is often narrowed down to include only the wood (predominantly the amount of timber that can be cut and sold, and, on separate occasions also the wood yield in terms of the future value), sometimes the concept also includes the cadastral value or the market value of the land. The rest of the forest values, namely, the non-wood forest values (such as ecological and social values) are often disregarded, since there are methodological and practical difficulties in terms of determining the monetary value, in order to compare the non-wood value with the value of wood and land (Tuherm, 1997; Tuherm and Berņikova-Bondare, 2008). Therefore, in order to determine the role of game management in Latvia's economy, as well as to identify the areas of priority in cases where game animals cause damages to other sectors, it is important to be able to determine the volume and the monetary value of the game-related products and services. If the role of game management is evaluated in a manner that does not cover the whole country, the land owners and hunters tend to base their decision-making solely on their personal experiences or interests that have developed over time, while failing to match the actual situation (Mc Kinley, 1999).

In Latvia the revenues of the state treasury generated by the game management have been first evaluated by A.Kalniņš, who already at that time emphasised the role of appropriate game management in the national economy, and the net revenues from game management was estimated at 100,000 LVL a year. The revenues from renting the state-owned hunting grounds in 1922/1923 accounted for 19,282 LVL, while the hunting permit tax in the same period brought in 65,640 LVL (Kalniņš, 1943). On certain occasions the volume and value of some specific game-related goods and services have been estimated in the times of the Soviet Socialist Republic of Latvia (Avotiņš, 1980; Siliņš, 1984). For instance, the game management of the Latvian SSR in terms of ungulates (*Artiodactyla*) meat products accounted for 1,365 t in 1976, 1,588 t in 1978 and 1,714 in 1980. The total amount of meat products (including all the edible game species) obtained in 1980 was estimated at 2,000 t. The fur products produced in 1980 accounted for 71,000 roubles, while rawhide products for additional 60,000 roubles.

The analysis of the quantity of game animals traditionally is based on data regarding the counted and the hunted animals. For instance, in the Russian Federation there were 604.67 thousand elks in 2007, out of which 14.269 thousand were hunted (Lomanova, 2007). One of the methods used to estimate the volume of the game products includes expressing the volume of the hunted animals' biomass (kg x km<sup>2</sup>). The biomass of the *Cervidae* family game animals hunted in the North America in 1996 was estimated at 110 kg x km<sup>2</sup> (Crete et al., 1998). The estimated volume of meat from the major game species in Europe was 43,122.320 kg, in 1960s and reached 91,002.400 kg in 1970s (Дёжкин, 1983).

Hunters have repeatedly pointed out that game management should be treated as a sector of Latvia's economy, yet since regaining independence there have been no studies on the total physical volumes and monetary value of game-related products and services.

The aim of this research is to determine the total contribution of the game management to Latvia's economy in 2009. In order to achieve the aim, the following tasks have been defined within the framework of this research: (1) to draft a list of game products and services; (2) to identify the potential sources of information required to determine the volumes of game products and services; (3) to develop calculation methodology in order to obtain the missing information; (4) to determine the physical volume and monetary value of game products and services in the hunting season 2009/2010, by providing a breakdown between the amounts of game products and services for sales and own consumption; (5) to estimate the game management's contribution to Latvia's economy in the hunting season 2009/2010; (6) to provide recommendations regarding further collection of information in order to determine the volume and value of game products and services.

### Materials and Methods

The list of game products and services has been drafted based on the non-wood categories of forest goods defined in the preparatory guidelines for the report on the State of European Forests SoEF2011. The list of game species has been extracted from the current version of the Cabinet of Ministers Regulation No 760 "Hunting Regulations" of December 23, 2003. The list of game services has been drafted by including all the statutory fees payable by the hunters, as well as by identifying the services that are required to ensure appropriate process of hunting.

As a part of the research the primary sources of information have been identified, such as the state institutions that are required by the law to maintain information on game products and services, companies that are engaged in buying and processing of game products, service providers, as well as hunters and hunter organisations. In order to obtain general information on the types and volumes of game products and services, questionnaires have been drafted and distributed among hunter organisations (hunting clubs) and individual hunters. In order to acquire as unbiased information as possible, (the questionnaires contain questions regarding economic and financial performance of hunting clubs) the survey is anonymous. This type of survey is not compatible with quality control (identification of the hunting clubs that have not submitted their answers, repeated sending of the questionnaires, if required or adjustment of incomplete data); however, taking into account the short timeline of the project, this was deemed to be the most appropriate way of obtaining the necessary data.

The hunters' survey covered the whole territory of Latvia. The sample group consisted of 350 hunters. The

sampling method was based on stratified random selection (the contact persons at each hunting district received questionnaires to be distributed among the hunters during the nearest driving hunt event). 284 valid questionnaires have been filled out and returned. It is assumed that the sample group is random and represents the general group (21469 hunters who have received the hunting permit from the State Forest Service for the hunting season 2009/2010). Taking into account the size of the sample group and the relevant assumptions, the survey error rate is  $\pm 2.5\%$ , with 95% probability. The questionnaires contained the following questions:

1. How much (LVL) did you spend during 2009 on the following items:
  - 1.1. Contributions to the hunting club budget (membership fees, rental, feeding etc.);
  - 1.2. Purchasing of hunting equipment (weapons, ammunition etc);
  - 1.3. Purchasing of hunting clothing and footwear;
  - 1.4. Transportation to the hunting venue and during the hunting;
  - 1.5. Keeping of hunting dogs;
  - 1.6. Hunting sports competitions;
  - 1.7. Participation in hunting trophy exhibitions;
  - 1.8. Other costs directly linked with hunting activities.
2. How many and what type of game animal furs/hides did you sell in 2009?
3. How many and what type of measures did you take to prevent game animals from causing damages in 2009?

The hunting clubs' survey covered the whole territory of Latvia. The sample group consisted of 100 hunters' clubs' (which is a representative sample of the general group). The sampling method was based on random selection. According to the data from the State Forest Service in 2009 there were 1319 hunting districts in Latvia. 84 valid questionnaires have been filled out and returned. Taking into account the size of the sample group, the survey error rate is  $\pm 5.1\%$ , with 95% probability.

The contact persons in each hunting district were approached based on the information from the State Forest Service. The survey was conducted by means of printed questionnaires in Latvian language. The questionnaires were delivered to the respondents. The questionnaires contained the following questions:

1. How much do you spend on the rent of the hunting grounds payable to the private owners of the land?
2. How many days in the hunting season 2009/2010 were dedicated to commercial hunting in your hunting club?
3. What was the volume of feeding the game animals in the hunting season 2009/2010?
4. How much and what type of game meat did your club sell in the hunting season 2009/2010?
5. How many and what type of measures has been taken by your hunting club to prevent game animals from causing damages in the hunting season 2009/2010?

The following formula has been used to determine the

interval of probability in the mean evaluation of the general group:

$$\bar{x} - z_{\alpha} \cdot \frac{s}{\sqrt{n}} \leq \mu \leq \bar{x} + z_{\alpha} \cdot \frac{s}{\sqrt{n}}, \quad (1)$$

where

$z_{\alpha}$  – Standardised critical value of normal distribution with 95% probability. It is assumed for the purposes of calculations that the value is 1.96

$s$  – Standard deviation

$n$  – Number of observations within the sample group

The following formula has been used to determine the interval of probability of the proportion of the indicator within the general group:

$$\bar{p} - z_{\alpha} \cdot \sqrt{\frac{p \cdot (1-p)}{n}} \leq p \leq \bar{p} + z_{\alpha} \cdot \sqrt{\frac{p \cdot (1-p)}{n}} \quad (2)$$

The following formula has been used to determine the error in the mean value of the indicator, which describes the general group and is expressed as an interaction between several indicators:

$$P_{ij} = \sqrt{P_i^2 + P_j^2}, \quad (3)$$

where

$P_{ij}$  – Standard error in the indicator describing the general group expressed as a percentage from the mean value

$P_i$  – standard error in the indicator “i” expressed as a percentage from the mean value

$P_j$  – standard error in the indicator “j” expressed as a percentage from the mean value (Arhipova et al., 2003).

The probability interval of the mean assessment within the general group is set at 95%, assuming that  $z=1.96$

The data on the quantities of the game animals hunted in 2009/2010 have been acquired from the official statistics maintained by the State Forest Service. In order to determine the volume of the game meat the game animal species have been divided in two groups – the edible game animal species and non-edible game animal species. In order to determine the physical volume of the hunted animals expressed in tons, the average weight (kg) of representatives of each edible game animal species has been used in accordance with the available reference data (Siliņš, 1984). In order to determine the volume of the game meat used for sale and own consumption, the data from the Food and Veterinary Service on the amounts of sold game meat (carcasses) have been used, while the data regarding the sold ungulate animal meat by different species have been acquired from the results of the survey conducted among the hunting clubs.

The quantity of furs, hides and trophies from the total number of the hunted animals is determined by experts. The data on the sold furs have been acquired from the results of the survey conducted among the hunting clubs, while data on trophies have been obtained from the trophy

exhibition catalogues. The estimates regarding the trophies only include items that are awarded medals in accordance with the appraisal system adopted by the International Council for Game and Wildlife Conservation (C.I.C.) (Varičak, 2000).

Information regarding the price of furs has been acquired by surveying the buyers.

## Results and Discussion

### Game products

In accordance with the defined tasks within the framework of this research a list of game products in Latvia has been produced. In conformity with the preparatory guidelines for the report on the State of European Forests (SoEF2011) there are the following game product categories in Latvia:

- ◆ Game animals;
- ◆ Game animal meat;
- ◆ Hides, furs and trophies.

In accordance with the Hunting Law, the list of game animals is stipulated by the Cabinet of Ministers Regulation No. 760 “Hunting Regulations” of December 23, 2003. There are the following game animal species in Latvia (total of 46 species): moose (*Alces alces*); red deer (*Cervus elaphus*); roe deer (*Capreolus capreolus*); wild boar (*Sus scrofa*); lynx (*Lynx lynx*); capercaillie (*Tetrao urogallus*); black grouse (*Tetrao tetrix*); wolf (*Canis lupus*); (*Tetrao tetrix x Tetrao urogallus*); grey hare (*Lepus europaeus*); mountain hare (*Lepus timidus*); pine marten (*Martes martes*); stone marten (*Martes foina*); polecat (*Mustela putorius*); muskrat (*Ondatra zibethicus*); badger (*Meles meles*); fox (*Vulpes vulpes*); American mink (*Mustela vison*); raccoon dog (*Nyctereutes procyonoides*); hazel grouse (*Bonasia bonasia*); pheasant (*Phasianus colchicus*); woodpigeon (*Columba palumbus*); feral pigeon (*Columba livia*); woodcock (*Scolopax rusticola*); hooded crow (*Corvus corone*); magpie (*Pica pica*); bean goose (*Anser fabalis*); white-fronted goose (*Anser albifrons*); Canada goose (*Branta canadensis*); greylag goose (*Anser anser*); coot (*Fulica atra*); teal (*Anas crecca*); gadwall (*Anas strepera*); shoveler (*Anas clypeata*); mallard (*Anas platyrhynchos*); garganey (*Anas querquedula*); wigeon (*Anas penelope*); pintail (*Anas acuta*); pochard (*Aythya ferina*); tufted duck (*Aythya fuligula*); scaup (*Aythya marila*); velvet scoter (*Melanitta fusca*); common scoter (*Melanitta nigra*); long-tailed duck (*Clangula hyemalis*); goldeneye (*Bucephala clangula*); beaver (*Castor fiber*).

The product “game animal” includes several other products such as game animal meat, furs, hides and trophies, as well as various game services. Therefore, the product has only been accounted for in quantitative values, since it is impossible to precisely calculate the monetary value of the product. Contribution to the economy can only be determined in terms of the hunted animals therefore, the evaluation is based on the quantity of hunted animals. Data on the quantity of hunted animals have been acquired from

the official statistics maintained by the State Forest Service (SFS, 2010). The quantities of the game animals hunted in the hunting season 2009/2010 are included in Table No. 1.

Table 1

**The quantities of the game animals hunted in the hunting season 2009/2010**

Species	Quantity of hunted animals (number)	Species	Quantity of hunted animals (number)	Species	Quantity of hunted animals (number)
Moose	2,656	Raccoon dog	4,376	Ducks	24,018
Red deer	5,226	Grey hare	246	Geese	2,001
Roe deer	30,619	Mountain hare	58	Woodcock	20
Wild boar	30,201	Pine marten	631	Hazel grouse	10
Wolf	175	Stone marten	64	Hooded crow	591
Lynx	140	Badger	108	Magpie	315
Beaver	15,456	Polecat	61	Feral pigeon	63
Capercaillie	83	American mink	113	Woodpigeon	0
Fox	10,028	Muskrat	11	Pheasant, black grouse	0

Species of edible game animals and the average weights of their carcasses are included in Table No. 2.

Table 2

**The average weight of edible game animal species' carcasses (Siliņš, 1984)**

Species	Weight of carcass (kg)	Species	Weight of carcass (kg)
Moose	170	Hares	3
Red deer	85	Geese, capercaillie	1.5
Roe deer	17	Ducks, woodcock, hazel grouse, pigeons, pheasant, black grouse	0.25
Wild boar	40		
Beaver	10		

The volumes and values of game animal meat produced in the hunting season 2009/2010 are included in Table No. 3.

Table 3

**The volumes and values of game animal meat produced in the hunting season 2009/2010**

Species	Meat (t)		Average price (LVL kg <sup>-1</sup> )	Total (LVL)	
	Sold	Own consumption		Sold	Own consumption
Moose	10.36	441.16	1.6	16,576	705,856
Red deer	28.9	415.31	1.3	37,570	539,903
Roe deer	20.54	499.99	2.0	41,080	99,998
Wild boar	16.96	1,191.08	1.6	27,136	1,905,728
Others		164.57	1.5		246,855
Sub-total:	76.76	2,712.11		122,362	3,498,340
Total:	2,788.87			3,620.702	

It is impossible to separately determine the value of game trophies in Latvia, since hunting is predominantly organised as a leisure activity or as a measure to control the game animal populations and prevent the game animals from causing damages to other sectors of economy, as well as a source of game meat. Game trophies are only regarded as a by-product that is treated as an element of the long hunting traditions. Therefore, it is proposed in this research to estimate only the quantities of game trophies, while the contribution to the national economy is examined as a part of game services or the commercial hunting. The data on the quantities of game trophies are based on expert's estimates acquired by means of analysing the game trophy exhibition

catalogues (Anonymous, 2010). For the purposes of this research the estimates regarding the trophies only include items that are awarded medals in accordance with the classification of the International Council for Game and Wildlife Conservation (C.I.C.) As to the quantities of furs, only the items offered in the market are accounted for, due to the fact that the quality of furs differs depending on the season in which they are acquired. Therefore, the estimates do not cover all the hunted furs bearing animals. The data on the sold furs by species have been acquired by means of surveying hunters.

The quantities of game trophies and furs acquired in Latvia in 2009/2010 are included in Table No. 4.

Table 4

**The quantities of game trophies and furs acquired in Latvia in the hunting season 2009/2010**

Type of trophy	Distribution of trophies (%)	Quantity of trophies (pieces)	Type of fur	Quantity of furs (pieces)	Average fur price (LVL/ piece)	Total (LVL)
Moose antlers	1	26	Beaver furs	5,410	4	21,640
Red deer antlers	5	261	Fox furs	5,014	3	15,042
Roe buck antlers	1	300	Raccoon dog furs	1,531	6	9,186
Wild boar tusks	1	302				
Wolves, lynx	30	95				
Total:		984	Total:	11,955		45,868

The total monetary contribution of game management to Latvia's economy in the hunting season 2009/2010 was 3,666.570 LVL.

*Game services*

The following list of game-related services has been compiled based on the official payments made by hunters, as well as the services required to ensure appropriate process of hunting:

- ◆ Rental of the state-owned hunting areas / Rental of privately owned hunting areas;
- ◆ Issuing of the seasonal hunting cards/ Issuing of hunting permits / Issuing of the seasonal hunting cards and hunting permits to foreign hunters / Issuing of trophy exporting permits / Issuing of hunter's certificates / Hunter's examination / Examination of the head of the hunt;
- ◆ Training courses for Hunters (applicant's) / Heads of the hunt;
- ◆ Organising of the hunt for foreign hunters / Organising of the hunt for local hunters;
- ◆ Administrative penalties for illegal hunting / Compensation of damages caused by illegal hunting;
- ◆ Feeding of game animals (costs of the feed and arranging for the feeding patches);
- ◆ Measures aimed at prevention of damages (repellents, fences, sound blasters, removal of beaver dams, hunting in the damaged areas etc.);
- ◆ Hunting infrastructure (tree-stands, shooting lanes, feeders, areas of preliminary processing of the hunted game);
- ◆ Transportation costs (fuel and maintenance of the vehicles);
- ◆ Retail trade of hunting equipment (weapons, ammunition, clothing);
- ◆ Hunting sports services (weapons, ammunition, rental of shooting ranges);
- ◆ Treatment of game trophies, taxidermist's services, participation in game trophy exhibitions;
- ◆ Keeping of hunting dogs.

The data on the state-owned hunting areas have been acquired from the Joint Stock Company „Latvia's State Forests”, while the data on the rental of privately owned areas have been acquired by means of surveying the hunting clubs. The information regarding the statutory issuing of documents, examination of hunters and heads of the hunt, as well as the monetary penalties and compensations of caused damages has been acquired from the State Forest Service. The data on commercial hunting have been acquired from the results of the survey conducted among the hunting clubs. The data on the costs associated with the training courses to acquire the status of hunter of the head of the hunt have been obtained by surveying the trainers.

The rental fees applicable to the private hunting areas as well as the services under items 6 - 12 of the table No. 4 have been acquired by surveying hunters and hunting clubs. The estimates are based on the percentage of the respondents who use the aforementioned services and the average amounts spent on each type of service. The feeding costs are based on the average market prices of the products used in feeding in 2009. In item 13, namely, treatment of game trophies, taxidermist's services, participation in game trophy exhibitions the calculations are based on the results of the survey conducted among hunters as well as on the data provided by the trophy treatment and taxidermy service providers. The quantity of the training courses for hunters and heads of the hunt has been aligned with the number of hunters, who have passed a relevant examination conducted by the State Forest Service in 2009. The calculations regarding the revenues from examination of hunters, the number of hunters who have passed the examination has been increased by 30%, while the number of heads of the hunt has been increased by 10%. The numbers are adjusted due to the fact that according to the State Forest Service approximately 30% of the applicants for the status of hunter and 10% of the applicants for the status of head of the hunt fail the examination on the first attempt and they have to undergo examination once again. Since the fee for seasonal hunting cards is differentiated, namely, 3 LVL for students and retired persons and 10 LVL



for the able-bodied, it has been assumed that approximately 30% or 7000 hunters are either students or retired persons.

The physical volumes and monetary value of the game services are included in Table No 5.

Table 5

**The physical volumes and monetary value of the game services in the hunting season 2009/2010**

No.	Type of service	Volume / Price	Total (LVL) (± standard error with 95% probability)
1.	Rental of the state-owned hunting areas	1,594.000 ha /0.29 LVL ha <sup>-1</sup>	467,000
	Rental of privately owned hunting areas;		35,828
2.	Issuing of the seasonal hunting cards	21,469 seasonal cards out of which 7,000 issued to students and retired people /3LVL; 14,469/ 10 LVL	165,690
	Issuing of hunting permits	119588 permits (elk, red deer, roe, wild boar) /1 LVL	119,588
	Issuing of the seasonal hunting cards and hunting permits to foreign hunters	69 x 20 LVL (1 day) 885 x 35 LVL (2-10 days) 143 x 80 LVL (season)	43,795
	Issuing of trophy exporting permits	50 permits/10 LVL	500
	Issuing of hunter's certificates	1,249 certificates/ 1 LVL	1,249
	Hunter's examination	1,249x30 = 37470 + 30% = 48,711 LVL	48,711
	Examination of the head of the hunt	101 x 10 = 1,010 + 10% = 1,111 LVL	1,111
3.	Training courses to acquire the status of hunter	1,249 / 100 LVL	124,900
	Training courses to acquire the status of head of the hunt	100 / 50 LVL	5,000
4.	Organising of the hunt for foreign hunters	1,097 / 500 LVL	548,500
	Organising of the hunt for local hunters	1,000 / 250 LVL	250,000
5.	Administrative penalties for illegal hunting		4,570
	Compensation of damages caused by illegal hunting		9,397
6.	Feeding of game animals (costs of the feed and arranging for the feeding patches)		1,384.950 ±48,581
7.	Measures aimed at prevention of damages (repellents, fences, removal of beaver dams, hunting in the damaged areas etc.)		524,706 ±44,688
8.	Hunting infrastructure (tree-stands, shooting lanes, feeders, areas of preliminary processing of the hunted game)		469,93 ±128,569
9.	Transportation costs (fuel and maintenance of the vehicles)		4,650.185 ±753,902
10.	Retail trade of hunting equipment (weapons, ammunition, clothing)		6,667.367 ±756,578
11.	Hunting sports services (weapons, ammunition, rental of shooting ranges)		1,790.684 ±264,017
12.	Keeping of hunting dogs		1,824.865 ±318,059
13.	Treatment of trophies, taxidermist's services, participation in hunting trophy exhibitions;		189,056 ±27,136
	Total:		18,857.056

The contribution of game services to Latvia's economy in the hunting season 2009/2010 has been estimated at 18.86 million LVL. A part of the amounts can be regarded as the direct hunting-related costs, while the rest can be regarded as the indirect costs (such as transportation and purchasing of hunting weapons) that for the purposes of statistics are accounted for as a part of other sectors of economy. However, in order to evaluate the total contribution of game management to Latvia's economy, it is important to take into account these costs. The total monetary value of game products and services in the hunting season 2009/2010 has been estimated at 22.52 million LVL.

Also in the future the information on rental of the state-owned hunting areas should be acquired from the Latvian Forestry Company AS LVM. The information on the rental fees of the private hunting areas can be acquired in two ways, namely, either by surveying hunting clubs or the land owners. The information regarding the issuing of statutory permits, examination of hunters and heads of the hunt, monetary penalties and compensations for caused damages can be acquired from the State Forest Service. The data on the stamp duties and state fees can also be obtained from the State Treasury.

The information on the commercial hunting, costs of the training courses for hunters and heads of the hunt, the costs of taxidermy services and trophy treatment services can be acquired by means of surveying the service providers.

The data regarding volumes and costs of the remaining game services (feeding, prevention of damages, hunting infrastructure, hunting equipment, transportation, hunting dogs, etc.) can be acquired by surveying hunting clubs.

### Conclusions

1. The total value of game products in Latvia in the hunting season 2009/2010 was 3.66 million LVL. The largest part of the total value is constituted by the game animal meat (3.62 million LVL), a part of which has been sold for the total of 122 thousand LVL (76.76 tons), while the own consumption accounts for the total value of 3.5 million LVL or 2.7 thousand tons.
2. The total value of game products in Latvia in the hunting season 2009/2010 was 18.86 million LVL. The total value is constituted by the following most significant services in terms of their monetary value:
  - ◆ Services related to retail sales of hunting equipment: 6.67 million LVL;
  - ◆ Transportation services (fuel and maintenance of vehicles): 4.65 million LVL;
  - ◆ Costs associated with keeping of hunting dogs: 1.82 million LVL.
3. The total contribution of game management to Latvia's economy in the hunting season 2009/2010 is estimated at 22.52 million LVL.
4. In the future, by carrying out similar studies, information regarding the volumes and values of game products and services should be obtained from the state institutions responsible for accounting for the game-related resources, as well as by means of surveying the relevant service-providers, hunters and hunting clubs.

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