Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics

Diploma Thesis

Sheep breeding in the Czech Republic

Markéta Michalicová

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Markéta Michalicová

European Agrarian Diplomacy

Thesis title

Sheep breeding in the Czech Republic

Objectives of thesis

The main goal is characteristic of selected commodity verticals with subsequent design optimization processes.

Partial goals:
1. Characteristics of tools of agrarian policy in Czech Republic (status of sheep breeds before and after the EU accession, subsidy system).
2. Characteristics and status of Czech sheep breeding in the agriculture.
3. Comparison of national average results in the branch with results of selected representatives of the branch.
4. Process design to improve the development of key indicators.

Methodology

To complete the theoretical part will be done literature search from the books coresponding to the topic of the thesis. The thesis will be based on collecting of statistic data followed by collecting of real data from choosed Czech breeders.

The practical part will be based on semi-structured interviews with selected representatives and on it built calculation of the expensiveness, profitability indicators and trends in this branch.

Recovery method:

- statistical analysis
- prognostic method
- index analysis

The proposed extent of the thesis

60 p.

Keywords

economy, production, costs, sheep breeding, agrarian policy

Recommended information sources

HORÁK, František. Chováme ovce. Vyd. v češtině 1. Praha: Ve spolupráci se Svazem chovatelů ovcí a koz v ČR vydalo nakl. Brázda, 2012, 383 s., 20, 8 s. obr. příl. ISBN 978-80-209-0390-7

HORÁK, František. Chov ovcí. Vyd. 1. Praha: Brázda, 1999, 156 s., [8] s. barevných obrazových příloh. ISBN 80-209-0284-8.

HUMPÁL, Jaroslav. Mechanizační a technologické vybavení farem s chovem ovcí a koz včetně faremního zpracování mléka. Vyd. 1. Brno: Svaz chovatelů ovcí a koz v ČR, 2008, 84 s. ISBN 978-80-904140-2-0

Chov hospodářských zvířat I: (chov skotu, ovcí a koní). 2. přeprac. vyd. Praha: Institut sociálních vztahů, 1999, 151 s. Živočišná výroba (Česká zemědělská univerzita). ISBN 80-213-0478-2.

KUCHTÍK, J. *Chov ovcí*. V Brně: Mendelova zemědělská a lesnická univerzita, 2007. ISBN 978-80-7375-094-7.

ŠTOLC, Ladislav, Lenka NOHEJLOVÁ a Jarmila ŠTOLCOVÁ. Základy chovu ovcí. 3., upr. vyd. Praha: Ústav zemědělských a potravinářských informací, 2007, 79 s. ISBN 978-80-7271-000-3.

Expected date of thesis defence

2016/17 WS – FEM

The Diploma Thesis Supervisor

Ing. Michal Malý, Ph.D.

Supervising department

Department of Economics

Electronic approval: 20. 11. 2015

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 20. 11. 2015

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 25. 11. 2016

Declaration

I declare that I have worked on my diploma thesis titled" Sheep breeding in the Czech Republic" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any third person.

In Prague on _____

Markéta Michalicová

Acknowledgement

I would like to thank Ing. Michal Malý, Ph.D. for professional assistance during the processing of the thesis. I would also like to thank Tomáš Kosař for the willingness and for providing of all the necessary information about his farm.

Chov ovcí v České republice

Souhrn

Diplomová práce pojednává o vývoji chovu ovcí v České republice. Hodnotí postavení českého ovčáctví na českém trhu a odůvodňuje směr vývoje současného zaměření chovu. Zabývá se užitnými směry chovu ovcí a způsobem zpracování produktů jednotlivých užitných směrů. Součástí práce je přehled finanční podpory poskytované ze strany jak státu tak Evropské unie. V práci je uveden přehled kalkulačních metod používaný pro výpočet nákladovosti zemědělského podniku a pro výpočet rentability podniku.

Cílem práce je zhodnocení odvětví chovu ovcí v České republice. Dílčími částmi hodnocení je stanovení vývoje produkční základny, spotřeby, zahraničního obchodu, a soběstačnosti v oblasti produkce a poptávky. Nakonec je provedena kalkulace příjmů a výdajů vybraného zemědělce pro představu o vlivu dotací na příjem zemědělce, je zhodnocena celková ekonomická situace farmy a jsou navržena možná vylepšení.

Klíčová slova: chov ovcí, užitné směry, zemědělská politika, dotace, produkce, obchodní bilance, ekonomika, náklady, výnosy

Sheep breeding in the Czech Republic

Summary

The thesis discusses the development of the sheep breeding in the Czech Republic. The thesis evaluates the position of the Czech sheep breeding on the Czech market and it provides justifications for the development direction of current focus of sheep breeding. The thesis deals with the utility directions of sheep breeding and with the processing technology within the individual utility directions. In the theoretical part is also included the overview of financial support provided by the state and by the European Union. The thesis provides the overview of calculation methods used for calculation of cost-effectiveness of the farm and for calculation of the profitability of the farm.

The aim of the thesis is to evaluate the sheep breeding sector in the Czech Republic. Partial aims of the evaluation are determination of the development of the production base, consumption, price, foreign trade and self-sufficiency in the field of supply and demand.

In the end are calculated the revenues and costs of a selected farmer and it is evaluated the overall economic situation of the farm for an idea of the impact of subsidies on the income of the farmer. Finally, possible improvements are proposed.

Keywords: sheep breeding, utility directions, agrarian policy, subsidies, production, trade balance, economy, costs, revenues

Table of content

Table of equations

Table of Pictures

Table of Graphs

List of tables

List of attachments

1 Introduction

Sheep breeding history started in 9th century. In these times sheep were raised mainly for their wool, where its development experienced quite lot of changes among positive and negative. The most noticeable change in the Czech sheep breeding appeared in the early 90´s back in the 20th century. The Supply Agreement of cheap sheep wool to Czechoslovakia was signed with Australia and since that time the wool home production sharply fell down. Wool breeds were replaced by meat and combined sheep breeds and wool price dropped down. The wool revenue does not cover the shearing cost, therefore it is not profitable nowadays.

In last recent years the sheep breeding became more popular at the domestic market. Currently, a lot of sheep are raised in small herds mainly as seasonal breeds. During the last 15 years, the number of bred sheep has increased by almost 170% and today we have more than 220 000 sheep bred in the Czech Republic. The consumption, however, stays on the low level in recent years.

Usually sheep are used for maintaining the appearance of the landscape in places with hard accessibility and are usually meant to receive the subsidies. As the subsidy policy plays an important role in the agriculture, the thesis covers the topic of its importance in the farm´s economy.

The thesis topic was chosen on the possibility to apply recently knowledge acquired from the subject study of the international trade with agricultural commodities, sectoral economics, subsidies policy and the farm economic. The thesis is also based on experience with sheep breeding and internship at Direct payments department of Czech Ministry of Agriculture.

2 Objectives

The objective of the thesis is to valorise the sheep breeding sector in Czech Republic and to propose possible improvements and measures of the future development.
Other part of the thesis will cover the theoretical background such as the historical development of sheep breeding, economics of breeding and state intervention overview.
The main objective will consist of following sectional aims:

a) Assessment of the state of the sheep breeding in Czech Republic based on theoretical and statistical background.
b) Cost calculation on a chosen farm.
c) Prediction of the future development and suggestion for its possible improvement.

3 Methodology

Completion of the theoretical part is based on literature research and corresponding information collection.

Practical part will be based on collection and analysis of corresponding data about state of Czech sheep breeding on the domestic market and on the world market. Practical part will also consist of cost calculation on the chosen farm.

Conclusion of the thesis will consist of findings from both parts and proposal of possible improvements.

3.1 Economics of sheep breeding

All entrepreneurs in animal sector should know their returns and costs. Sheep breeds as a hobby is a different point of view, because the investment is considered as a kind of pleasure and the breeding is a relax for the breeder. Currently in Czech Republic is no source which deal with the topic of costs and returns in sheep breeding. Therefore, it is not possible to propose general improvements. Currently, it is not possible to breed sheep without subsidies. The reasons are simple, prices of inputs increase (purchased feed, fuel, cost of labour). Moreover, the exercise price of lambs decreases in last 5 years. Price of milk, on the other hand increased by about 6 % in recent years. Without subsidies, however, the production economy stays non-profitable (Horák, 2012).

Production factors

The aim of the business is to have the highest possible productivity based on the effective use of all inputs, correspondingly to the production. By calculation of the division of returns and costs. Production factors are influenced by many other factors in animal production: the breed, conditions in the breed (climate, nutrition, breeding technology) and by education of the breeders. The results of differences caused by factors characteristic for animal production are different returns and costs per production unit (Bucek, et al., 2015).

The most important factors of production in sheep breeding are usually: lambs for slaughter, amount of fresh milk and share of fresh milk processed to cheese. (Bucek, et al., 2015)

Economic factors

As economic factors are considered mainly prices of inputs and outputs. Price of inputs such as energy, feedings, and price of human work influences final prices of products. The price of sheep milk and meat increased at least two times during the last decade (Bucek, et al., 2015).

The situation differs from country to country in Europe though. Prices of final products are also based on the demand for sheep products and on the technical basis, production intensity and difficulty of the production process of the breed (Bucek, et al., 2015).

3.2 Costs in the entrepreneurship

Every entrepreneurial activity is connected with costs. Total costs consist of amount of cost items and every item has different „behaviour". The amount of costs directly influences a profit of entrepreneur. The higher the cost, the lower the profit. (Freiberg, et al., 2008)

General costs division

a) Direct and indirect
b) Variable and fixed
c) Primary and secondary
d) Opportunity costs

(Freiberg, et al., 2008)

a) Direct and indirect costs

The division of costs in this case depends on the assignment to calculation unit. Directs costs are costs which are directly connected to the calculation unit, on the other hand, indirect costs are costs for which calculation unit is not clearly identifiable or if there is more of them. Regarding direct and indirect costs it is necessary first establish calculation unit. Calculation units are usually: 1 pc of product, subcomponent of the product, the group of components (Freiberg, et al., 2008).

Other examples of calculation units are: business contract, activity or process. It is important to not interchange costs for business contract with overheads. All costs connected to the business contract are direct costs of the businnes contract (Freiberg, et al., 2008).

b) Variable and fixed costs

The division between variable and fixed costs can be hardly determinable, because almost all costs change (vary) after certain period of time. However, variable costs are only costs that increase with increasing number of operation and decrease if the range of operations is reduced. Fixed costs are simply not dependent on fluctuations of the range of operations or produciton (Freiberg, et al., 2008).

c) Primary and secondary costs

Primary costs are connected to consumption of primary sources. Primary sources are connected to the sources from the outside of the company or farm. Secondary costs are means spent to pay the serivce wtih the use of sources from primary costs. Good example in this case could be construction of the barn. A material bought for construcioun would be primary costs and secondary cost is the service or the work of employees of the farm. (Freiberg, et al., 2008)

Division of costs in sheep breeding

All costs connected to sheep feeding and treatment and finalization of sheep products are included. Total cost spent on sheep breeding and revenues for individual products are compared while calculating profitability of the breeding (Humpál, 2008).

Calculation of costs in sheep breeding sector is generally the same as for all sectors in animal production. Costs of animal production includes following items (Humpál, 2008).

a) **Purchased feed and litter**

   This cost item represents first direct cost. The way of accounting of the purchased inventories depends on the entrepreneur.

b) **Own feed and litter**

   Own feed and litter usually constitutes the major part of the whole cost structure in animal production. It is necessary to evaluate the feed and litter correspondingly to costs spent on its production.

c) **Pharmaceuticals and disinfection**

d) **Other direct material**

   Section of other materials includes consumption of material needed for barns maintenance and involuntary shortages.

e) **Other direct costs and services**

   Other direct costs and services include consumption of:

   a. Water and gas
   b. Energy (fuel consumption and electricity used in fencing)
   c. Buildings and mechanical devices maintenance from external providers
   d. Veterinary operation and insemination payments
   e. Rent for individual buildings used for animal production
   f. Costs of travel connected to individual breeds
   g. Other services and small assets consumption
   h. Property tax
   i. Other operating costs (insurance of individual breeds and buildings
   j. Interests
   k. Change of the status of animals (Humpál, 2008)

f) Total labour costs

Includes all direct labour costs and social and health insurance contributions. This section includes also costs of manure disposal.

g) Depreciation of intangible and tangible fixed assets

All depreciation should correspond to the wear of depreciated asset (Humpál, 2008).

h) Depreciation of basic herds of animals

First of all, definition of the term "basic herd" is needed. Basic herd includes adult animals able to provide its breeding and production properties. At the same time these animals have to be able to reproduce their own breeds. In sheep breeds the basic herd represent: ewes and breeding rams. Basic herd is depreciated individually mainly because of its higher costs of acquiring. In larger breeds individual depreciation is hardly feasible and impractical.

Currently it is possible to realize also the group depreciation.

i) Costs of auxiliary activities

It includes work of tractors, trucking for individual livestock production. In these costs belong also own-account costs.

j) Production overhead

Includes all primary and secondary costs related to livestock management.

k) Administrative overhead

All primary and secondary corporate costs.

(Humpál, 2008)

Cost calculation methods in agricultural enterprises

Calculation method is used to calculate costs of calculation unit. Always there have to be balance between costs of production and the amount of manufactured products. Method of calculation depends on the type of company´s production. Production of agricultural company can be pooled or un-pooled production. Pooled production are those companies, where by one production process are formed different products or performances. Un-pooled productions on the other hand form only one product. Majority of agricultural companies are with pooled production (Poláčková, 2010)

Calculation method

a) In pooled production:
   - Subtracting method
   - Scheduling method

a) In un-pooled production:
   - Scheduling method
   - Dividing method
   - Contract method

(Poláčková, 2010)

- **Subtracting method**

All products in pooled production are observed as a whole. For this method, one product is marked as the main one and the rest of products are by-products. For the purpose of subtracting method only the main product (performance) is calculated. By-products are evaluated by internal prices. For getting the cost of the main product is the sum of the by-product prices deducted from the total costs of pooled product (performance). In animal production usually the by-product is manure and slurry. (Poláčková, 2010)

- **Scheduling method**

This method is based on the equivalence of all pooled operations, operations are not divided as main and by-products. Based on the itemizing basis, which expresses the link of different natural or financial indicators, are pooled or in other words "associated" costs itemized to individual operations. Total costs of associated operation are assigned to individual types of operations according to different "itemizing basis" (Poláčková, 2010):

1) **Ratio metric numbers**
   Numbers determine the ratio between individual operations (products) according to its amount or weight (Poláčková, 2010).
2) **Percentage shares**
   Assign own costs to associated operations.
3) **Auxiliary calculation unit**
   One unit is chosen for division of total costs.
4) **Other calculation methods**
   a. *Dividing method* is used in farms with one product. Own costs of product are divided by the total amount of calculation units. (Poláčková, 2010)
   b. *Contract method* is used in case of only one product which is at the same time calculation unit.
   c. *Phase method* and *Stage method* are not used very often. It is possible to apply methods in new productions, for example production of electricity in biogas plant. In sheep breeding where breeders finalize their products can be used *Stage method*. (Poláčková, 2010)

Final products cost calculation in sheep breeding

Calculation of costs per individual products needs individual cost calculation for basic herd, lamb fattening and young breeding sheep. For small breedings is possibility to calculate costs per „feeding days" foollowed by individually stated coefficient adjustment. Individual costs serve as a base for products costs calculation (Humpál, 2008).

For calculation of costs is used combination of methods: subtracting and scheduling. Individual costs for basic herd, fattening and young breeding sheeps are basis for own costs calculation. (Poláčková, 2010)

Sheep breeding has combined production. In one production process is produced meat, lambs, wool, cheese and manure. Sheep dung is considered as a by-product. (Humpál, 2008)

Products division

- **Main products:** lambs, meat, cheese
- **By-products:** manure and wool (Humpál, 2008)

In average, in sheep breeding is produced approximately 11,3 tonnes of sheep dung/ year/large unit (LU=500 kg) (Ministerstvo zemědělství, 2015).

While calculating the costs, the total price of by-products have to be deducted from the sum. The price of manure is simmilar to price of manure of bovine animals, thus around CZK 400/ tonne. Price of the manure corresponds to the price of contained nutrients. The wool should be appraised correspondingly to its realization by the farmer (Humpál, 2008).

Cost calculation for main products: weaned lambs and sheep's milk lump cheese

Costs of both products can be divided relatively to corresponding amount of consumed milk per weaned lambs and milk used for cheese production.

Assumption for average *milk consumption* or use:

- 5.1 l / 1 kg live weight of weaned lamb
- 4.5 l / 1 kg sheep's milk lump cheese

Example:

- **Basic herd:** 300 pcs of sheep(ewes)
- **Lambs:** 450 pcs
  - are weaned having cca 18 kg of live weight/ piece
- **Breeding index:** 450/300 = 1.5 weaned lambs/ewe
- **Production of live weight of lamb/ewe:** 18kg x 1.5= 27 kg of live weight

Production of cheese equal to 25 kg/ewe (Humpál, 2008) (Poláčková, 2010).

Table 1 Total consumption of milk

	Amount (kg)	Milk consumption (l)/ 1 kg	Total milk consumption (l)
Weaned lambs	300x27=8100	5,1	41310
Milk lump cheese	300x25=7500	4,5	33750
		Total:	75060

Source: (Humpál, 2008)

Total costs of herd = 1 386 000 CZK (costs of one feeding day of ewe = 12.66 CZK). For the calculation of costs per 1l of milk is needed to divide the total costs by total milk consumption: 1 386 000/75 060 = 18.47 CZK/l. (Humpál, 2008) (Poláčková, 2010)

Table 2 Main products costs

	Costs of consumed milk (CZK) (1l=18.47 CZK)	Main product costs (CZK/kg)
Weaned lambs	41310*18.47=762 995.7	762996/8100=94.20
Milk lump cheese	33750*18.47=623 362.5	623363/7500=83.12

Source: (Humpál, 2008) (Poláčková, 2010)

Cost calculation for main products: weaned lambs

In case that weaned lambs are the only main product, total costs are divided by total number of weaned lambs produced in calculation period. In this case, the costs of one weaned lamb production should be: 1.386,000/450= 3080 CZK. The cost is equal to 171.11 CZK/1 kg of live weight (3080/18=171.11 CZK). (Humpál, 2008) (Poláčková, 2010)

Cost calculation for main products: lambs for fattening

Next category of main products are *lambs for fattening*. Costs calculation is different in this group. First – price of by-products is deducted from total costs of *weaned lambs*. Then, costs of weaned lambs are aggregated with total costs of lambs for fattening. To calculate the costs/kg is simply divided totalcosts/total produced amount of live weight in kg. (Humpál, 2008) (Poláčková, 2010)

The last category in basic herd is *young breeding sheep*. In this category *feeding days* are the most important. The main product is the growth in weight (calculation unit is 100 feeding days). (Humpál, 2008)

3.3 Depreciation

Depreciation of adult animals

An adult animal is considered animal with an ability to reproduce. As adult animal are in sheep breeding considered *breeding rams* and *ewes* (Poláčková, 2010).

It is necessary to calculate accounting depreciation in accordance with the Act No. 563/1991 Coll (Poláčková, 2010).

Adult animals are depreciated individually or in groups. Entry price of depriciation item is always the cost of acquiring. The basis for depreciation is *depriciation plan*. The company then accounts depreciation by *accumulated depreciation*. Accumulated depreciation are included in calculation of costs from the start of using of the asset (animal) and are accounted equally every month (from the 1st month after the month of allocation of the asset to use) in accordance with the plan. (Poláčková, 2010)

Individual depreciation

Individual depreciation is eearmarked for breeding farm, usually for individual animals with high breeding value and therefore high purchasing price. These aimals are individually registered in general. The depreciation can be done in two ways (Poláčková, 2010).

a) Accounting standard:

Equation 1 Individual depreciation of animals

$$RO = \frac{PP - R_{cull}}{t}$$

RO = 1 year depreciation

PP = purchasing price in CZK

Rcull = expected revenue from culling

t = expected amount of years in breeding herd

(Poláčková, 2010)

b) Depreciation rate

Based on the purchasing price and on the expected time of placing of the animal in the breeding is given the rate/1 feeding day of the individual animal. (It can be used aso for the whole group, in group depreciation.) (Poláčková, 2010)

Group depreciation

An accounting regulatory does not include the calculation procedure description. It includes a possibility which presupposes the plan of yearly depreciation.It is possible to use following formula:

Equation 2 Group depreciation of animals

$$RO = \frac{(PP - R_{cull}).n}{t}$$

RO = 1 year depreciation

PP = purchasing price in CZK

Rcull = expected revenue from culling

t = expected amount of years in breeding herd

n = number of animals in the group

(Poláčková, 2010)

3.4 Intensity of the animal breeding

The intenstity of the sheep breeding is calculated in accordance to the Act. No. 79/2007 Coll., appendix No. 4 – About conditions for the implementation of agrienvironmental measures. The appendix includes the list of conversion coefficients for calculation of large unit (LU). The regulation for calculation of LU in sheep breeding is following (Ministerstvo vnitra, 2016):

$$1\ sheep\ at\ age\ 12\ months\ =\ 0.15\ LU$$

From the formula is obvious that for having one large unit, farmer must breed approximately 7 sheep at age 12 or more months. (Ministerstvo vnitra, 2016)

3.5 Profitability ratios

Profitability ratios show the ability of entrepreneur to create added value, new sources and profit. These ratios estimate the management of the company´s expenditures. They express the the structure of sources that creates the income of the company. The aim of all business is to achieve the maximum profit possible.
For calculatio of profitability in practical part of the thesis were chosen following ratios (Peterson, et al., 1999):

- **Return on Assets (ROA)**

Return on Assests shows the ability of the company to create profit not considering the origin of the financial sources (whether it is from own or external sources). It calculates the effectiveness of use of assets in company´s operations. Other option of similar calculation is the ratio of EBIT (Earnings before interest and taxes) and assets. This equation consider the way of financing of assets (Peterson, et al., 1999).

Equation 3 Return on Assets

$$ROA = \frac{Profit}{Assets}\ x\ 100$$

Source: (Peterson, et al., 1999)

Equation 4 Basic earning power

$$Basic\ earning\ power = \frac{Earning\ before\ interest\ and\ taxes}{Assets}\ x\ 100$$

Source: (Peterson, et al., 1999)

- **Return on Equity (ROE)**

The ratio result refers to the effectiveness of the use of the equity (invested capital). It says how much of the profit was generated by currency unit (CZK 1) of equity. The result of return on equity is most interesting for shareholders (investors). However, it expresses the ratio of the profit which will be received to the equity in the stock (Peterson, et al., 1999).

Equation 5 Return on Equity

$$ROE = \frac{Profit}{Equity}\ x\ 100$$

Source: (Peterson, et al., 1999)

- **Return on sales (ROS)**

The ratio evaluates the operating performance of the company. Sometimes it is called "operating margin". It shows the amount of profit made by company after the payment of costs (Avdeev & Co., 2016).

Equation 6 Return on sales

$$ROS = \frac{EBIT}{Sales}\ x\ 100$$

Source: (Avdeev & Co., 2016)

- **Return on costs (ROC)**

It expresses the amount profit acquired from one currency unit (CZK 1) of costs. The higher the value of ratio, the more effective is the use of items of company´s activity (Růčková , et al., 2012).

Equation 7 Rentability of costs

$$Rentability\ of\ costs = \frac{Profit}{Costs}\ x\ 100$$

Source: (Růčková , et al., 2012)

- **Cost effectiveness**

The ratio is considered as a supplement of the ratio Return on sales. The lower is the value, the better is the economic result. The value should correspond to the result of: (1-ROS) (Růčková , et al., 2012).

Equation 8 Cost effectiveness

$$Cost\ effectiveness = \frac{Costs + Income\ tax}{Sales}\ x\ 100$$

Source: (Růčková , et al., 2012)

- **Gross profit margin**

The ratio expresses general profitability of the company, the share of sales that is kept if the production expenses are deducted (Peterson, et al., 1999). The result also indicates to which level can prices of goods/unit decrease without getting the company in financial loss (Thukaram, 2006).

Equation 9 Gross profit margin

$$Gross\ profit\ margin = \frac{Sales - Cost\ of\ goods\ sold}{Sales} x\ 100$$

Source: (Peterson, et al., 1999)

- **Net profit margin**

The indicatior shows how much of the revenue is transformed to profit. In this case as revenues are considered operating income and extraordinary revenues. In case of agriculture the operating income is mainly represented by subsidies, therefore it can be said that the result of the ratio simply expresses the profit generated from received subsidies (Peterson, et al., 1999).

Equation 10 Net profit margin

$$Net\ profit\ margin = \frac{Profit}{Operating\ income + Extraordinary\ revenues} x\ 100$$

Source: (Peterson, et al., 1999)

3.6 Balassa Index

Balassa Index is used to measure normalized export shares. The normalization of export corresponds to the exports of the group of reference countries of the same industry. Conditions for calculation of the Balassa Index are following (Hinloopen, et al., 2001):

If X_j^A - export value of industry *j* of the country A,

X_j^{ref} - export value of industry *j* for the group of reference countries,

$X^i = \sum_j X_j^i ; i = A, ref$

Then the Balassa Index of revealed comparative advantage (BI_j^A) of the country A for industry *j* is equal to*:*

Equation 11 Balassa Index

$$BI_j^A = \frac{X_j^A / X^A}{X_j^{ref} / X^{ref}}$$

If $BI_j^A > 1$, then it is said that the country A has a comparative advantage in *j* industry. The reason is that the industry is more important for country A´s exports in comparison to the reference countries exports. (Hinloopen, et al., 2001)

4 Literature review

4.1 Development of sheep breeding in the Czech Republic

Sheep is one of the first domesticated animals in the world mainly thanks to the potentiality to be breeded in almost all climate and manufacturing conditions. First mention about domestication is from the 9th millennium BC in front Asia. Thanks to unassuming breeding it fast expanded to the rest of the world. In the Czech Republic sheep are breeded from about the 9th century. At the turn of the 15th and 16th century, sheep were breeded in large herds on our grounds with focus on fine merino wool. High demand for wool and establishment of textile manufactures led to expansion of "wool sheep" to the world. In the same time the so called "fallow" three-field system also helped to utilize sheep not only on fertile areas but also on less favoured areas (Horák, 2012) (Kuchtík, et al., 2007).

In the 17th century, sheep breeding was the main sector of the livestock manufactory. In the 19thcentrury, in the Czech Republic was the biggest expansion of sheep breeding. Almost 2 million sheep were bred in large herds on large farms. The main reason of favourable development of sheep breeding was: suitable prices for wool and high demand for the commodity (Kuchtík, et al., 2007) (Štolc, et al., 2007).

After the entrance of the Australian and New Zealand´s sheep wool to the world market the production on the Czech market restricted. This tendency was perceptible also in other states in Europe till the beginning of the Second World War. In this period also gradually changed average size of herds, small breeds started to outweigh the large breeds. During the war and during the collectivization period the sheep breeding was on slight increase. Then, again the sheep breeding loses its position on the market till 1965. Afterwards, till 90's the amount of sheep increases almost to 430 thousand pieces (Kuchtík, et al., 2007).

Before the year 1990 private breeders breeded about 67% of sheep and 33% were in the ownership of socialist sector (agricultural cooperatives and state farms). From the year 2000 private breeders breeded more than 90%, transformed agricultural companies breeded about 5% and the rest belonged to other organizations such as schools and researches.

From the year 1989 to 1992 the purchase price of the wool decreased by about 84%. In that time the whole herds of wool sheep such as merino were exterminated. In 1991 our economy went through extensive changes and with the advent of market economy the production focus of Czech sheep breeds changed. The wool was not more subsidy subject and therefore production of wool was replaced by the meat production sheep and sheep bred for reproduction. The milk production is still unique on Czech farms (Horák, 2012) (Štolc, et al., 2007).

Main factors that caused decrease in herds of wool sheep was really significant decline in purchase prices of wool and with this also almost disappeared companies focused on repurchase of wool for further manufactory. Then also reduction in state aid and extensive liquidation of herds infected by virus called Maedi-Visna (Kuchtík, et al., 2007).

Compared to Slovakia, the focus in sheep breeding is totally different. Czech breeders are focused on meat production, while in Slovakia breeding is focused on milk production. The problem of meat breeds in CR is low or almost no profitability without subsidies. In this case, acceptable could be to change the breeding partially to focus also on milk production. This should help the farm to extend the offer of its products and consequently reduce the dependency on subsidies. The problem on the Czech market is very low possibility to sell the sheep milk directly to the dairy and therefore the producer should also be a processor, which is very costly affair. However, almost the only way how to expand the sales of sheep farm is to expand the range of sheep products (not replace) and sell it directly so called "from yard" or through the market network. Moreover, there is a possibility to get the financial aid from Czech and EU sources – Support for the processing of agricultural products and increasing the competitiveness of the food industry (Kuchtík, et al., 2006).

The idea of expansion of the range of product by milk products is very interesting from a simple reason. The nutritional value of sheep milk is quite higher than the cow milk. The percentage of water is lower and the percentage of protein contained in milk is higher (5.7% in sheep milk/3.3% in cow milk). The similar situation is also with carbohydrates and fats (KalorickéTabulky.cz).

Other idea of the status of sheep breeding sector in Czech Republic improvement is to specialize the utility of meat herds on fertility. If the sector is focused on meat production, then only fertile herds can increase the productivity of sector. In this problematic mainly maternal population should be considered. To rearing only young animals from multiple litter should be reproduced (Štolc, 1999).

4.2 Situation of sheep breeding in the Czech Republic after the year 2000

Positive trends

- overall increase in herds of sheep (average per herd and total)
- higher importance of pastoralism and awareness about it
- higher demand for lamb thanks to its quality proteins, high share of mineral substances, vitamin B and because it is easily digestible meat (suitable for diet)[1]
- subsidies for sheep breeders (especially for sheep breeded in Less Favoured Areas)
- increasing interest of small breeders in sheep as a multifunctional animal (biological grass cutting)
- increase in ecological way of sheep breeding

(Kuchtík, et al., 2007)

[1]http://www.gone-prlov.cz/chov-ovci.html

Negative trends

- low load of sheep per 100 ha of agricultural land
- despite the fact that the interest in sheep meat increases, the consumption is still at the low level
- low price for wool and its low repurchase and sales

(Kuchtík, et al., 2007)

Assuming that the sheep breeding for meat will outbalance, it is necessary to follow some criteria.

- The average fertility of sheep should be about 150%
- The mortality of lambs should be gradually reduced
- The average number of sheep in herds should be increased because the contemporary status is still economically problematic (Kuchtík, et al., 2006).
- The breeding should be based mainly on low-cost nutrition mainly thanks to the possibility of pasture fattening (the most economical alternative of nutrition).
- Give priority to reconstruction of elderly building over building new sheepfold.
- Focus on sheep milk production which is in west situated countries evaluated as economically most interesting. Problem in the CR are high cost of buying parlours and for other equipment necessary for production of milk.

(Kuchtík, et al., 2007)

4.2.1 Number of sheep in the Czech Republic

If it is distinguished between individual regions in the Czech Republic, the three regions with the highest number of sheep in 2014 were: South Bohemian Region (29,023), Central Bohemian Region (25,378) and Zlín Region (22,031).

As was mentioned, these numbers have the increasing tendency, mainly because of the small breeders who breed sheep as a multifunctional animal. The share of permanent grasslands in agricultural land is 23,5%. From these sheep the majority are females (ewes represent more than 50% of the total number in 2014) (Bucek, et al., 2015).

The reason of the high number of ewes compared to the number of rams is focus of contemporary farmers on reproduction of sheep followed by production of meat which is currently the main product from sheep breeding (Bucek, et al., 2015).

From 1990 to 2013 the Czech sheep breeding went through significant changes. The price of wool sharply dropped down and sheep breeders gradually focused on meat production instead of production of quality wool. In 2013 the structure of sheep breeds was as follows: breeds with combined performance 48%, breeds with meat performance 40% and the share of fertile or diary sheep 12%. For comparison, in 1990in the Czech Republic, the share of wool breed was 62% and the share of combined and meat breeds was about 37% (Bucek, 2014).

4.2.2 Conditions for functioning of the branch

The main condition of the rational development of all branches focused on food production is to take part in the effective demand of population. Share of the branch and its trend should match to the economic concept of the country and its agrarian policy. This all should naturally be consistent with the EU policy. For good capital reproduction of the branch proper market information are needed. Units of the branch should have idea about the animal numbers, annual consumption per capita represented by main representatives of the branch, actual market prices of the main representatives at all levels, the status of the foreign market and conditions of the entrance to foreign market and the cost of production (Peterová, 2010).

Specification of animal commodities

The aim of animal production is to offer final products of animal origin. The basis of the whole branch is the animal reproduction. Animal production is divided to two specializations. First breeding is focused on reproduction, output should be production of pure-breeding animals (breeding herds and reproduction herds). The rest of the animals are so called production herds (Peterová, 2010).

The tool which is used to explain the average status of animals is called "feeding day". It expresses the average number of animals in a certain period – month or year. Feeding day includes all movements as increase in weight, death etc. and it can be called average daily yield (Peterová, 2010).
In herds with animals breeded for reproduction it is possible to evaluate the productivity in pieces (one mother) of the basic herd (Peterová, 2010).

4.2.3 Factors influencing the level of performance in animal breeding

The performance of the breeding is influenced mainly by the quality of husbandry. Breeds are divided into two parts – specialized and combined. Combined breeds represent herds with two utility directions. Specialized breeds are of better quality in comparison with combined breeds. This does not necessary have to badly influence the economic efficiency. The economic efficiency depends also on the price of both final products and on possible savings from lower severity with regard to inputs (Peterová, 2010).

4.2.4 Price of animal products

Market with agricultural commodities is characterized by large number of farmers who, therefore, accept prices, not propose. The massiveness of raw products influences the structure of market. For sellers is difficult to find buyers who then determine the range of the buyer´s monopsony power (McLaren, 2015).

Usually, farmers do not have enough financial means for financing of storage spaces and with this connected costs or for getting their products to further markets. Therefore, farmers usually sell their products in their locality or to so called middle-men. (McLaren, 2015)

Price of every product is determined by certain conditions, as: product identification, name of product, unit of measure, quality, supplied amount, supply conditions etc. The price can include only economically justified costs of acquisition, costs of processing, circulation, tax, duty and appropriate profit. The final price should correspond to the home market situation (Peterová, 2010).

Price is influenced by the size of the stock and the production prediction. Usually majority of products made in Czech Republic have different line development across the regions (Peterová, 2010).

In case of the price decrease due to the higher supply than the demand, the state can influence the price stability by setting of the intervention price. Intervention price is the lowest possible price of given products for which the state buys the product to the public/intervention stock. The limit for home producers are usually prices on the foreign market. In case of the equal prices with foreign markets, home processors tend to import these products (Peterová, 2010).

The price can be influenced also by the choice of other distribution channels such as the sale directly to the customer or the "yard sale". In this case the product is sold for higher price but still it is cheaper than the purchase from wholesaler. The advantage includes also the quality of the product and freshness (Peterová, 2010).

4.3 Utility directions of sheep breeding

Sheep breeding is the main supplementary sector in the whole animal production. Among the most significant advantages of the sheep sector is its versatility in the context of its utility and products. Among the main products are included: meat, wool, milk and skins of sheep. By-products which are subsequently used in other sectors are: lanolin, meat offals (heads, dufs, extremities), small intestines, stomachs of milk lambs, blood, tallow, endocrines, horns, bones, boiled sour sheep's milk whey „žinčica". Among the indirect benefits of sheep breeds are included: production of solid sheep dung, ability to use absolute pastures, agronomic importance, use for research (physiological and immunological experiments). Currently it is possible to observe growing trend in having sheep breeds for off-market purposes. The importance of sheep breeding rests on its favorable influence on the landscape, especially restoration abilities. Perspective is also development of agrotourism and possibility to have varied diet (Horák, 2001).

4.3.1 Main products

Sheep meat

In Czech Republic all breeds have meat as the main utility attribute. The only breed where the meat is not the main utility are milk sheep breeds. The utility of the breed then decides about the economy of the breed. Sheep meat is characterized by its high dietetic value and by specific odour. Sheep meat is easily digestible and its characteristics have good influence on cholesterol metabolism. Sheep and mainly meat of lamp is high-quality product, unfortunately still unrecognized by majority of all generations. Its characteristics can be compared to beef meat. Among the most obvious advantages belong no limitations with regard to religion and also no use of hormonal stimulation of growth. (Horák, 2001)

Factors influencing the production and composition of meat:

a) **The sheep breed**
   In comparison of merino and "mast" sheep, mast breeds have much more quality and lean meat. On the other hand, e.g. "heather" sheep´s meat has its own specific game meat taste. Caracul or Awassi sheep´s meat is without subcutaneous fat and also lean.
b) **Gender**
   The taste of ewe´s meat is usually less significant in comparison to ram´s meat taste.
c) **Age**
   Generally, the lamb meat is preferred in the kitchen. The young meat is not so solid and aromatic as the old one. Elder sheep have more fat which also influences the taste of the meat (Horák, 2001).

d) Other

This section includes other influences such as variety or type of nutrition, the system of breed and stabling, the constitution, condition and health condition. What influences the final product the most is slaughter processing and the final preparation in the kitchen. (Horák, 2001)

Wool

The wool grows continuously and it is produced by majority of sheep. The quality and amount is influenced by the type of sheep breed, age, gender, stabling, nutrition and genetics – almost the same factors as for meat. The quality of wool is also influenced by the technological process – the way of shearing and storage (Horák, 2001).

Milk

Sheep milk has high share of acetic acid, iron and zinc. The sheep milk in first seven days after birth, so called colostrum is the most important for lambs. Sheep milk is used for production of cheese. To produce 1 kg of cheese is needed approximately 5 kg of milk. The same amount of milk is needed also for lamb´s 1 kg increment. Following table represents the share of individual milk components in milk of different animals/human (Horák, 2001).

Table 3 The average milk composition of mammal selection in %

	Dry matter	**Fat**	**Proteins**	**Sugar**	**Ash**
Breastmilk	11,8	3,0	2,1	6,5	0,2
Cow´s milk	13,1	4,0	3,5	4,8	0,8
Goat´s milk	13,1	4,1	3,8	4,4	0,8
Sheep´s milk	21,3	8,9	6,3	5,0	1,0

Source: (Horák, 2001)

The share of individual components increases during the lactation period. On the other hand, the average amount of collected fresh milk per day is slowly decreasing during the lactation period. The length of lactation period is in average between 100-250 days. Ordinarily, in the lactation period is collected 80-140 kg of fresh sheep´s milk in average. In milk sheep breeds the average amount of collected milk is about 200-300 kg (the exception are e.g. East Friesian breeds with 500-600 kg of milk/lactation period in average). Accordingly, the average daily collected amount ranges from 0.5 – 3 kg/sheep/day (Štolc, et al., 1999). To milk one sheep is needed about 25 presses. In the beginning, the sheep is milked 3 times a day, later 2 times and in the end of lactation just once a day. It is perspective to consider the investment in milking machine if the farm has more than 20 pieces of sheep (Horák, 2012).

Wool

Quality and the appearance of the wool is influenced by many factors, as: gender, breed, age, nutrition, breeding conditions and external parasites. Skin from slaughtered animals and its quality is distinguished according to its age. Further, the skin is distinguished to: fur skin, pelt skin and tanning skin (Horák, 2001).

Fur skin

Fur skin is used to make products with wool inside and juncture outside of the product. Usually, for fur skin products purposes the Romanov sheep is bred (Horák, 2001).

Pelt skin

Products made from pelt skin have the “hair” (wool) on the outside. In Czech Republic, pelt skins are obtained most often from Merino sheep (Horák, 2001).

Tanning skin

Tanning skin has very short wool (up to 1.5 cm). Damaged skin is used for haberdashery products (Horák, 2001).

4.4 Processing technology

Meat

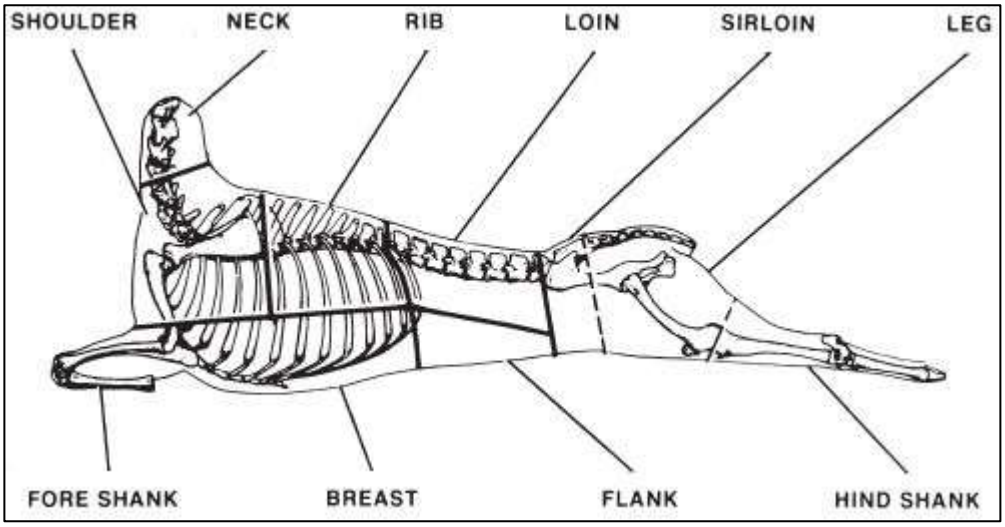
Sheep have to be prepared on slaughter. One whole day before the slaughter the sheep is not fed, it also must have an access to drinking water and it should be at rest. The process of slaughter must be in accordance with the law (The Act No 246/1992 Coll. – The Act of Czech National Council on the protection of animals against cruelty, Decree no. 245/1996 Coll. about the treatment with animals during the slaughter) (Horák, 2001).

Usually the sheep is stunned by blow to the head-crown or by the electricity in slaughterhouse. Within 30 seconds the sticking (the process of blood leakage) should be made, with the prevention of dirtiness of the sheep wool. First the sheep is skinned and after that the evisceration is made. In the carcase stay only tallow and kidney. Offal can be also processed for cooking (Horák, 2001).

- **The carcase**

The sheep carcase is in Czech Republic cut in following parts: a neck, a shoulder, a back (a rib + a loin), a leg (a rump), a side (a flank+ a breast). The structure can be seen on the following *Picture 1* (Horák, 2001).

Picture 1 Lamb carcase



Source: https://etravelweek.com/hmbbsatts/1781181545.gif

Cutting of the carcase is usually made in a shop. Skilled worker standardly needs about 45 minutes to put the sheep to death, then eviscerate and in the end bone the body. The processing of sheep meat is approximately 1.5 times more complex in comparison to beef meat (Horák, 2001).

Wool

Sheep wool is irreplaceable textile raw material with specific attributes. Weaving of the wool was known already in Neolithic and the wool was used as a textile protection against the cold. Nowadays, the wool begins to be used in building sector as a perfect insulating material (Horák, 2012).

With regard to its quality it is important to consider the term and the way of shearing, good treatment, storage and the way of processing of the wool. The sheared wool is called "fleece". For evaluation of the quality of the wool it is used special *Assortment scale of the wool* which includes several criteria as for example *designation of softness, yearly length, curls per centimetre* etc. (Horák, 2001).

The preparation for wool shearing includes about 2-3 days without rain and a remove of object from sheep wool. During the shearing, sheep should be fasted and located in clean and dry place. The number of shearing in a year depends on the average annual length of the breed. Breeds with the length of the wool to 12-14 cm should be sheared only once a year. Breed with longer wool can be sheared 2 or 3 times within a year. It also depends on the gender of sheep.
Sheep are usually sheared by electric shearing machine. Sheep can be laid on the ground or it can be used bench (Horák, 2001).

Milk

Milk is biological fluid which contains around 200 different substances. The comparison of composition of the sheep milk with milk of other animals can be seen in Table 3 (Horák, 2012). Milk yield is influenced by the phase of lactation. The peak of the milk yield is reached between the 3rd and 5th lactation week. The yield is also influenced by the nutrition (Horák, 2001).

After weaning of lambs or after transfer to the pasture, the lactation curve usually reaches second peak. The more the sheep is milked, the higher is the lactation yield. Milk yield is also higher while milking by hand in comparison to milking machine (Horák, 2001).

- **Production of sheep cheese**

It is possible to make two kinds of cheese from sheep milk – soft and hard. The basis of farmer is lump cheese. The lump cheese serves as the basis for production of bryndza cheese, parenica cheese, Roquefort cheese, camembert etc. Cheese is produced by adding of rennet in filtered milk and by heating the milk to 28-32 °C for 30 minutes. Subsequently, the milk rennet is processed and the milk begins to form lumps at around 20 °C. If the cheese is dedicated for sale, milked sheep milk must undergo the process of pasteurization (heating of the product to certain temperature for a short time), thereby are removed pathogenic organisms from the milk. It is possible to combine the sheep and cow milk in production of milk products. The importance of the sheep milk could be more distinct after the introduction of cow´s milk quotas (Horák, 2001).

Sheep leather

Sheep leather is used for production of fur. One type is used as a filling and other type is used with its wool hair outside. The typical sheep breed breeded for the first type of "leather" is Romanov sheep. The most quality fur, so called "Persian" is obtained from Caracul sheep. Leather prepared for sale must be dry, professionally treated, deprived of remains of meat, without head, legs and tail (Horák, 2001).

By-products

All sheep produce pulled wool from which is obtained lanolin after washing. Lanolin is used for manufacturing of cosmetics. By-product in every milk sheep farm is "žinčica", water of light yellow colour and sour taste which remains after manufacture of lump cheese. Other by-product is small intestine, used in meat industry and also as tennis racket weaving (Horák, 2001).

4.5 State Intervention

In the Czech Republic, breeders have different possibilities how to get a financial support. There are two flows of money for breeders. First possibility is to obtain money from funds of the European Union and the second possibility is to get the money from the national budget. Some other distinction of payment depends on hectares of cultivated area or on number of bred animals (sheep). Some payments also require to submit a project or other required documentation.

Animals registry

The application Animals registry includes data from central register of a Czech-Moravian Organization of Breeders Inc., Prague (ČMSCH). Company supervises the registration of movements, births, slaughtered animals and deaths with the main aim to protect the breeds against the infection (Ministerstvo zemědělství, 2016).

Identification and registration of animals is also the basis for common market organization in the EU. The identification information is used to define the place of production. Every sheep has to be registered from 2004. Sheep is marked by two pieces of plastic ear-marks with different colours that correspond to the gender of the sheep.
In the evidence are kept following information about sheep: identification number, sex, movement (date, identification number of farm from/to which was the animal moved), date of the domestic slaughter. The previous identification number can be also included (Bucek, 2005).

All sheep must be registered within 6 months of age and not later than before the leave of the place of birth (Ministerstvo zemědělství, 2016)

- for keeping the central register, the applicant uses the form: Announcement about the birth of the animals, their mortality, loss and relocation
- all changes have to be recorded within 7 days in the central register (Ministerstvo vnitra ČR, 2015)

4.6 Subsidy options for Czech active farmers

Not only the Czech Republic but also all other member states of the European Union must follow the rules of CAP. The Active farmers have access to two different schemes of subsidies, see *Table 4* (European Commission, 2013).

Table 4 EU Schemes of direct payments for active farmers (2015-2020)

Compulsory schemes (all member states)	Share in the total national envelope	Voluntary schemes (choice of member states)	Share in the total national envelope
Single Area Payment	up to 70%	Redistributive payment	30%
Green payment	30%	Support in areas with natural constraints	up to 5%
Young farmer scheme	up to 2%	Coupled support	8-12%

Source: own processing according to (European Commission, 2013)

The compulsory schemes

The SAPS will be replaced by Basic Payment Scheme in 2021. The Member States should also gradually decrease the granted amounts of "Transitional National Aid" of sectors supported in 2013 until 2020 (European Commission, 2013).

The payment in case of Green payment is dependent on meeting several Conditions with regard to climate and environment. Payment is granted per hectare in addition to SAPS and penalties for failure to comply with rules can reach 25% in 2018 from claimed value of Green payment (European Commission, 2013).

Last compulsory payment called Young farmers scheme is intended for farmers under the age 40, starting their agricultural activity. The payment is granted for maximum 5 years (European Commission, 2013).

The voluntary schemes

The Redistributive payment is granted on the first 30 ha of the farmer. If the average size of farm is higher than stated, then the payment is granted up to the national average size of farm. Other payment is Payment for Areas with Natural Constrains, known as Less Favoured Areas. Last scheme is Voluntary coupled support intended for specific agricultural sectors or ways of farming, sectors with difficulties etc. Additional 2% can be provided for protein crops (European Commission, 2013).

The structure of the granted payments in 2013 (2014) with focus on sheep breeding sector can be found in the *Attachment 10*.

4.6.1 Direct payments to farmers focused on sheep breeding

Direct payments are governed by the government regulation No. 50/2015 Coll. § 2 (Ministerstvo vnitra ČR, 2015). All payments are subject to cross compliance.

- **Cross Compliance**

From January in the year 2009 in the Czech Republic all granted subsidies (payments) depend on the cross compliance. If the rules of cross compliance are not respected, the payment can be reduced or annulled. Cross compliance commits all farmers receiving subsidies to sustain the land in a good environmental and agricultural state and to follow rules of farming with regard to environment, climate change, good state of land. The farmer must also follow the rules of the public health, health of animals and plants and animal welfare (Ministerstvo zemědělství, 2016).

Direct payments represent the largest share in total granted subsidies in agriculture. The rules are set according to the CAP (Common Agricultural Policy) of the European Union. In the period 2015-2020 are these payments connected to environmental friendliness, arrival of young generations to agriculture as a reimbursement of the old generations and to agricultural sectors with various difficulties or with importance in the economic, social or environmental field (Státní zemědělský intervenční fond, 2015).

- **Applicant for direct payment for farmers**

For this support may apply natural person or legal entity, when:

a) it is active farmer,
b) agricultural entrepreneur,
c) or if he cultivates agricultural land registered in the register of land use (LPIS) (Ministerstvo vnitra ČR, 2015).

The applicant delivers *Request for the provision of direct payments* to the State Agricultural Intervention Fund through a Single Application form (in 2015 the last deadline was 29 May 2015). After this date, it was allowed to submit an application for another 25 days, with penalties of 1% per working day of delay). In other year it was obligatory to submit the Application form till 15 May of the given year (Ministerstvo vnitra ČR, 2015). In 2016 the submitting period was from April 8 to May 16 plus additional 25 days (with penalty 1% for each day as well as in 2015) (Státní zemědělsý intervenční fond, 2016).

The Single Area Payment (SAPS)

According to the Government Regulation No. 50/2015 Coll. Section 6

Single Area Payment is provided from the EU budget. To obtain the SAPS is necessary to be registered in the Register of Agricultural Entrepreneurs according to the law No. 252/1997 Coll., on the agriculture section 2e-2 h, and at the same time to have registered agricultural land in the LPIS at least from the date of delivery of the request for payment to SAIF to 31 August of the calendar year and keep it in accordance with the rules on cross-compliance throughout the calendar year (Ministerstvo zemědělství, 2015).

A condition for the receipt of SAPS is to cultivate at least 1 hectare of agricultural land (with culture: the standard cropland, fallow, grass, permanent grass, vineyards, hop garden, orchard, nursery, fast growing trees, other permanent culture, forested land (eligible for SAPS to 2008) or another culture entitled for subsidy) (Ministerstvo zemědělství, 2015).

The provision of payments to farmers meeting the agricultural practices favourable to the climate and the environment (Greening)

According to the Government Regulation No. 50/2015 Coll. Section 9-18

This Greening is the support of agricultural practices in the area of climate and the environment. Three options, how to get support for Greening are following:

- the diversification of crops
- maintaining the level of permanent grassland
- the setting-up of the Ecological Focus Areas (EFA)

(Ministerstvo vnitra ČR, 2015)

It is important the correct registration of the culture on the parts of land blocks in the LPIS. Fulfilment of the conditions covered by the Greening refers to the area of over 10 hectares in case of crop diversification, and refers to the area of over 15 hectares in case of EFAs (Ministerstvo vnitra ČR, 2015).

The condition in case of maintaining the level of permanent grassland is to maintain the ratio of grassland to agricultural area (in general it is not the banned to plough the land). However, if the ratio changes by more than 5% (the difference of the reference share and of the annual share), the farmer is asked to reverse grassing acreage, which leads to a recovery ratio of permanent grassland (Ministerstvo vnitra ČR, 2015).

The environmentally sensitive areas to be kept in the register as the LPIS culture T, are covered by a complete ban on plough. In the case of the plough of the land will be obliged to reverse grassing (Ministerstvo vnitra ČR, 2015).

Payment for young farmers

According to the Government Regulation No. 50/2015 Coll. Section 33

This support is intended for young farmers who are starting a business in agriculture as a natural or legal person. This support should facilitate the beginnings of the farm and its development. Support shall be paid as a supplement to the SAPS (25%), which means that if the farmer does not have claim to the SAPS, is not entitled to payment for young farmer (Ministerstvo vnitra ČR, 2015).

Conditions: in the year of filling of the first application of SAPS the applicant is not more than 40 years old, for the first time establishes a holding as its head or for the first time established an agricultural enterprise in the course of a maximum of 5 years prior to the first application of SAPS. The maximum size for the grant payment is 90 hectares. The payment is paid in the course of 5 years (Ministerstvo vnitra ČR, 2015).

4.6.2 Voluntary Coupled Support (VCS)

- **Support for breeding of ewes or breeding of goats**

According to the Government Regulation No. 50/2015 Coll. Section 31

This is the only Direct payment, which is implicitly linked to the breeding of sheep and goats. The applicant must breed or graze the ewe or goat at least from 15 May to 11 September of the calendar year on *Permanent grassland* or on *Grassland on arable land* registered in LPIS on the farm registered in the central register in accordance with a Breeding Act (Ministerstvo vnitra ČR, 2015).

SAIF provides support only for breeding of ewes or breeding of goats older than 1 year. It is necessary to keep records of breeding every day for 5 years. The support is granted only if the granted value is equal to the amount of at least EUR 100. If the numerical status of sheep or goats of the applicant is higher than it is indicated in the payment application form, the SAIF calculate payments on the basis of the information provided in the application. If the numerical status of the sheep and goats of the applicant is less than stated in the application, the SAIF, either reduce the payment or reject the application (Ministerstvo vnitra ČR, 2015).

4.6.3 Rural Development Programme (RDP) for the period 2014-2020

The managing authority of the RDP in the Czech Republic is the Ministry of Agriculture. Projects submitted by RDP are granted from the European Agricultural Fund for Rural Development (EAFRD). The aim of the RDP is to improve the competitiveness of the agriculture, support of food chain, improve the state of ecosystems, support of resource utilization and improve the state of economic development in rural areas (Ministerstvo zemědělství, 2014).

Less Favoured Areas (LFA)

Government Regulation No. 72/2015 Coll.

This measure is used as a substitute for the costs or income foregone for farmers performing in less-favoured areas. The condition is that the applicant is at the same time the agricultural entrepreneur and active farmer. The farmer has in the LPIS in LFA included at least 1 ha of agricultural land, on which it is possible to provide payment. It is the responsibility of the applicant that on the grassland every day in the period from 1. 6. to 30. 9. is kept the minimum level of livestock/ha. (Státní zemědělský intervenční fond, 2015).

Three basic types of LFA areas:

- H - Mountain (higher elevation/altitude arched higher land)
- O - other (lower profitability, lower density of settlement with higher representation of agriculture employees)
- S - specific (a lower return on land outside the LFA-O)

(Státní zemědělský intervenční fond, 2015)

Natura 2000 on agricultural land

Government Decree No. 73/2015 Coll.

Areas of Natura 2000:

- bird areas located on the territory of 1st national parks or 1stzone of protected landscape areas
- localities included in the national list located on the territory of 1st zone of national parks or 1st zone of the zone protected landscape areas,
- areas with other environmental restriction

(Ministerstvo vnitra, 2015)

The applicant is an agricultural entrepreneur and also cultivates at least 1 ha of agricultural land, with the kind of culture of permanent grassland registered in LPIS. Payment is granted on the DPB (part of the land block recorded in LPIS in Natura 2000 section). The rate is 86 EUR/ha/year. The amount is paid in the Czech currency according to the current exchange rate (Ministerstvo vnitra, 2015).

In the calendar year for which the payment is granted, a farmer has to comply with the conditions of cross-compliance and with the prohibition of the use of fertilizers with the exception of grazing livestock. At the same time the farmer kept DPB, which requires the provision of payments to the applicant in the LPIS. The minimum period of keeping of DPB in LPIS is: from the date of delivery of the request to the SAIF to the 30 September of the calendar year. At the same time the permanent grassland is located on the DPB (Ministerstvo vnitra, 2015).

Agri-environment-climate measures

Government Regulation No. 75/2015 Coll., Section 2/d – treatment of grassland

Two options how breeders can receive the payment are following: treatment of grassland (meadows and pastures) or grassing of the arable land. The minimum area for grant payment are 2 hectares. According to the Section 17 the applicant must comply with the limits for stocking density of livestock. It means that every day of the control period from June 1 - September 30, the applicant must comply with the breeding of at least 0.3 LU/1 ha of permanent grassland, managed by the applicant, and kept in the LPIS (Ministerstvo vnitra, 2015).

Other conditions of intensity are:

- for permanent grassland max. 1.15 LU/1 ha,
- for agricultural land max. 1.5 LU/1 ha.

(Ministerstvo vnitra, 2015)

In the Section 18 are described other conditions regarding mowing and pasturage that applicants must also follow (Ministerstvo vnitra, 2015).

The request for payment is submitted within the Single application form till 15. May of a given year. The applicant is committed to for a period of 5 years by the request. The applicant must also comply with the terms and conditions of the sub-area of cross compliance (Ministerstvo vnitra, 2015).

Organic farming

According to Government Regulation No. 76/2015 Coll., on conditions for the implementation of the measures of organic farming

The condition for the application of the subsidy is to be: an agricultural entrepreneur and an active farmer. The applicant must also fulfil conditions of cross-compliance, minimum requirements for the use of fertilizers, requirements for use of plant protection products and others (Ministerstvo vnitra, 2015).

The minimum acreage of agricultural land, which is possible to categorise in Organic farming is 0.5 ha. The commitment is for 5 years, starting from January 1st of the first year of duration of the commitment. The subsidy shall be granted if the applicant is included in the measures of Ecological agriculture. All of the changes is required to report to the SAIF through requests for amendments to the classification. Request has to be delivered to SAIF to 15. May of the first year of the commitment (Ministerstvo vnitra, 2015).

4.6.4 Transitional national aid

Transitional national aid are payments fully covered from the budget of the Czech Republic provided to the SAPS. In the framework of this grant title it is possible, among other possibilities, to ask for payment on sheep breeding or goats breeding (Státní zemědělský intervenční fond, 2015)

Payment on sheep or goats breeding

According to the Government Regulation No 112/2008, Coll., section 7
The applicant for the payment on the sheep breeding, or on the goats breeding can be a natural or legal person who breeds the sheep or goats at least from July 1 to July 31 of the calendar year on the farm registered in the central register (Ministerstvo vnitra, 2015).

Payment for ruminants

Government Regulation No 112/2008 Coll., on certain conditions, the provision of national determination of additional payments to direct aid, section 6

The applicant is a natural or legal person who, as of 31. March 2007 breeded ruminants on the farm registered in the central register in the amount of at least 2 LUs. Rams and tups are not included in the number of LUs. If the appropriate regional veterinary administration in the period from 1. 8.2006 to 31. 3.2007 ordered culling or slaughter of ruminants, the applicant may submit the application to the State of the ruminants to 31. July 2006). The applicant shall at the same time submit the confirmation of the status of ruminants breeded to 31. March 2007 and calculation of LU of these animals. These documents applicant receives at the request of the Czech-Moravian society of breeders (ČMSCH).If the Fund (SAIF) has provided to the applicant on payment in the years 2007-2014, applicant does not submit these documents again (Ministerstvo vnitra, 2008).

4.6.5 National subsidies

Control of utility for sheep breeders

Support is provided to the breeder whose farm animals are included in the Control of utility. The Control of utility is based on sampling of animals. The breeder registers his breed through authorized legal persons providing the Control of utility in the Czech Republic (Ministerstvo zemědělství, 2016).

- **Support for breeder whose sheep are included in the Control of utility**

For sheep included in the Control of utility the support equals maximum of CZK 150/piece. For milk sheep controlled for milk utility the support equals to maximum of CZK 300/ piece included in the Control. Support is granted through the authorized legal person which obtains 4% of the whole subsidy for this purpose (Ministerstvo zemědělství, 2016).

- **Support for: performance tests, inspection of heredity, breeding value estimation**

For farmers who keep breeding rams included in the Control of utility and at the same time the ram is registered in the herdbook. Farmer has assigned central register and rears the ram/rams in the period from 01/09/2015 to 31/08/2016. The support for this purpose equals to maximum of CZK 17/ feeding day (CZK 6,205/year) (Ministerstvo zemědělství, 2016).

For farmers who prove the breeding value of breeding ram. At the same time, the breeding ram is selected by recognized breeder´s association to rearing and sold and included in the elite classes. This all happens in the period from 01/09/2015 to 31/08/2016. The support equals to maximum of CZK 3,500/piece (Ministerstvo zemědělství, 2016).

To pursue the claim for above mentioned subsidies farmers must apply through relevant breeder´s association and similar authorized persons till 30/09/2016 at the latest (Ministerstvo zemědělství, 2016).

4.6.6 Operational Programme Environment (OP E) for the period 2014-2020

The governing body of the programme in CR is Ministry of the Environment. The subsidies are granted from Cohesion Fund (CF) and from European Regional Development Fund (ERDF). For the period 2014-2020 is allocated the sum EUR 2.64 billion. The main focus of the programme is to protect the environment, to support effective resource management, and to eliminate the impacts of the human activity on the environment and climate change (Ministry of Regional Development CZ, 2015).

It is planned to forbid the storage of bio-waste in Czech municipalities. All municipalities should therefore ensure the processing or liquidation of the bio-waste. From this reason the EU supports the creation of Composting plants. The subsidy equals up to 92% of the total costs associated with the establishment of composting plant. The subsidy covers: project, the construction of composting plant, manipulation technique (loader, tractor), waste processing technology (crushing machine, etc.), weighing system, measuring system and computing system etc. (Dotace OPŽP - Dotace od EU, 2016).

4.6.7 Support and Guarantee Agricultural and Forestry Fund (SGAFF)

The aim of subsidies granted by SGAFF is to increase the competitiveness of the Czech agriculture and others, to support the development of the rural areas, to support the employment in rural areas and to ensure the food sovereignty (PGRLF,a.s., 2015).

Insurance support

- **Support for growers to cover costs associated with insurance of crops**
- **Support for farmers to cover costs associated with insurance of livestock**

Insurance support aims to protect entrepreneurial activities against damages. The subsidy covers a part of costs spent on an insurance of crops and animals. Sheep breeders can apply for subsidy on the insurance of *production of grasses and legumes grown for seed* or on the insurance of sheep herds. The sum can reach 50% of costs of insurance, the minimum is CZK 1,000 (PGRLF, a.s., 2016).

Interest support

The subsidy is granted in a form of partial coverage of loan interest. The subsidy includes following programmes:

- **Farmer Programme**

The Farmer Programme is investment support on following investments: purchase of primary agricultural production technology (tractor, packing machine etc.), construction or purchase of immovable property for primary agricultural production, purchase of breeding animals for improvement of genetic merit (PGRLF, a.s., 2016).

- **Land Purchase Support**

The programme is intended to cover partially the loan interest from the land purchase (PGRLF,a.s., 2016).

- **Processor Support**

The Processor Support covers partially the loan interest from the acquisition of investment property for processing purposes (PGRLF,a.s., 2016).

5 Practical Part

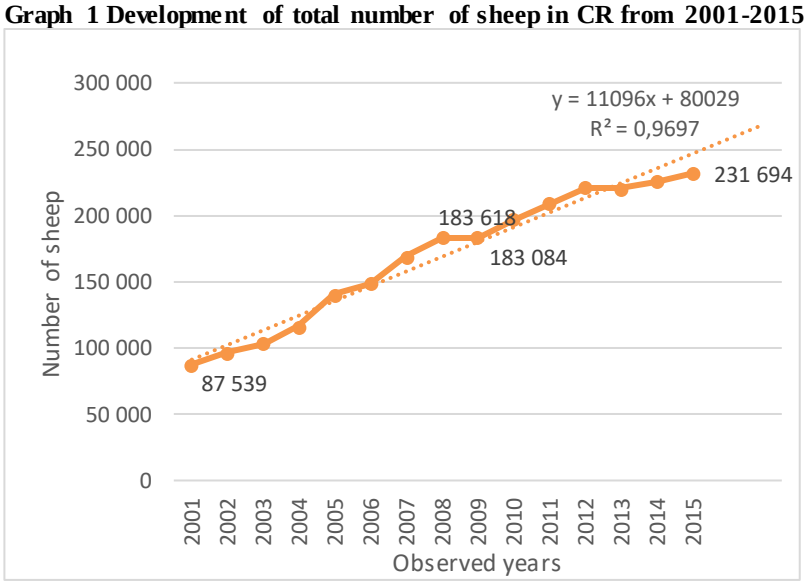
5.1 The production base

Development of number of sheep in CR

The overall development of total numebr of sheep bred in the Czech Repbulic has positive trend from the year 2000 with the exception of the year 2009, when the number of sheep decreased by 543 pieces compared to the year 2008 (see *Graph 1* below and *Attachment 1*). This decreasing trend at the turn of the year 2008/2009 was noticeable also in cattle, pigs and poultry production sector. The only exception of the overall decrease in amount of animal were goats. In the period 2008-2009 also decreased prices of animal and crop products in generall but prices of sheep were significantly higher in the end of year 2009 in comparison to the year 2008.

The total number of sheep in CR increased from 87,539 pieces in the year 2001 to 231,694 pieces in the year 2015. Therefore from 2001-2015 the total number increased by 165% with the sharpest growth in regions: Central Bohemia (285%), Ústí nad Labem (283%) and Southern Moravia (235%) (see *Attachment 3*).

Graph 1 Development of total number of sheep in CR from 2001-2015



Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Development of representing of individuall Czech regions in number of bred sheep is avaiable in the *Attachment 1* and in the *Attachment 2*. The highest share of number of sheep in 2015 represents South Bohemian region with more than 13% (30,671 pieces), then follows Central Bohemian region with more than 11% (26,054 pieces) and Zlín region with almost 10% (22,694 pieces).

The highest growth indexes across the regions were noted in the year 2005 (see the *Attachment 3*). The year 2005 is the first year after the accession to the European Union. The negative trade balance in agriculture was reduced and the agricultural production increased. In 2005 increased production of mutton and lamb meat but other animal sectors have opposite development. The sharp increase in numbers of sheep can be also consequence of the new regulations for EU member states of mandatory registration of all sheep.

In the period 1990-2000 the sheep breeding sector undergone a crisis. After the 1989 was signed an agreement with Australia about the purchase of cheap Australian sheep wool instead of the Czech one. The subsidies were therefore no longer dependent on the production of the wool and the price of wool dropped down because of the Australian competetiveness. From that time the utility directions in sheep breeding sector must be changed. Today the majority of sheep breeds in the Czech Republic and in the whole world are focused on meat and combined production.

Size of herds in the Czech Republic

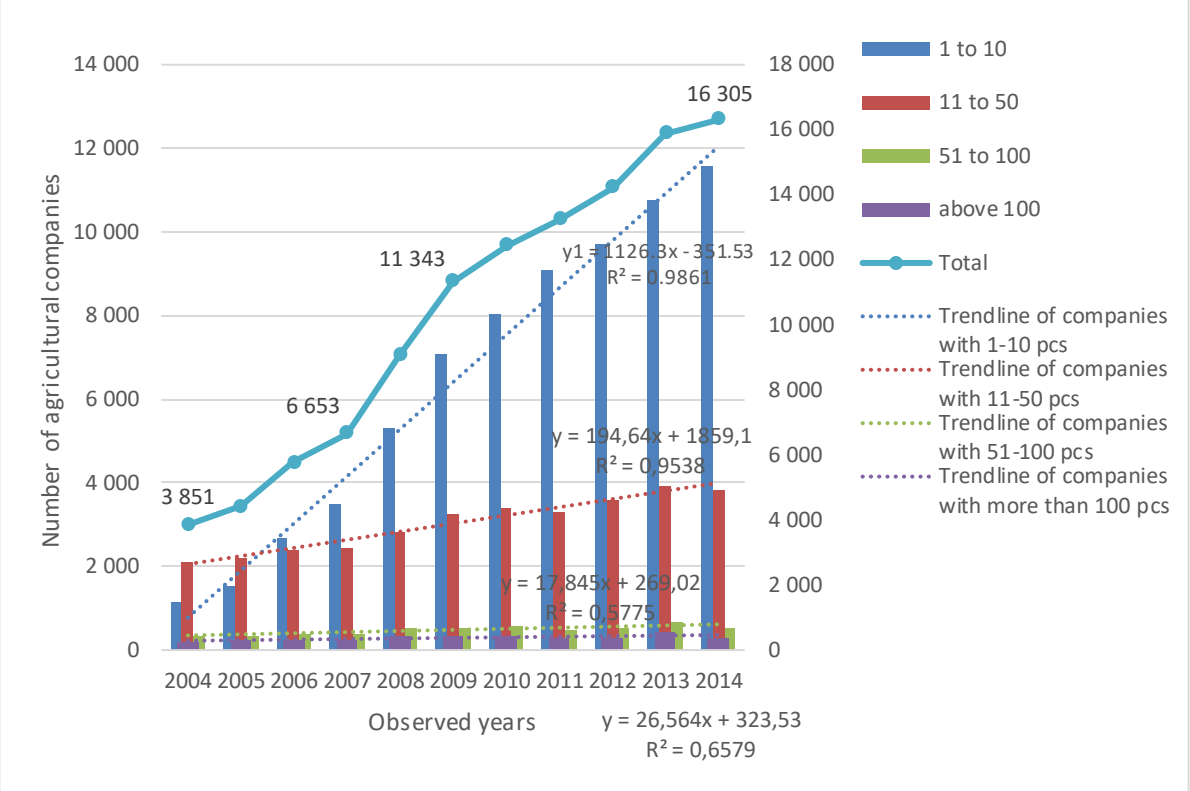
Czech sheep breeding is focused on breeding in small farms with amount of 1-10 pieces of sheep, *see Table 5* based on data from ČMSCH, Plc. This way of farming prevails from the last observed year 2004. In 2014, 71% (11,570) of agricultural companies bred 1-10 pieces of sheep. On the second place (24%) were agricultural companies with 11-50 sheep. Agricultural companies with more than 100 sheep represent less than 3% (see *Table 5).*

Table 5 Number of sheep farms in the Czech Republic according to the size of herd

Number of sheep (pcs)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1 to 10	1,147	1,547	2,702	3,502	5,306	7,087	8,053	9,087	9,710	10,755	11,570
11 to 50	2,123	2,211	2,388	2,420	2,814	3,278	3,390	3,307	3,610	3,922	3,833
51 to 100	316	354	384	407	535	549	562	485	512	689	519
above 100	265	290	303	324	405	429	442	367	397	532	383
Total	**3,851**	**4,402**	**5,777**	**6,653**	**9,060**	**11,343**	**12,447**	**13,246**	**14,229**	**15,898**	**16,305**

Source: own processing according to the data in *Ročenka chovu ovcí a koz* 2004-2014, (Bucek, 2005-2015)

Graph 2 Amount of sheep agricultural holdings according to the size of herd



Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

From the *Graph 2* is obvious the growing tendency in total number of agricultural holdings. According to the *Attachment 4* the most significant growig tendency have agricultural companies with small herds, as 1-10 pieces in the period 2005-2009. At the turn of years 2005/2006 the number of these companies increased even by nearly 75% (from 1,547 to 2,702 companies). In 2008 was observed significant growth in all sizes of herds and in 2011 the opposite – numebr of companies with the exception of companies with 1-10 pieces decreased quite a lot. Number of ompanies with herds of above 100 pieces fell down by 17% and in 2014 by 28%.

5.2 Production of sheep meat

Production of sheep meat depends on the number of bred herds in the Czech republic and also on import of mutton and lamb meat from other countries. Generally, the Czech Republicis is characterized by high numebr of domestic slaughters (not only in sheep meat sector but also in poultry meat sector). Estimations say that about 90% of all slaughters of sheep are made at home. Following *Table 6* summarizes official amount of slaughters in slaughterhouses. Slaughters at home are not included, but can be seen in the *Table 6.*

Slaughters of sheep and lambs in slaughterhouses

The trend of slaughters in slaughterhouses corresponds to the development in number of sheep bred in CR. Number of slaughters has increasing trend with the exception of decrease during the economic crisis in years 2008 and 2009. In 2014 was slaughtered 12,391 pieces of sheep in slaughter houses. For imagination, this number represented only 0.5% of slaughters of pigs (2.640,128 pieces) in slaughterhouses at the same year.

In all observed years approximately 80% of slaughtered sheep represented slaughtered lambs. The reason of high share of lamb slaughters in total sheep slaughters is higher demand for lamb meat with better tastiness and low fat content in comparison with the demand for mutton. With increasing age the meat becames slightly harder, consists of more fat and gets the characteristic odor. Other reason is seasonal sheep breeding, thus breeding of lambs to desired weight (average lamb slaughter weight in the period 2006-2014 was 32.8 kg/lamb) during the warmer half of the year. This way of breeding is very simple and undemanding if the herd is pastured on pasture. During the cold half of the year herd must be fed by dry substitute for fresh grass – by hay and grain.

Table 6 Slaughters of sheep and lambs in slaughterhouses (2006-2014)

Category	Pieces	Slaughter weight (t)	Average sl. weight (kg)	Live weight (t)	Average live weight (kg)
2006					
Sheep	12,263	195	15.9	444	36.2
thereoflambs	10,155	146	14.4	336	33.1
2007					
Sheep	12,694	207	16.3	481	37.9
thereoflambs	10,184	149	14.7	350	34.4
2008					
Sheep	11,201	186	16.6	429	38.3
thereoflambs	8,337	120	14.3	281	33.7
2009					
Sheep	9,421	146	15.5	337	35.8
thereoflambs	7,159	95	13.2	222	31.0
2010					
Sheep	9,220	145	15.7	336	36.4
thereoflambs	7,389	101	13.7	238	32.1
2011					
Sheep	10,169	159	15.6	368	36.2
thereoflambs	8,191	112	13.7	263	32.1
2012					
Sheep	10,374	165	15.9	383	37.0
thereoflambs	8,408	119	14.1	278	33.1
2013					
Sheep	11,319	176	15.5	407	36.0
thereoflambs	9,125	127	13.9	297	32.6
2014					
Sheep	12,391	189	15.2	439	35.4
thereoflambs	10,428	146	14.0	342	32.8

Source: own processing according to the data in *Ročenka chovu ovcí a koz* 2004-2014, (Bucek, 2005-2015)

Slaughters of sheep and lambs in slaughterhouses including domestic slaughters estimates

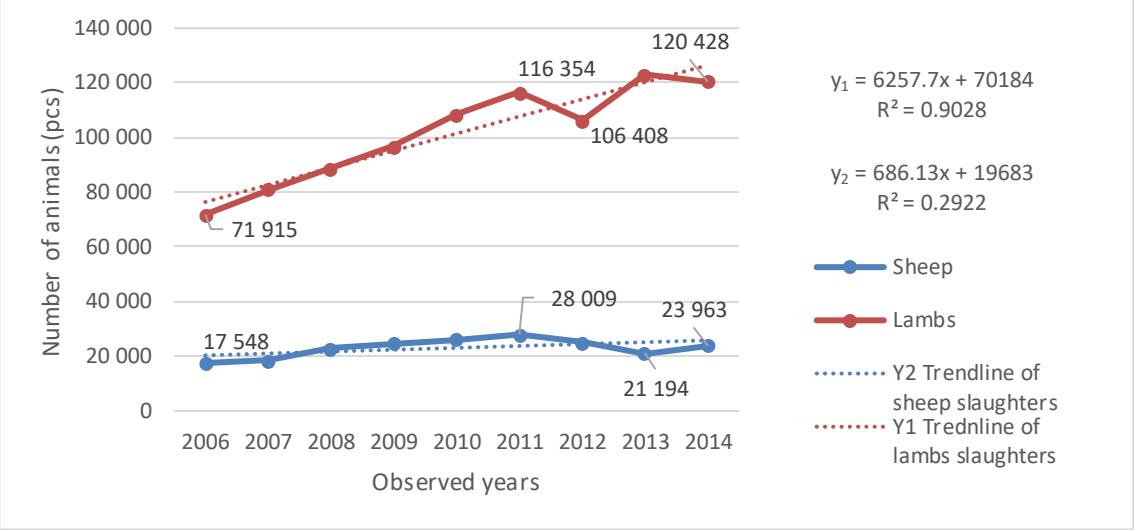
As was already mentioned in the beginning of the chapter about production of sheep meat, an estimated 90% of all slaughters are made at home or by small butchers. The development of sheep slaughters including the prevailing amount of lamb slaughters can be seen in *Table 7* and in *Graph 3*.

Table 7 Slaughters of sheep and lambs including the domestic slaughters estimation (2006-2014)

Category	Pieces	Slaughter weight (t)	Live weight (t)
2006			
Sheep	89,463	1,518	3,453
thereof lambs	71,915	1,132	2,603
2007			
Sheep	99,438	1,542	3,575
thereof lambs	80,992	1,115	2,616
2008			
Sheep	111,713	1,749	4,050
thereof lambs	88,662	1,215	2,851
2009			
Sheep	121,409	1,886	4,376
thereof lambs	96,834	1,318	3,091
2010			
Sheep	134,808	2,091	4,843
thereof lambs	108,539	1,481	3,474
2011			
Sheep	144,363	2,237	5,183
thereof lambs	116,354	1,588	3,725
2012			
Sheep	131,374	2,777	5,832
thereof lambs	106,408	1,981	4,002
2013			
Sheep	144,319	3,096	6,537
thereof lambs	123,125	2,293	4,629
2014			
Sheep	144,391	3,255	6,677
thereof lambs	120,428	2,236	4,522

Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Graph 3 Slaughters of sheep and lambs including the domestic slaughters estimation (2006 -2014)



Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

For the purpose of graphical expression were used numbers of slaughtered sheeps not including lambs and numbers of slaughtered lambs. In the period 2006 – 2014 both numbers have increasing tendency. However, it should be noted that in 2012 is registered a relative fall in slaughtered lambs by approximately 10,000 and a slight decline is obvious also in sheep slaughters.

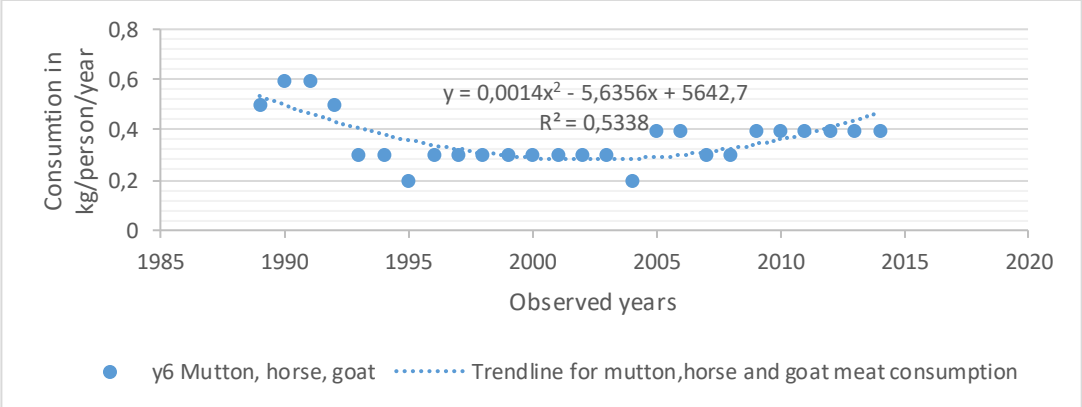
5.3 Consumption of sheep meat

Consumption of mutton is on a very low level in comparison to other meat. Nor statistics about consumption of meat listed by Czech Statistical Office, neither regularly posted "Annual overviews about the sheep breeding" include individual data about mutton meat consumption. Mutton consumption development is observed as a complex together with horse and goat meat, which have also very low level of consumption.

According to data in *Graph 4* and data in *Attachment 5*, the consumption of mutton meat in the observation period 1950-2014 has decreasing trend in generall. In 1950 the consumption of 0.7 kg/person/year was at the highest level and from that time it never grew up to the same level.

For the expression of the trend in mutton meat consumption in the period 1989-2014 was chosen polynomial function with the best coefficient of determination (R^2=0.5338). Looking at the *Graph 4* below is obvious that the trend remained decreasing untill the year 2004 (0.2 kg/person/year). After the EU accession, the consumption of mutton meat increased to 0.4 kg/person/year and with the exception of two years (2007, 2008) it stayed at the same level till 2014. Majority of mutton meat is sold directly from the small farmers and therefore the real consumption of meat can be quite different from public statistics.

Graph 4 Development of mutton, horse and goat meat consumption in CR (1989-2014)



Source: own processing acoording to (Český statistický úřad, 2016)

For sheep breeders and processors of sheep meat is always most important to folow the development and status of demand for the meat and consumption of the product (Český statistický úřad, 2012).

Total consumption of meat

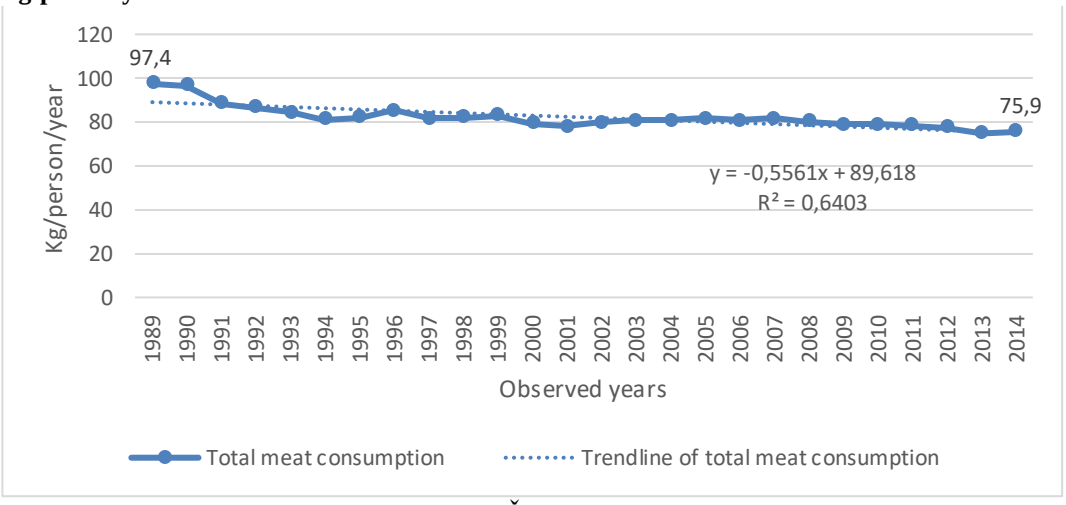
In the *Table 8* and also in is expressed development of total consumption of meat (not including fish meat consumption) from 1989-2014. In the observed period is noticeable long-term decrease in consumption

Table 8 Development of total meat consumption in Czech Repbulic from 1989-2014 in kg/person/year

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
97.4	96.5	88.4	86.6	84.3	81.2	82	85.3	81.5	82.1
1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
83	79.4	77.8	79.8	80.6	80.5	81.4	80.6	81.5	80.4
2009	**2010**	**2011**	**2012**	**2013**	**2014**				
78.8	79.1	78.6	77.4	74.8	75.9				

Source: own processing according to: (Český statistický úřad, 2016)

Graph 5 Development of total meat consumption in the Czech Republic from 1989-2014 in kg/person/year



Source: own processing according to: (Český statistický úřad, 2016)

From 1989 to 2014 the total meat consumption decreased by almost 22 kg, namely from 97.4 kg/person/year in 1989 to 75.9 kg/person/year in 2014. The consumption also stagnated during the observed period, for example from 1994 to 1996. The stagnation was caused by increase in pork meat consumption in this period. Pork meat consumption is still in the first position followed by consumption of poultry meat from 1997. After 1997 the poultry meat overgrowed the beef and veal meat consumption and kept its position till 2014 (see graphical expression in Attachment *6*).

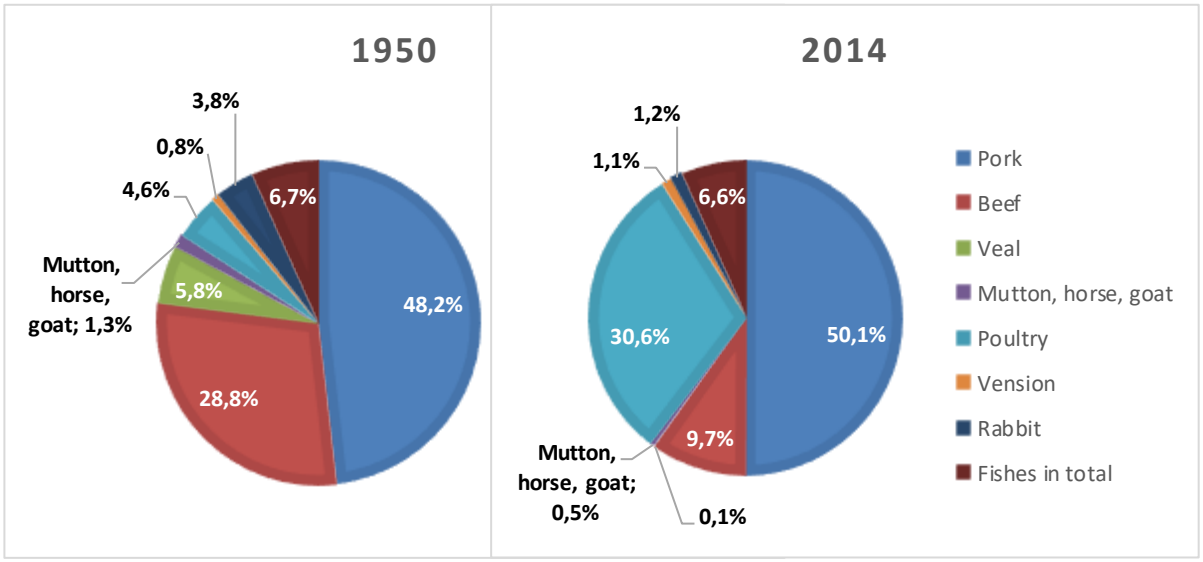
The long-term decreasing trend of meat consumption can be connected to chagnes in consumer behaviour. The structure of consumed food changes accoringly to the variety of products offered on the market. Consumers tend to consume more fruit and vegetable, more rice and pasta products and therefore less meat products.

Meat consumption structure in 1950 and in 2014

Pie charts in following *Graph 6* are used as a comparison of a change in strucutre of meat consumption of Czech citizens in 1950 and 2014. Pie charts show different eating habits according to the project published by Czech Statistical Office "61 Years of Czech Consumer".

From pie charts is obvious the stable and strong position of pork meat consumption in both years. In 2014, more than a half of the meat consumption represents pork meat consumption. Poultry meat consumption increased almost six times from 1950 at the expense of beef meat consumption which is approximately three times lower in 2014. The reasons for decrease in beef meat consumption are higher prices of meat, occurence of several infections in the history and also the higher preparation requirements. On the other hand, chicken meat is cheaper and the preparation is very fast. Therefore chicken meat consumption got the 2nd highest position in meat consumption.

Graph 6 Consumption of meat in 1950 and in 2014 in the Czech Republic



Source: Own processing according to: (Český statistický úřad , 2016)

5.4 Price development of sheep products in Czech Republic

Sheep meat

Main influences that affect the price meat (both – lamb and sheep) are season, quality of products and demand for products. The price can be also influenced by the exchange rate in case of export or import. For improvement of the sheep meat position on the market must be improved the consumer´s knowledge about the cooking preparation, about the composition of the meat and also about the way of breeding the suitable sheep breeds. The price of lambs is also influenced by the average slaughter weight which should be under 40-45 kg of live weight. Prices go down when the slaughter weight cross the limit. The development of purchase price of sheep meat can be seen in the *Table 9*.

Table 9 Purchase price development of sheep meat in kg of live weight (2011-2015)

Category	Unit*	2000	2001	2002	2003	2004	2005	2006	2007	2008
Slaughter lambs	CZK/kg	46	48	49	49	49	45	43	41	39
Slaughter sheep	CZK/kg	15	15	16	17	17	11	15	15	15
Category	**Unit***	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	
Slaughter lambs	CZK/kg	38	38	39	40	40	48	49	49	
Slaughter sheep	CZK/kg	15	15	16	17	17	18	18	18	

* In live weight

Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Before the EU accession the prices were higher than in current time (CZK49/kg of live weight). After EU accession the purchase prices gradually decreased to the lowest CZK 38/kg of live weight. The decline in price was influenced by the change in structure of countries that import the slaughter lambs. Instead of export mainly to Italy, the lambs are from the accession exported mainly to Germany and Austria. Both countries have higher quality requirements and also lower strike prices.

Purchase price of the 1 kg meat in slaughter weight is approximately 2 times higher, therefore CZK 100-150/ kg. The cheapest meat can be bought directly from the farmer, in wholesales the price includes additional charge for storage, transport etc.

Sheep wool

The purchase price of sheep wool is negligible in comparison to the price of meat since the Australia and New Zealand entered the European market. The purchase of wool is not developed very well in the Czech Republic and the price does not exceed CZK 16/kg of wool.

5.5 Supply balance of sheep meat on the Czech market

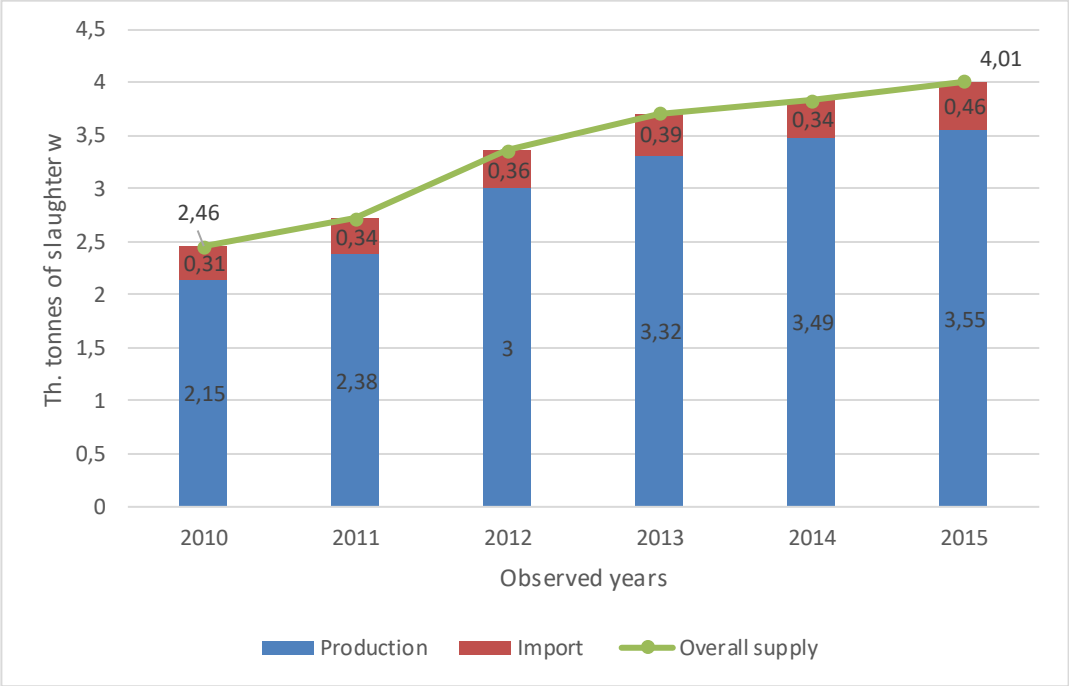
According to the following *Table 10* was calculated self-sufficiency with regard to the domestic supply and demand for sheep meat in the period 2010-2015. The data are published for sheep and goats in common and therefore the results are not accurate. However, the production of goat meat is negligible in comparison to sheep meat production or even to poultry or pork meat production.

Table 10 Self-sufficiency of CR on the sheep meat market in the period 2010-2015

Indicator	**Unit**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Sheep population	pcs	196,913	209,052	221,014	220,521	225,397	231,694
Goat population	pcs	21,709	23,263	23,620	24,042	24,348	26,765
Production	th.t of sl. w.	2.2	2.4	3.0	3.3	3.5	3.6
Import	th.t of sl. w.	0.3	0.3	0.4	0.4	0.3	0.5
Overall supply	th.t of sl. w.	**2.5**	**2.7**	**3.4**	**3.7**	**3.8**	**4.0**
Domestic Consumption	th.t of sl. w.	2.4	2.7	3.3	3.6	3.7	3.8
Export	th.t of sl. w.	0.1	0.0	0.1	0.1	0.2	0.2
Overall demand	th.t of sl. w.	**2.5**	**2.7**	**3.4**	**3.7**	**3.8**	**4.0**
Self-sufficiency	**%**	**87%**	**88%**	**89%**	**89%**	**91%**	**89%**

Source: data accessible on: *Komoditní karta Ovce a kozy listopad 2016* (Ministerstvo zemědělství, 2016)

Graph 7 Supply of mutton meat on the Czech market in tonnes of l.w.(2010-2015)



Source: data accessible on: *Komoditní karta Ovce a kozy listopad 2016* (Ministerstvo zemědělství, 2016)

Despite the fact that the domestic demand for sheep and goat meat is on a very low level in a long-term, in the period 2010 – 2015 the domestic production covers the overall demand for sheep and goat meat only by 88% in average. The rest of the supply is ensured by import.

The total supply of sheep in tons of live weight increases in the observed period as well as the sheep population. From 2010 to 2016 the overall supply of sheep meat increases approximately by 1.5 thousand tons of live weight and accordingly increased the demand.

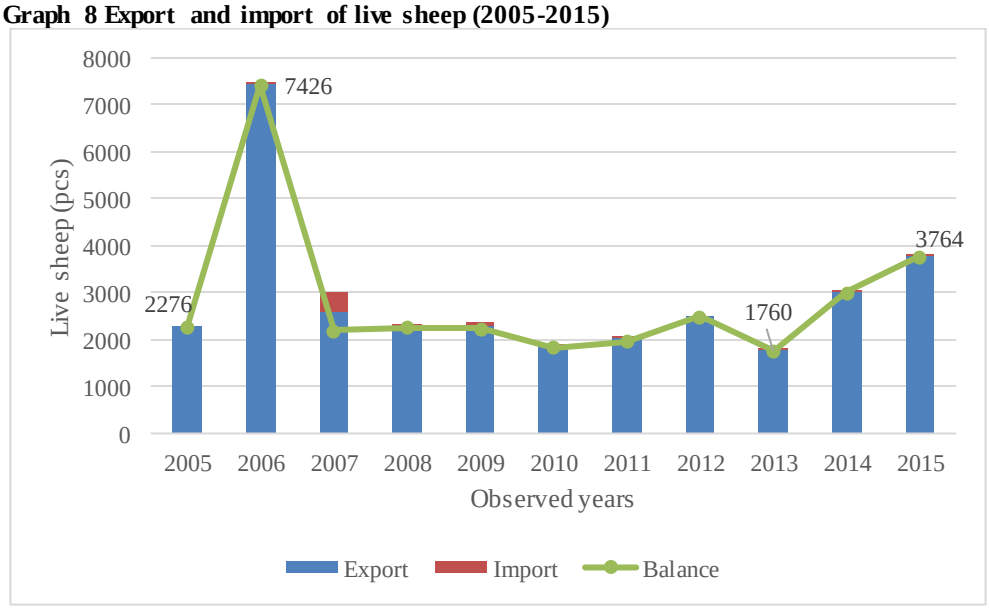
Positive trend is that import does not prevail the domestic production. On the other hand, export is lower than import in all observed years. That means that the Czech Republic has negative trade balance with regard to trade with sheep meat. However, opposite situation relates to the foreign trade with live sheep. Details about the trade are in the following chapter.

5.6 Foreign trade with sheep meat

Export and import of live sheep

The foreign trade has positive balance in case of trade with live animals (sheep) (See *Graph 8*). The opposite situation appears in case of trade with meat with negative balance in both tonnes and CZK/tonne (see *Graph 9*).

Graph 8 Export and import of live sheep (2005-2015)



Source: own processing according to: *Komoditní karta ovce a kozy listopad 2011-2016*, (Ministerstvo zemědělství, 2011-2016)

The *Graph 8* above shows the development of live sheep trade balance in period 2005-2015. The balance is positive in the observation which means that export predominates over import.

Teritorial structure of foreign trade with live sheep

For assessing the main export and import countries were summarized all exported live sheep to individual countries and imported sheep from individual countries in the period 2005-2014 (see *Attachment 8* and *Attachment 9*).

In the following *Table 11* are top five countries that import live Czech sheep. The order of individual states corresponds to the sum of all exported sheep in the period from 2005-2014. At the 1st place with 26,190 live sheep is Austria, at the 2nd place with 14,350 live sheep is Germany and then Slovakia with 7,012 live sheep. In the top 5 countries also belong Hungary and Italy.

Table 11 Teritorial structure of export of live sheep from CR (2005 - 2014)

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Austria	540	4,005	578		719	650	1,368
Germany	214	1,282	1,434	1,919	649	31	55
Slovakia		274					7
Hungary					212		
Italy	221	534	493	311			

	2012	**2013**	**2014**	**In Total**
Austria	3,846	6,646	7,838	**26,190**
Germany	2,832	3,723	2,211	**14,350**
Slovakia	3,171	1,244	2,316	**7,012**
Hungary	1,978	211	1,697	**4,098**
Italy		1,527		**3,086**

Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

In the ***Table 12*** are top 5 countries from which the Czech Republic imports live sheep. The order of countries corresponds to the total imported amount in the period from 2005-2014. First place represents Romania with 400 pieces imported that were imported in one step in 2007. Without considering the Romania, atthe 1st place is France with 386 sheep, at the 2nd place is Germany with 386 pieces, 3rd place is Slovakia with 169 pieces and last country is Austria with 158 pieces.

Table 12 Teriotorial structure of import of live sheep in the period 2005 – 2014

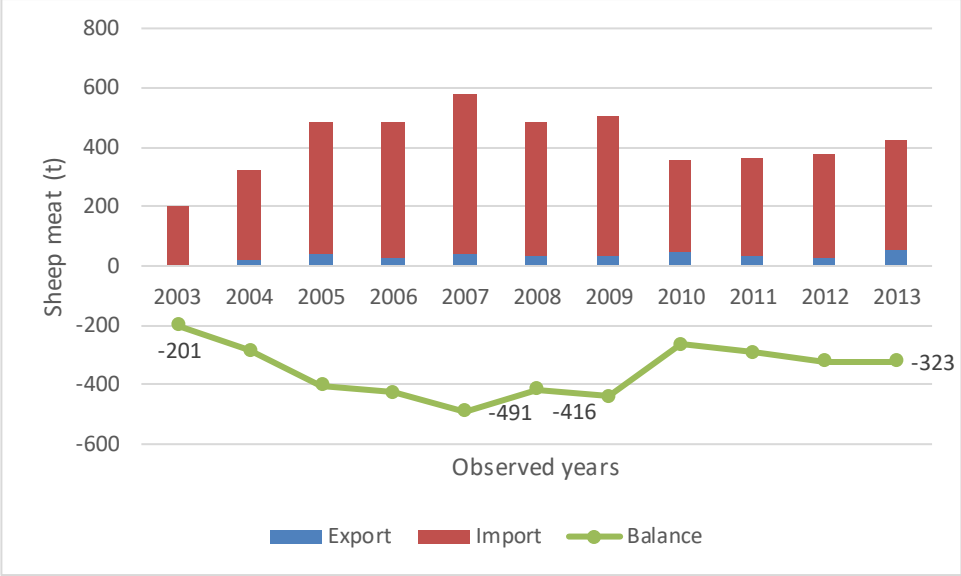
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	In total
Romania			400								**400**
France								167	206	13	**386**
Germany				1				54	223	14	**292**
Slovakia					50		60	22	28	9	**169**
Austria					6	31		56	61	4	**158**

Source: own processing according to the data from *Ročenka chovu ovcí a koz from years 2004-2014*, (Bucek, 2005-2015)

Export and import of sheep meat

The trade balance of sheep meat (see *Graph 9)* shows negative values in the whole observed period. The production of sheep meat is on a very low level and its real value which includes domesic slaughters is only estimated. The Czech Republic is not specialized to production of sheep meat in comparison to other european countries. Prevailing number of small farms focus on selling from the yard.

Graph 9 Export and import of sheep meat (2003-2013)



Source: own processing according to: *Komoditní karta ovce a kozy listopad 2011-2016*, (Ministerstvo zemědělství, 2011-2016)

Export and import of lamb wool and skin

The trade balance of lamb skin (see *Table 13*) is in positive numbers in the whole observed period. The trend is, hovewer, different in case of import and export. Imported pieces of skin increase from 2011, on the other hand exported pieces decrease from 2011.

In case of trade with grasy sheep wool (see *Table 13*) Czech Republic shows negative trade balance in all observed years. From 2005 production of sheep wool is not the main product of sheep breeding. The price is not competetive on the domestic market, where prevails imported wool. From 2011 the import increases faster than export and therefore the trade balance shows constant deterioration.

Table 13 Foreign trade with sheep wool and skin in the period 2009 - 2013

Year	Lamb skin (pcs)			Greasy wool (t)		
	Import	**Export**	**Balance**	**Import**	**Export**	**Balance**
2009	5,277	10,216	**4,939**	18,280	579	- **17,701**
2010	-	623	**623**	32,019	124	- **31,895**
2011	3,801	25,152	**21,351**	29,646	410	- **29,236**
2012	5,268	18,352	**13,084**	30,414	433	- **29,981**
2013	6,306	7,115	**809**	34,967	447	- **34,520**

Source: own processing according to *Ročenka chovu ovcí a koz za rok 2013* (Bucek, 2014)

5.7 Global market situation of live sheep production, consumption and trade

5.7.1 World sheep sector

Live sheep

The production of live sheep increases from the year 2009. The total world production of live sheep in 2014 was 1,209,908,142 pieces. With regard to continents, in 2014 was the largest producer of live sheep Asia (41%), Africa (28.1 %) and Europe (10.8%). America produced 7.2% and Oceania 8.5% from the total world production.
The world countries with largest production of live sheep were: China (202 mil. heads), Australia (73 mil. heads), India (63 mil. heads), Iran (50 mil. heads) and Nigeria (40.5 mil. heads) (FAOSTAT, 2016).

Sheep meat

Total world production of sheep meat in 2013 equaled almost to 9 mil. tonnes. China was the largest producer of sheep meat, as well as with regard to live sheep. China represented 24% of total world meat production with slightly over 2 mil. tonnes (FAOSTAT, 2016).

China is followed by Australia with approximately 660 thousand tonnes and share 8% in the total world production. Next follow New Zeland (5%), Sudan (4%) and Turkey (3%) (FAOSTAT, 2016).

5.7.2 EU sheep sector

Live sheep

The total EU live sheep production in 2014 was almost 98 mil. pieces (see *Table 14*). The largest producing countries were: Untied Kingdom (35%), Spain (16%), Romania (9%), Greece (9%) and France (7%). These top 5 EU countries represented 76% of the total EU live sheep production. Another 15% were represented by Italy, Ireland and Portugal. The rest of production came from the rest of the EU member states.

Almost half of the total EU export (4.7 mil. live sheep) of sheep represent Romania (41%) with nearly 2 mil. sheep. Next large exporter is Spain (20%) with slightly over 900 thousand pieces, then France and Hungary.

Total imported amount of live sheep to the EU was almost 3 mil. pieces. Major part in imports represent Italy (39%) with about 1 mil. pieces. Next follow Spain, France, Greece and other countries.

Table 14 The live sheep production, export and import in the EU in 2013

Production			Export			Import		
EU member	**pieces**	**%**	**EU member**	**pieces**	**%**	**EU member**	**pieces**	**%**
United Kingdom	32,856,000	**34%**	Romania	1,942,683	**41%**	Italy	1,073,517	**39%**
Spain	16,118,590	**17%**	Spain	934,987	**20%**	Spain	537,860	**19%**
Romania	8,833,830	**9%**	France	600,806	**13%**	France	373,028	**13%**
Greece	9,356,000	**10%**	Hungary	579,146	**12%**	Greece	180,153	**7%**
France	7,239,057	**7%**	Netherlands	213,501	**5%**	Portugal	114,801	**4%**
EU	**97,672,280**	**100%**	**EU**	**4,739,709**	**100%**	**EU**	**2,763,197**	**100%**

Source: own processing according to data from (FAOSTAT, 2016)

Sheep meat

The European Union produced approximately 850 thousand tonnes of sheep meat in 2013 (see *Table 15*). Largest sheep meat producer in 2013 was United Kingdom (34%) followed by Spain (14%), France (13%), Greece (9%) and Romania (8%).

The trade balance in quantity of sheep meat was in negative numbers in 2013, because the import prevailed over the export by slightly over 100 thousand tonnes. With regard to export of sheep meat, the first position belongs to UK. The United Kingdom exported about 1/3 of its sheep meat production and represented slightly over 40% of total EU sheep meat export. The UK is followed by Ireland (18%), Spain (14%) and other states.

The main importer of sheep meat in the EU was France (29%) followed by the United Kingdom (28%), both having the import quantity approximately 100 thousand tonnes. Then followed Germany, Netherlands and Italy.

Table 15 The sheep meat production, export and import in the EU in 2013

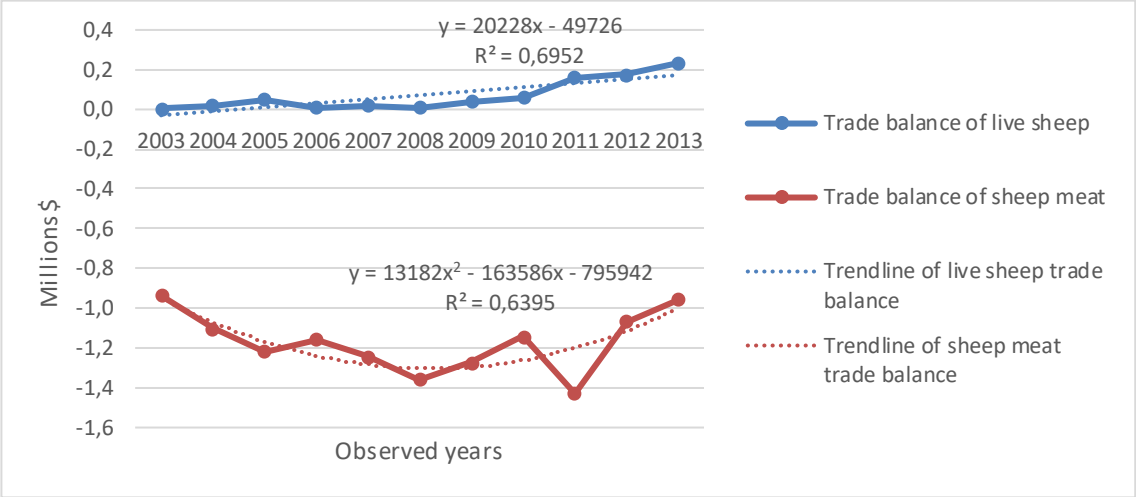
Production			**Export**			**Import**		
EU member	**tonnes**	**%**	**EU member**	**tonnes**	**%**	**EU member**	**tonnes**	**%**
United Kingdom	289,000	**34%**	United Kingdom	103,157	**43%**	France	102,696	**29%**
Spain	118,261	**14%**	Ireland	42,595	**18%**	United Kingdom	98,293	**28%**
France	110,936	**13%**	Spain	33,108	**14%**	Germany	33,807	**9%**
Greece	77,000	**9%**	Netherlands	24,850	**10%**	Netherlands	27,290	**8%**
Romania	68,108	**8%**	Belgium	11,397	**5%**	Italy	23,533	**7%**
EU	**853,515**	**100%**	**EU**	**241,388**	**100%**	**EU**	**357,289**	**100%**

Source: own processing according to data from (FAOSTAT, 2016)

The EU trade balance comparison for live sheep and sheep meat from 2003-2013

Following *Table 16* expresses the comparison of EU trade balances of live sheep and sheep meat in US$. Trade balance of live sheep has positive numbers in the whole observed period with increasing tendency from 2008. The trade balance in live sheep was 233,466 thousand US$ in 2013. Opposite situation is in trade balance of sheep meat. The overall import prevails over the export in the whole observed period. In 2013 the value of trade balance with sheep meat equaled to -955,846 thousand US$.

Table 16 Comparison of EU trade balance of live sheep and sheep meat in $ (2003-2013)



Source: own processing according to data from (FAOSTAT, 2016)

Import from non-EU countries

According to the *Table 17* which summarizes the strongest non-EU external import partners in quantity of sheep and goat meat it is obvious, that the majority of meat comes from New Zealand (minimum 80% in each observed year). Next main importer in 2013 are Australia with approximately 11%, Chile, Uruguay, Argentina and other countries. In the last column is expressed the annual rate of change for individual countries with negative development in case of Argentina (drop by almost 43%) and Uruguay (decrease by nearly 7%). Other mentioned countries show positive development in last two observed years.

Table 17 EU import of sheep and goat meat from non-EU countries (in tonnes*) 2010-2013

Importing countries/Year	2010	2011	2012	2013	% TAV 2013/2012
New Zealand	228,562	211,350	170,113	178,681	**5.0**
Australia	19,163	22,046	17,632	19,645	**11.4**
Chile	5,676	5,856	3,225	3,984	**23.5**
Uruguay	5,722	4,532	3,505	3,265	**-6.8**
Argentina	7,410	5,982	1,943	1,115	**-42.6**
Other countries	4,908	5,344	4,523	5,010	**10.8**
Total	**271,441**	**255,110**	**200,941**	**211,700**	**5.4**

* tonnes in carcass weight, includes live animals
Source: own processing according to data from (European Commission , 2014)

Balassa Index of main EU sheep meat and live sheep exporters and Czech Republic

According to the *Equation 11 Balassa Index* on the p.29 were calculated indices for top 5 exporters of sheep meat and live sheep in the EU. With the help of Balassa Index could be calculated the competitive advantage of individual countries within the trade in sheep sector (see *Table 18* and *Table 19*).

Table 18 Balassa Indices of top sheep meat exporting EU countries + CR in 2013

Balassa Index: Sheep meat export	United Kingdom	Ireland	Spain	Netherlands	Belgium	Czech Republic
Within the export of all meat	14.81	3.45	1.18	0.93	0.81	0.05
Within the export of all agri.pr.	10.95	9.42	1.26	0.88	0.80	0.03

Source: own processing according to data from: (FAOSTAT, 2016)

From the *Table 18* is obvious that 3 main exporters of live sheep (United Kingdom, Ireland, and the Netherlands) are strongly specialized in export of sheep meat within the all meat export and within the total agricultural export. On the other hand, Czech Republic with its indices 0.05 and 0.03 is far from being specialized in sheep meat export, which also corresponds to the volume of production in comparison to other EU members.

Table 19 Balassa Indices of top live sheep exporting EU countries + CR in 2013

Balassa Index: Live sheep export	Romania	Spain	France	Hungary	Netherlands	Czech Republic
Within the export of all meat	20.97	5.15	0.45	3.48	0.30	0.02
Within the export of all agri.pr.	56.40	2.99	0.67	6.56	0.36	0.05

Source: own processing according to data from: (FAOSTAT, 2016)

According to the *Table 19* can be stated specialization of individual live sheep leading exporting countries in the EU. The first two exporters, Romania and Spain are specialized on export of live sheep within total live animals export and within total agricultural export as well as Hungary. However, France, despite its leading position is not specialized in the export of live sheep, as well as the Netherlands. With regard to Czech Republic, its export value is negligible within the EU export value.

5.7.3 Organic farm Kosařův Mlýn

For the purpose of cost analysis was chosen a farm, on the Czech standards large farm, which disposes by 1079 sheep in 2016. The farm is located in the Central Bohemian Regionin. In 2014 in the Czech Republic were only 5 farmers with sheep herd consisting of more than 1 thousand sheep. It should be noted that large herds are mainly located in mountain and foothill areas in the Czech Republic.

Characteristics of the farm

The legal form of farm is legal person – limited company. The farm is from the year 2009 registered in Registry of ecological entrepreneurs as an *Ecological Farmer*. The controlling organization of the farm is company KEZ o.p.s., controlling and certifying organization of the system of ecological agriculture. Current certified products are: hay, haylage and sheep. All products have status BIO. The sheep are also the subject to Performance testing.

In 2015 the farm applied for an exemption within the rules of Organic farming, concretely for rule called "Interventions on animals – Docking of tails of lambs within 8 days of age". The application was fulfilled entirely. The validity period is from 17/04/2015-17/04/2020. In this period the farmer can dock the tails of his lambs and thereby prevent the infection in the tail area of sheep.

The main business of the farm relates to sale of breeding material (pure-bred Suffolk sheep) and lamb meat. However, the main revenues consist of national and European subsidies.

The farm has only one employee. Labour costs are divided between the owner (hereinafter "farmer") and the employee. The approach of the farmer is about having so many lambs and land area that both employees have enough work for 8 hours/ the working day.

The farmer started his business on the rented farmhouse and surrounding land area (35 ha) in 2008. The leased land was gradually expanded by about 190 ha. The reason of lease is high selling price of the agricultural land.

According to the estimation, currently the purchase of such a large land area would be very costly. Estimation of the price of 190 ha at a price CZK 15/m^2 equals to CZK 28,500,000. In this case the Agricultural lease is the only effective solution.

In 2008, the farm has almost no machinery equipment. The farmer therefore decided to gradually invest to his own machinery, which includes mainly machinery for field work, machinery for processing of hay and haylage and machinery for feed preparation and serving of feed for sheep.

Land area

The farmer worked on just 35 leased ha in 2009 and 2010. From 2011 the farmer leases 25 ha land area, in 2012 the farmer leases more 120 ha and in recent three years the land area grows up to 221.8 ha. Currently the farmer leases all the area and the farmhouse. The farmer disposes of more leased land blocks registered in organic (ecological) agriculture. First part of cultivated land blocks is located in the Příbram region (94,92 ha), the second part is located in Prague – west region (117,89 ha). From the total area, 8.37 ha are in the transition period, the rest (212.81 ha) is the are Organic farming area (see *Table 20*).

Table 20 Overview of acrages registered in LPIS according to regions in 2016

Region	Area in OA* (ha)	Area in TP* (ha)
Příbram	**94.92**	**0**
Velká Hraštice	34.48	0
Starý Knín	1.44	0
Nový Knín	44.22	0
Krámy	0.73	0
Velká Lečice	14.05	0
Prague - west	**117.89**	**8.37**
Štěchovice u Prahy	4.76	0
Malá Lečice	57.12	7.47
Senešnice	2.69	0
Masečín	53.32	0.9
Total	**212.81**	**8.37**

**OA - Organic Agriculture; TP - Transition Period*
Source: own processing according to LPIS data

For the pasture purposes are used approximately 80 ha of grasslands from the total area of the farmer, located close to the farmhouse. The owner would prefer to pasture the sheep on approximately 120 ha. In the summer 2016 the farmer must feed sheep from the mid-August because of droughts and therefore lack of fresh grass.

Table 21 Overview of acrages registered in LPIS according to crops

Crop	Area in OA* (ha)	Area in TP* (ha)	%
Arable land (R)	36.49	7.47	20%
Grassland (T)	162.24	0.9	74%
Grass on arable land (G)	14.08	0	6%
Total	**212.81**	**8.37**	**100%**

**OA - Organic Agriculture; TP - Transition Period*
Source: own processing according to LPIS data

Main part of the farmer´s land represent grassland with 162.24 ha and share 74%. Second largest area belongs from the year 2016 to arable land. The area of arable land will be used in the spring 2017 for the purpose of fodder crops cultivation for own consumption on the farm. Approximately 14 hectares belong to "grass on arable land". Production from the cultivated area is used for feeding purposes on the farm only.

Number of sheep

The current status (November 2016) of number of sheep is 1079 pieces in total (see *Table 22*). The herd is currently divided in three parts. One part represent sheep from the crossbreed (50% Romanov sheep, 50% Suffolk sheep), second part are pure-bred Suffolk ewes and lambs and the last part are pure-bred Suffolk rams for fertilisation purposes.

The crossbreed is very young and the plan of the farmer is to use it for sale of meat. The Romanov sheep is characteristic for its high fertility (approximately 1,5 -2 lambs/ ewe) in comparison to Suffolk sheep with low fertility maximum 1,5 lambs/ewe, according to the information of the farmer.

The pure-bred sheep are bred for sale as a breeding material, therefore the price of pure-bred sheep is higher than the price of cross-bred sheep.

During November 2016 the farmer plans to tup approximately 300 Suffolk ewes and 350 cross-breed ewes.

Table 22 Development of number of sheep on the farm (2011 - 2016)

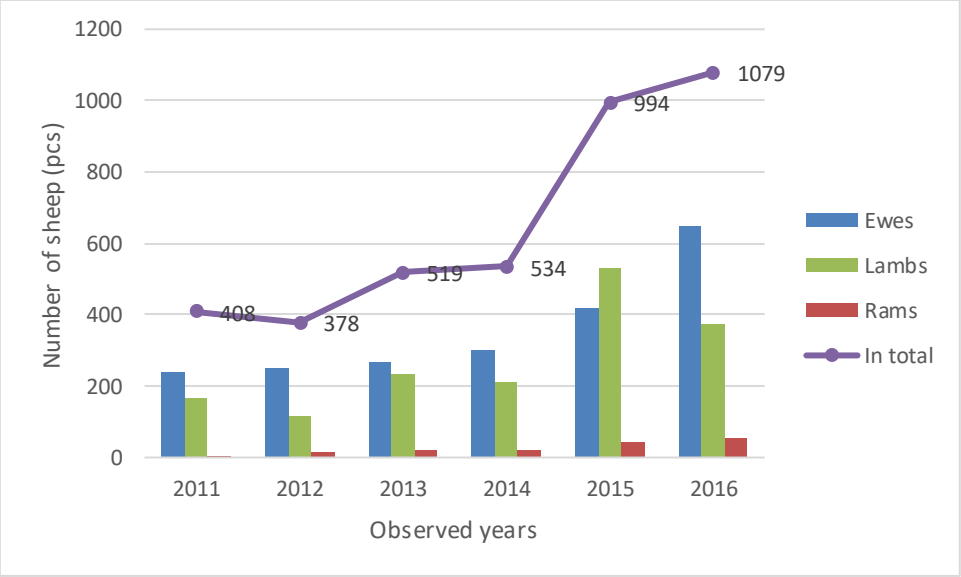
Year	2011	2012	2013	2014	2015	2016
Ewes	238	249	265	303	419	650
Rams	6	14	22	19	44	53
Lambs	164	115	232	212	531	376
In total*	**408**	**378**	**519**	**534**	**994**	**1079**

** Data on December 31*

Source: own processing

According to the *Table 22* can be seen that the number of sheep from 2011 to 2016 almost tripled from 408 sheep to 1079 sheep in total. The average breeding index equals to 0.8. All sheep in the observed period are from own production with the exception of the year 2015 when the cross-bred lambs were purchased. The purchase can be seen as a prevailing number of lambs over ewes in 2015. See also graphical expression in the *Graph 10*.

Graph 10 Development of number of sheep on the farm (2011-2016)



Source: own processing

Prices of main products and by-products

The price of cross-bred and also pure-bread sheep sold directly for meat consumption purpose moves around CZK 85-90/kg of slaughter weight. The price of pure-bred Suffolk sheep for breeding purposes moves in an interval CZK 4-6 thousand/ 1 ewe lamb and CZK 6-12 thousand / ram lamb. Slaughter weight of lambs is 45 kg in average.

The main customers of the farmer are Arabs. Arabs or better – Muslims, are large consumers of sheep meat worldwide. According to the information from the farmer, Arabian customers prepare the lamb meat in the luxury and other restaurants in Prague or use it for own consumption.

Feeding

The basic feed of sheep herds throughout the year is pasture. Sheep herds have no stabling. For the purpose of protect the herds against the externalities are used bushes and small woods on pastures. Farmer´s herds are fed exclusively by the farmer´s own production of hay and haylage in the vegetative rest period. Lambs are fed extra by granulated mixture.

The average consumption of adult sheep/year not considering the pasture is 1 package of hay + 2 packages of haylage. The price equals to CZK 400-500/ package. The weight of package is approx. 500 kg. Lambs consume approximately 70 – 100 kg of bio quality granulated mixture. Price of granulated mixture equals to CZK 13-16/kg.

Revenues of the organic farm

The farm revenues consists of subsidies, revenues from sold lambs and wool and other items. Even though the farm revenue should consist mainly of revenues from sold goods and on the other hand subsidies should support the production, the opposite is true.

Table 23 Revenues of the organic farm in the period 2011-2015

REVENUES in CZK /Year	2011	2012	2013	2014	2015
Performances	**706,000**	**1,404,000**	**1,394,000**	**1,660,000**	**2,493,000**
- Change in stocks	*-*	*-*	***869,000***	***531,000***	***1,472,000***
- Revenue from sale of goods	*-*	*-*	***525,000***	***1,129,000***	***1,021,000***
- lambs + meat	*692,829*	*1,391,088*	*508,694*	*1,111,710*	*991,435*
- wool	*13,171*	*12,912*	*16,306*	*17,290*	*29,565*
Revenues from sale of tangible fixed assets	**150,000**	**-**	**-**	**-**	**-**
Other operating revenues	**2,619,000**	**3,092,000**	**3,245,000**	**3,536,000**	**8,398,000**
Other financial revenues	**-**	**-**	**1,000**	**138,000**	**34,000**
Extraordinary revenues	**-**	**-**	**-**	**13,000**	**-**
In total	**3,475,000**	**4,496,000**	**4,640,000**	**5,347,000**	**10,925,000**

Source: own processing accroding to farm´s financial statements

In all observed years subsidies represent more than a ½ of the total revenues. Subsidies are recorded as a part of Other operating revenues. On the second place in share in revenues are *performances*, ranging from 20 to 30%. This unit includes revenues from sale of goods (lambs, live sheep, meat and wool) and the change in stock of own production. The detailed division of performances is available from 2013, because the previous years were recorded in the siplified form. *Revenues from sale of wool* were calculated as a sum of all produced wool in a year at an average selling price of the farmer.

The value of the sum was calculated by multiplying the average price of wool/sheep and the sum of average produced wage of wool per adult sheep and lamb in a year.

The revenues from wool represent approximately 0.3% share in the total revenues and its value changes in accordance with the size of herds. The last two accounting units – *Other financial revenues* (as e.g. the surplus in cash) and *Extraordinary revenues* represent negligible share of revenues (approximately 0,3% in average).

- **Subsidies**

Subsidies, as a part of accounting item *Other operating revenues*, represent majority of total revenues of the farmer in all observed years (see *Table 23* and *Table 24*).

Table 24 Development of granted subsidies (2011-2015)

Financial Program/Year	2011	2012	2013
Agro-environmental measures	959,844.60	1,019,893.26	1,088,374.68
Top-up - national topping up of SAPS	24,697.86	-	-
SAPS	840,336.45	1,487,137.24	1,175,607.18
Support and Guarantee Agricultural and Forestry Fund	50,215.00	-	-
EAFRD LFA	525,178.86	547,963.31	575,580.45
Ewes, goats pastured on grassland	-	77,832.08	70,538.49
Transitional National Aid	-	-	-
Ecological Agriculture	-	-	-
Operational Programme Environment	-	-	-
Total	**2,400,272.77**	**3,132,825.89**	**2,910,100.80**

Continuing of the Table 24

Financial Program/Year	2014	2015
Agro-environmental measures	1,085,524.06	1,066,412.22
Top-up - national topping up of SAPS	-	-
SAPS	1,287,003.06	758,443.98
Support and Guarantee Agricultural and Forestry Fund	-	-
EAFRD LFA	623,630.24	437,991.69
Ewes, goats pastured on grassland	157,754.26	228,008.06
Transitional National Aid	43,123.07	83,332.60
Ecological Agriculture	-	136,377.26
Operational Programme Environment	-	4,558,720.00
Total	**3,197,034.69**	**7,269,285.81**

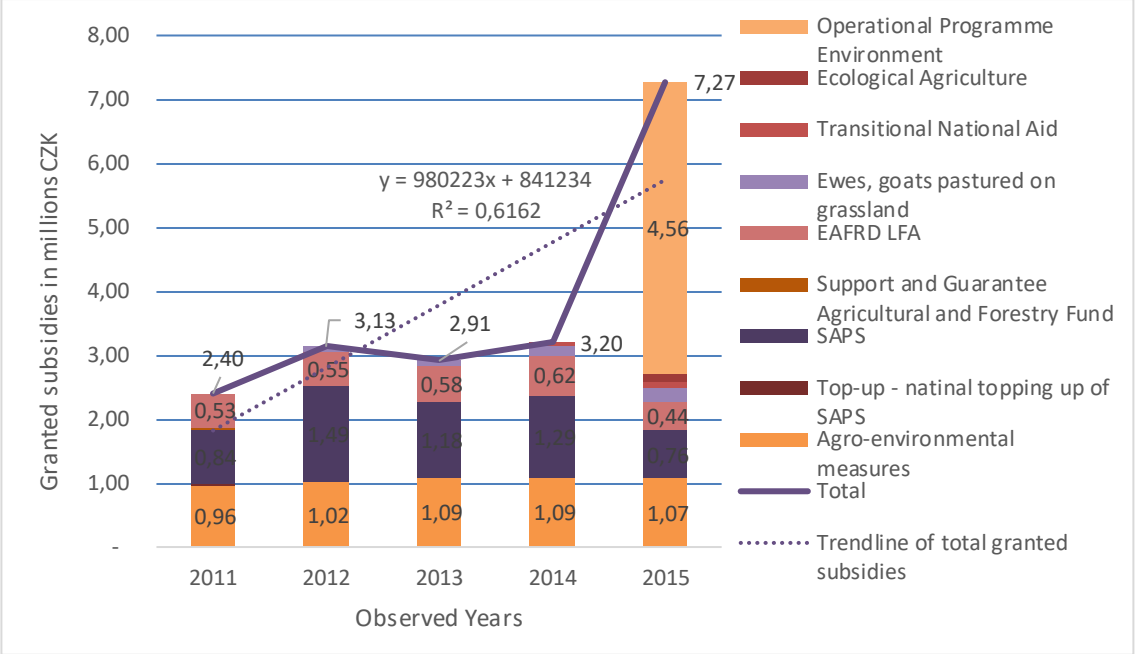
Source: own processing according to: *Registr příjemců dotací,* (Ministerstvo zemědělství, 2016)

In the *Table 24* are shown granted subsidies in observed period 2011-2015. In the *Graph 11* is recorded graphical expression of the table. The last year is also shown in the form of pie chart in the *Graph 12*.

Values of granted subsidies were found on the web site of Ministry of Agriculture, however their values do not correspond exactly to values from profit and loss accounts of the farmer. The reason can be gradual timing of subsidy payments. Total operating revenues, besides, include also subsidies granted by: PGRLF (Supporting and Guarantee Agricultural and Forestry Fund), also payments for Control of Utility, and for breeding rams.

Not considering the large subsidy CZK 4.5 mil. in 2015, the major part of subsidies in average represent *SAPS* with 39% in average. Next follow *Agro-environmental measures* with share 36% in average. Third place belongs to subsidies for LFA with 19% share in average. The National subsidy for *Ewes, goats pastured on grassland* (Ewes, goats breeding) represent in average 4%. *Transitional National Aid* was granted in 2014 and in 2015 and consist mainly from the Payment on agricultural land.

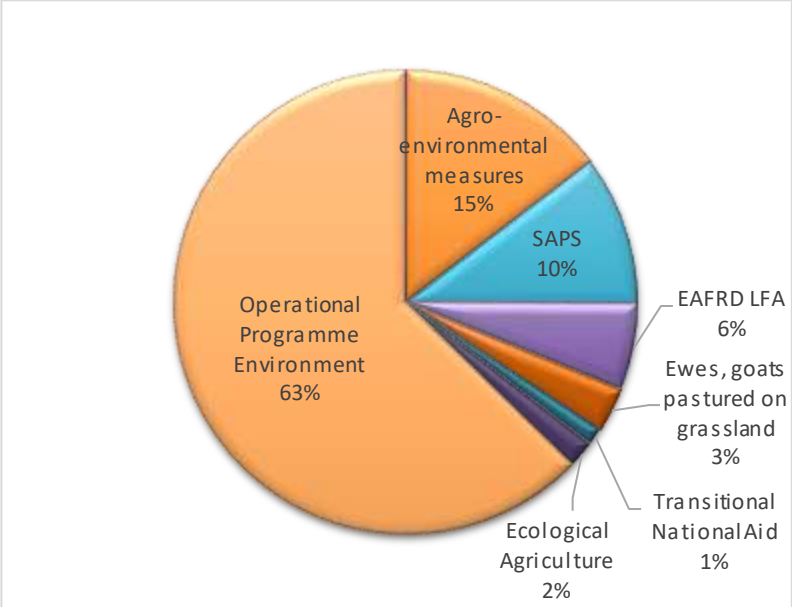
Graph 11 Structure and development of granted subsidies of the farmer (2011-2015)



Source: own processing

In 2015 the farmer was granted by a large subsidy amount from the Cohesion Fund of the European Union. The subsidy was granted under the *Operational Programme Environment* for: *Technology for material use of biodegradable waste by composting, including its collection*. The total costs for aquiring of the complet equipment equal CZK 5,363,200.00, thus the fund provided the farmer 85 % of the total cost, by amount CZK 4,558,720. The difference CZK 804,480.00 must be covered by the farmer. The composting plant is used to process the bio.waste from the nearest surroundings and from the farm. The processed bio-waste will be used as a fertiliser on the arable land of the farmer with the purpose of growing of crops as a feed for sheep.

Graph 12 Structure of granted subsidies of the organic farmer in 2015 (%)



Source: Own processing

From the *Graph 12* which summarizes the share of indiviudal subsidies in 2015, is visible the prevailing share of the subsidy for composting plant (63%). Not considering this subsidy the main financial support came from the programme *Agro-environmental measures* (46% Ecological Agriculture, 22% Meadows, 17% Grassing of arable land, 14% Pastures, 1% Treatment of grassland), followed by SAPS, *Less Favoured Areas* (area O), *Ewes, goats pastured on grassland* (3%), *Ecological Agriculture* (2%, Transitional period- other crops)and *Transitional National Aid* (1%, Payment for agricultural land).

Costs of the organic farm

The value of costs increases annually in the observed period, see *Table 25*. The total value of costs increase approximately by CZK 1 mil. every year, with the exception of the year 2015. At the turn of the year 2014/2015 costs almost doubled. The reason is the investment to the composting plant. Part of the costs for composting plant was covered by the subsidy (the cost is included in unit *Other operating costs*) and the rest is included in the *Performance consumption* as a material and services.

Table 25 The costs of the organic farm in the period from 2011-2015

COSTS/Year	2011	2012	2013	2014	2015
Performance consumption	**1,992,000**	**2,394,000**	**2,161,000**	**2,870,000**	**4,130,000**
- granule mixture	*202,130*	*141,738*	*285,940*	*261,290*	*654,458*
- hay and haylage	*440,100*	*432,675*	*544,050*	*577,800*	*983,475*
- energy, material, services	*1,349,770*	*1,819,588*	*1,331,010*	*2,030,910*	*2,492,068*
Personal costs	**173,000**	**190,000**	**378,000**	**371,000**	**390,000**
- Labour cost	*-*	*-*	*281,000*	*276,000*	*290,000*
Taxes and fees	**8,000**	**3,000**	**8,000**	**17,000**	**11,000**
Depreciation of t. and int. assets	**1,035,000**	**1,399,000**	**1,504,000**	**1,543,000**	**1,485,000**
Other operating costs	**4,000**	**130,000**	**165,000**	**23,000**	**4,655,000**
Interests payable	**108,000**	**178,000**	**212,000**	**163,000**	**101,000**
Other financial costs	**18,000**	**68,000**	**30,000**	**112,000**	**15,000**
Income tax	**26,000**	**25,000**	**-**	**-**	**-**
In total	**3,364,000**	**4,387,000**	**4,458,000**	**5,099,000**	**10,787,000**

Source: own processing according to the farm´s financial statements

The *Table 25* shows that the item *Performance consumption* represents approximately 50% in all observed years with the exception of the year 2015. The main costs included in this item belong to the consumption of energy (fuel), material (for maintenance, repairs, packaging for haylage, net for hay, fence etc. Services include the rent, maintenance, repairs, travel costs, representation costs etc. The paymnet of lease increase gradually. The available information show, that in 2015 the farmer paid approximately CZK 1,333,785.00 for the leased land and farmhouse (221.18 ha), which means that the average payment for 1 ha of leased land equals to CZK 5,126.07 in 2015.

Depreciation of tangible and intangible assets is the second largest cost item with share approximately 30% every year. The item summarizes depreciation of fixed assets purchased in the period 2011-2015 and depreciation of born lambs in the period.
Other significant item – *Personal costs* – represent 6% of total costs in average. Personal costs include wages (approximately 70%), social and health insurance and social costs. The item *Interest Payable* represent 3% in average and include interest payable for loans. Interests should be partially covered by subsidy granted by SGAFF. Negligible share then represent items *Other financial costs* (usually fees on bank accounts, etc.) and *Income tax*.

- **Depreciation**

The item of depreciation includes depreciation of fixed assets of the farmer. All farmers depreciated assets are included in Depreciation groups 2 and 1. In the observed period, the main part consists of depreciation of new machinery purchased from 2011-2015 (Group 2). Other part represent depreciation of the Accrual of the livestock from 2011-2015. The sheep accrual is placed in the depreciation group 1 and the method is *group depreciation*. The accrual is therefore depreciated 3 years, usually by linear depreciation and in some cases by accelerated depreciation.

All the assets purchased in the observed period should be depreciated until 2021, with the exception of the Accural of the livestock, which should be depreciated every year as the farmer´s herds have new lambs every year.

Profit of the organic farm

Following table shows the development of the profit, comparing profit which includes and does not include the subsidies. The result is obvious.

Table 26 Development of profit of the farm (2011-2015)

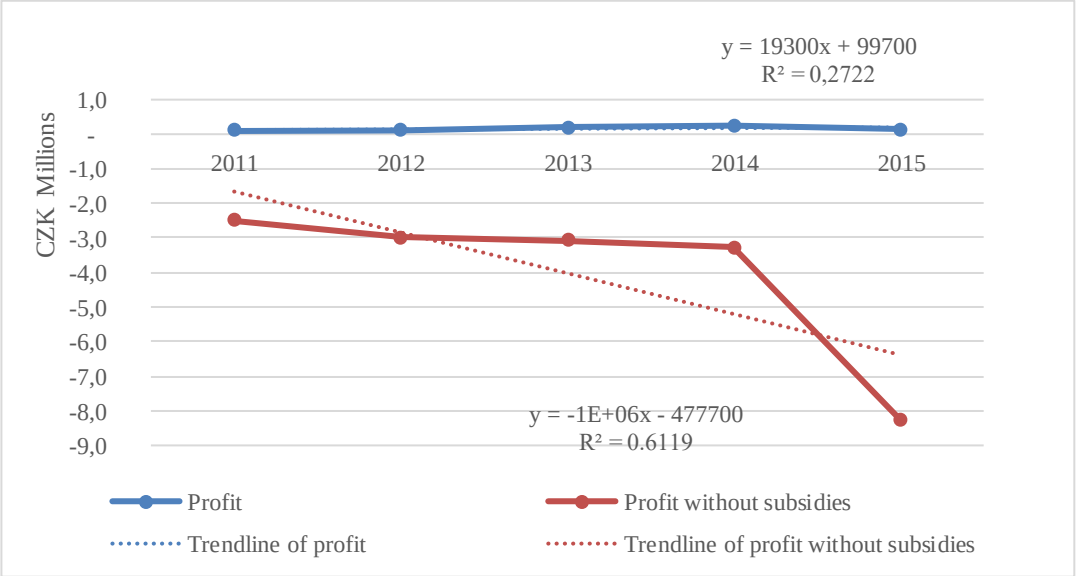
Accounting Item/Years	2011	2012	2013	2014	2015
Total Revenues	3,475,000	4,496,000	4,640,000	5,347,000	10,925,000
Total Revenues without subsidies	856,000	1,404,000	1,395,000	1,811,000	2,527,000
Share of subsidies on total revenues	75.4%	68.8%	69.9%	66.1%	76.9%
Total Costs	3,364,000	4,387,000	4,458,000	5,099,000	10,787,000
Profit	**111,000**	**109,000**	**182,000**	**248,000**	**138,000**
Profit without subsidies	**-2,508,000**	**-2,983,000**	**-3,063,000**	**-3,288,000**	**-8,260,000**

Source: own processing according to farm´s financial statements

Although the main part of revenue should come from sold products, it comes from subsidies. The revenue from subsidies has essenital impact on the economic result of the farm. The profit of farm is fortunately in positive numbers, with increasing trend in the observed period (see *Graph 13*). In 2015 can be seen essential decrease in profit by 44% compared to the year 2014. The reason is the investment in new lambs of Romanov sheep and also partial share in the investment on the composting plant in 2015. However, without subsidies which represent approximately 71% in observed period would be the economic result in negative numbers all the years with increasing trend in favor of negative numbers.

The noticeable drop in the last year of observation would not happen in reality, because without subsidies granted for composting plant the farmer would not invest in the project.

Graph 13 Development of profit and profit without subsidiea of the farm (2011-2015)



Source: Source: own processing according to farm´s financial statements

Costs and revenues per sheep

Following tables (see *Table 27* and *Table 28*) and include data from financial statements of the organic farm. According to the information delivered by the farmer, as prices of feed, average consumption of sheep and prices of sheep and meat for sale, were calculated and estimated approximate costs and revenues per sheep in farmer´s herd (sheep and lambs are not differentiated). For the calculation were chosen only costs and revenues that are closely connected to sheep breeding. With regard to subsidies, all of them are included with the exception of the composting plant (both in revenues and in costs).

Table 27 Annual revenues per sheep in CZK (2011-2015)

Revenue item/ Year	2011	2012	2013	2014	2015	Years Average
Sold goods	845.7	1,815.4	1,011.6	2,114.2	1,027.2	**1,362.8**
Sold lambs + meat	*813.5*	*1,781.2*	*980.1*	*2,081.9*	*997.4*	**1,330.8**
Sold wool	*32.3*	*34.2*	*31.4*	*32.4*	*29.7*	**32.0**
Subsidies	6,419.1	8,179.9	6,252.4	6,621.7	3,862.5	**6,267.1**
Total revenue	**7,264.9**	**9,995.3**	**7,264.0**	**8,736.0**	**4,889.6**	**7,629.9**

Source: own processing according to farm´s financial statements

Data in the *Table 27* show the revenues/sheep in every observed year and in average (last column). Revenue per sheep in aerage equals CZK 7,629.9 in the period. Major part represent subsidies. Revenues from sold goods are represented mainly by sold lambs and meat, sold wool contributes only by 2% in average to the revenue from sold goods. In the observed period are shown two declines. The decrease in revenue at the turn of years 2012/2013 was caused by decrease in sold goods by 45%. Next decrease happened at the turn of the year 2014/2015 when was bought approximately 150-200 Romanov sheep (estimate) and therefore the revenue per sheep decreased.

Table 28 Annual cost per sheep in CZK (2011-2015)

Cost item/ Year	2011	2012	2013	2014	2015	Years Average
Performance consumption	4,882.4	6,333.3	4,163.8	5,374.5	4,154.9	**4,981.8**
Granule mixture	*495.4*	*375.0*	*550.9*	*489.3*	*658.4*	***513.8***
Hay and haylage	*1,078.7*	*1,144.6*	*1,048.3*	*1,082.0*	*989.4*	***1,068.6***
Energy, material, services	*3,308.3*	*4,813.7*	*2,564.6*	*3,803.2*	*2,507.1*	***3,399.4***
Personal costs	424.0	502.6	728.3	694.8	392.4	**548.4**
Other operating costs	9.8	343.9	317.9	43.1	96.9	**162.3**
Total costs	**5,316.2**	**7,179.9**	**5,210.0**	**6,112.4**	**4,644.1**	**5,692.5**

Source: own processing according to farm´s financial statements

Table 28 shows changes in costs/sheep in observed period. Share 88% in average belongs to *Performance consumption* including energy and materials (68%), hay and haylage (21%) and granule mixture (10%). Mixture of granules is however given only to lambs for fattening. At the 2nd place are *Personal costs* with 10% share in average followed by *Other operating costs* including e.g. losses and deaths of animals, or insurance.

Table 29 Annual profit per sheep in CZK (2011-2015)

Revenue item/ Year	2011	2012	2013	2014	2015	Years Average
Total revenue	7,264.9	9,995.3	7,264.0	8,736.0	4,889.6	**8,186.6**
Total costs	5,316.2	7,179.9	5,210.0	6,112.4	4,644.1	**5,692.5**
Profit	**1,948.7**	**2,815.4**	**2,053.9**	**2,623.6**	**245.5**	**2,494.1**

Source: own processing according to farm´s financial statements

According to the *Table 29* can be derived the average profit calculated per 1 sheep, which equals to approximately CZK 2,494 in observed period. Without subsidies the costs per sheep would be approximately 4.5 times higher and therefore the sheep breeding would not be profitable at all.

Profitability ratios of the organic farm

For calculation of profitability ratios of the farm were used *Equations 3-10* in the chapter *Profitability ratios*. Before starting the calculation, it was obvious that result will not be satisfying. The company (farm) is dependent on subsidies which represent 71.4% of the revenues in average in the period from 2011-2015. However, following *Table 30* summarizes the results which were calculated according to the accounting items in the *Attachment 11*.

Table 30 Profitability ratios of the organic farm (2011-2015)

Calculated Ratio /Year	2011	2012	2013	2014	2015
ROA	3%	2%	3%	5%	2%
ROE	9%	8%	12%	14%	7%
ROS	16%	10%	13%	15%	6%
ROC	3%	2%	4%	5%	1%
Cost-effectiveness of sales	396%	314%	320%	307%	396%
Cost-effectiveness incl. operating income	98%	98%	96%	98%	98%
Gross profit margin	-133%	-71%	-55%	-73%	-66%
Net profit margin	4%	4%	6%	7%	2%

Source: own processing according to the financial statements

For calculation of Return on Assets ratio were used items Total Assets and Net Profit. The value of ROA does not exceed 5%, which means that from 1 unit of asset is produced maximum 5% of profit. Values of ROA stagnate in the observed period.

In case of Return on Equity (ROE) were used items Net Profit and Equity. It shows that in the period from the Equity value was generated maximum 14% as profit. It means that from CZK 1 of equity was generated maximum CZK 0.14 of profit. From all observed years, the year 2014 shows the highest profit. The value of the equity increases every year with the weakest growth at the turn of years 2014/2015. In the year 2015 was also more than half drop in Net Profit caused by investment in new lambs in herd. Consequences of an adverse development of both indicators cause the lowest value of ROE 7% in 2015. The ratio is not very important for farmer in comparison to large joint-stock companies and their shareholders.

The ratio Return on Sales should demonstrate the value of profit created by revenues from sold goods of the farmer. As it is already known from previous calculations, total costs of the farmer are approximately 3.5 times higher in average than the Sales (revenues from sold goods) in the period. The profit which is created during the years does not come from the production but mainly from subsidies. However, the resulting figures show that from CZK 1 of Sales is created in average CZK 0,12 of the profit. The highest values 16% were shown in 2011.

The reason was that values of EBIT and also values of Sales were quite low. In 2012 the value of ROS fell down by 6%, because even though the Sales almost doubled, costs of the production increased as well plus the operating revenues were not adequately increased. The result of 2012 was lower profit and therefore the ROS also decreased. Higher value of ROS was not obtained until 2014, when it shows 15%. Sales in 2014 increased by 20%, the EBIT by 36% and costs only by 14%. The reason of drop in 2015 is the same as in previous ratio.

Values of ratio Return on Costs (ROC) are very low in the whole period with stagnating development of values under 5% all the time. The reason is, that the farmer has a very low profit in comparison to his total costs that are mostly covered by financial support.

The indicator of cost-effectiveness in the *Table 30* has two versions. In first version (Cost effectiveness of sales) were taken into consideration only Sales as revenue of the farmer. The values that are result of ratio are very big (over 300% in all years) because the subsidies were not considered in the calculation. Values of costs of the farm are approximately 3-4 times higher than pure revenue from his production. Because the result of ratio does not reflect the reality if subsidies are not included, it was calculated once more with subsidies added to sales. Results after including Operating revenues are much better in comparison to the previous results, not exceeding value 98.1%. On the other hand, the result is still not satisfying, because it means that for CZK 1 of revenue (including Sales and Operating Income) accounts CZK 0.97 of costs in average. The development of cost-effectiveness stagnates in the observed period, with a negligible improvement at the turn of the year 2014/2015 by 0,03%.

Very poor results were obtained from Gross profit margin calculation. All values are negative, which means that revenues from sales are very low and costs are many times higher). Values stagnate in the period with negligible improvement in the last year by 7%.

Net profit margin is calculated as a profit divided by operating and extraordinary revenues. Result show very low values not exceeding 7% (2014). The value expresses that from CZK 1 of Operating revenue and Extraordinary revenues (only CZK 13,000 in 2014) was created maximum CZK 0.07 of Net profit in the observed period. The value of net profit margin begins as 4% and reaches the peak in 2014 with 7 %. In 2015 the value drops down because of the large investment in composting plant.

6 Results and Discussion

6.1 Results from the practical part

The number of sheep in Czech Republic increases every year since 2001 with specialization on combined and meat breeds. Sheep wool is considered as a by-product since the entrance of Australia and New Zealand to the European market and its price does not cover the shearing costs. Sheep breeding based only on wool production would not be profitable at all in current situation. In 2015, in the Czech Republic was bred 231,694 sheep. Since 2001 to 2015 the number of sheep has increased by 165%. The largest share on the sheep breeding is represented by South Bohemian region with 13%. The sharpest growth was noticed in 2005 after the EU accession, the reason can be also the change in the way of registration.

According to the size of sheep herds, in the Czech Republic prevail small sizes of 1-10 sheep and 11-50 sheep. The reason is that majority of small sheep herds are only the way how to obtain a subsidy (for sheep and for ecological land cultivation) and not to increase the meat production. Sheep are therefore used as a pretext for the subsidy payment because the combination of having grasslands and pastures with sheep perfectly complement each other. Sheep breeding also became more popular in recent years and many citizens have few sheep for own consumption and for the pasture of their land.

Sheep meat production corresponds to the number of sheep bred in the Czech Republic. In CR prevail lamb slaughters (80%) and the rest are adult sheep. The total amount is only estimated because the number of slaughtered animals is mainly represented by slaughters “at home”. The last estimate of total slaughtered sheep was equal to 144,391 sheep including lambs.

Unfortunately the consumption of sheep meat is so low that it is not observed individually. The average consumption of sheep meat, including horse and goat meat, was 0.4 kg per person in 2014.

The largest consumed meat are currently pork and poultry, followed by beef. However, the total meat consumption development from 1989 to 2014 shows a decline of 22 kg/person. The trend is caused by a high variety of products on the market, as e.g. more fruit, vegetable, rice, pasta etc.

The supply of sheep meat on the domestic market is observed together with goat meat. Self-sufficiency reached a maximum of 91% in 2014. In 2015 decreased a bit but no far with a solid 89%. The domestic supply is topped-up by import of sheep meat which prevails over the export of sheep meat from 2003-2013. Data about teritorial structure of import are available only for live sheep but in all probabilty the import partners for sheep meat coincide with import partners of live sheep. The main importers of live sheep to the Czech Republic are France, Germany, Slovakia and Austria. The number is very low and does not exceed even 400 sheep per country. Imported sheep are usually for breeding purposes and for the improvement of breeding values. Czech live sheep are exported mainly to Austria and Germany and the number of exported sheep does not exceed 8,000 pieces/country/year since the year 2005 to 2014. From the observation of trade with lamb skin was found positive trade balance with large fluctuations and significant decline at the turn of years 2012/2013. The trade balance of greasy sheep wool is negative in a long term, because the wool is imported from Austraila, New Zealand and other countries and the price of czech wool is not even competitive for the domestic market.

In the practical part was also observed the rest of the world including EU situation of sheep breeding sector.The largest world producer of live sheep and sheep meat in 2013 was by far China. China represented 24% of total sheep meat production. Next followed were Australia (8%) and New Zealand (5%) among the world. Regarding the European Union, the largest producer of live sheep in 2014 were United Kingdom (35%), Spain (16%) and Romania (9%). Together with Greece and France, these 5 countries represent a solid 76% of the EU live sheep production. The EU trade balance with live sheep was positive in 2013 and on the other hand the sheep meat trade balance resulted with a negative performance in the period 2003-2013. Main non-EU importing partners are New Zealand, Australia and Chile.

The specialization of top EU exporters in sheep meat export was calculated by Balassa Index for the year 2013. Results show, that highly specialized in sheep meat export within the total export of meat and also within the total export of all agricultural products were the following countries: United Kingdom, Ireland and Spain. Higly specialized in export of live sheep within the total meat export and within the total agricultural export were Romania, Spain and Hungary.

Czech Republic on the world market or even on the EU market is negligible and has no specialization in this field. From a detailed view on the domestic situation is obvious, that the CAP and subsidies policy play a key role, not only in sheep breeding sector but in the whole agriculture. European Funds offer broad range of subsidy programmes in favor of sheep breeding. The subsidies are divided as a compulsory and voluntary schemes for all Member States and are granted partialy from EU Funds.

The individual payments are divided according to their dependence on the size, location and treatment of cultivated area followed by the agricultural sector and its difficulties. It is common to obtain payment on 1ha of cultivated agricultural land registered in LPIS. Currently is placed greater emphasis on the environment and the climate change situation. The farms are supported financialy for organic cultivation which does not burden the land and for the production of organic products. Conditions can be very difficult and binding towards the farmer, because the financial support is not granted without several commitments. However, from the cost-calculation on the chosen farm was found that the farm focused on sheep breeding located in the Czech Republic can not be cost-effective without subsidies.

6.2 Results from the cost-calculation of the organic farm

For the cost and revenues analysis was chosen the organic farm Kosařův Mlýn in Central Bohemian region. The analysis was made for the period from the year 2011-2015. For the calculation were used mainly Profit and Loss Accounts and in some cases were used Balance sheet.

The organic farm is one of the largest sheep breeding farm in the Central-Bohemian region. The land area of the farm is 221.8 ha and approximately 36 % (80 ha) is used for grazing. In 2015 the sheep herd counted 994 heads of sheep. Currently the sheep herds count 1079 sheep and the farm belongs to the 3% minority of Czech sheep breeders with herd over 100 sheep. The number of sheep was increasing steadily until 2015. In all years has prevailed the number of ewes, followed by the number of lambs. The rams number equals to 44 in 2015. The average breeding index is 0.8 which is very low and the reason is low fertility of the Suffolk sheep including certain level of mortality.The farmer has a "laisser-faire" approach in case of new-born lambs. If the lamb itself is not strong enough it will die. The reason is that for breeding purposes and for performance tesing of Suffolk sheep are suitable only strong individuals. To take care of weak lambs means higher costs and lower revenues from its sale.

The farm is focused on lamb production and following sale of lambs. All produced crops are intended for own consumption. The main income of healthy farm should represent revenues from sales and the financial support in form of subisides should be used as a supplement in the business.

On the basis of the analysis of costs and revenues of the farm was found out that in average 71% of the total revenues comes from the Operational income. Operational income includes only subsidies. Major part of subsidies creates SAPS with 39 % in average, then Agro-environmental measures with share 36% in average (representation according to the share: Ecological Agriculture (46%), Meadows (22%), Grassing of arable land (17%), Pastures (17%), Treatment of Grasslans (1%). Then follows LFA payment (19%) and payment for Ewes, goats pastured on grassland (4%).

In 2014 and 2015 was granted Transitional National Aid represented by Payment on agricultural land. In 2015 the farmer obtained a subsidy financed by the Operational Programme Environment for composting plant worth of approximately CZK 4.6 mil.

Farmer performance revenue (change in stock, revenues from sale of lams and wool) is on the 2nd place and represents 20-30% of total revenues with increasement of 41% every year in average. The share of sold wool in total revenues is negligible.

Farm costs increase annualy aproximately by CZK 1 mil. with the exception of the year 2015, when the farmer invested in composting plant. Main share of costs represent performance consumption, followed by depreciation and personal costs (labour costs) in all years with the exception of the year 2015.

Farm's profit development shows increasing tendency since 2012-2014 with average annual increasing of 33%. Without subsidies would be the farm´s economic result in negative numbers and the trend of costs would be opposite. The profit concerned per one sheep equals to CZK 2.494 mil in average.

According to the overall profit development calculation and farmer's profit approximaty per one sheep of his herd was found that without subsidies obtained by the farmer would not be possible to operate the farm. The costs of farm would be approximately 4 times higher than revenues.

Profitability calculation results show that ratios correspond to the findings from previous part. A key role on the farm play subsidies. Majority of ratios have low values because subsidies which have significant influence on the profit have not been taken in consideration among indicators. The reason is that subsidies are not used as a stimul for higher production but they are used as a source for maintaining the farm "alive".

From chosen Profitability ratios e.g. ROS (Return on Sales) shows that from CZK 1 of sales revenue was created CZK 0.12 of profit in average. The result itslef means that the rest of the profit is created somewhere else than in sales.

The Return on Costs ratio shows also very low values under 5% and mainly because the profit is so low in comparison to total spent costs. The cost-effectiveness indicator was modified that it includes also subsidies. The result shows that the average cost-effectiveness of the farm is 97 %.

Gross profit margin calculation shows that final profit margin is negative without subsidies. Net profit margin evaluates the amount of profit created by obtained subsidies. As was already mentioned, the subsidies are used to keep the farm alive, thus to keep the farm in postive numbers in case of profit. The production and its sales increases slightly annually but from the result of Net profit margin is obvious that the average valute of 7% does not correspond to the purpose of subsidies.

The overall evaluation of the farm from the economic point of view can be divided into two parts. First part of evaluation shows that the farmer effectively uses the subsidies and as a result He can operate his farm, breed a Suffolk-sheep and ensure his own feed production for sheep. The second part of evaluation has not shown so strong results as the previous part because the farm "consumes" the subsidies and the economic result is not very satisfying as was calculated by Net profit margin indicator.

Based on the results given by the interviewed farmer, shows that even He is not satisfied with the principle of the operation of his farm. However, his choice in 2008 was to lease the land for pastures and meadows and last year he started to cultivate the arable land. His plan for the year 2016 and upcomming years is to cultivate fertile crops for own feeding purposes. As mentioned in the previous chapter, farmer received a subsidy for compostion plant in 2015, which covered 85% of total costs of the project. The year 2016 is the first operating year of the plant. The processed compost will be used for fertilization of his arable land. Among others, farmer mentioned that He will receive the subsidy on fertile crops production next year.

During the interview was also mentioned that the farmer would like to extend his production by cooperation with the project called "Mléko z farmy", thus the milk directly

from farm. The project works as a distribution of fresh milk with designated stops, where customers buy products directly from the wagon. By this way the farmer could increase his sales by having regular consumers and also improve the general awareness about the healthy sheep meat.

Other plans for the future farm´s development and improvement of financial situation is to set up farm´s own slaughter and to extend the sale of meat products from the cross-bred sheep herd. From the survey of subsidies possibilities was found that the farmer could receive the payment within the Rural Development Programme on *Processing of the agricultural products and placing of agricultural products on the market* and use it to partially cover the costs of the reconstruction of currently unused farm spaces. The farmer had relatively creative ideas about the future development of the farm. Other plan or better said "wish" of the farmer is to set up his own drying room for sausages made from sheep meat of his own production. This could be probably followed by setting up the farmer´s own brand of BIO products.

Next proposal is not planned by the farmer but it could be good idea how to increase revenues. Currently it is popular to open the farm for the public. The farmer could offer the lectures about sheep breeding, visitation of the farm and his large land area and in some cases accommodation in the free nature.

According to own assessment was found that costs of the farm can´t be reduced to increase the profit. The farm has only two employees and one accountant. Without investment in new machinery it would not be possible to operate the farm, because the farm did not dispose by machinery in the beginning. The farmer does not buy any feed with the exception of the granule mixture for lambs. Therefore, the way to increase profit is to extend the production by higher sales or by higher prices of sheep meat, which is not possible in current situation.

7 Conclusion

The thesis aims to the valorisation of sheep breeding sector in the Czech Republic. The main objective was fulfilled by completion of sectional objectives of the thesis, which include combination of theoretical and practical information. As the current Czech sheep breeding is focused on production of meat and majority of data are available only regarding to lamb and meat, the thesis has been adapted to the availability of data.

Theoretical information were collected from appropriate sources and the practical part was completed as a combination of data collection, illustrative cost calculation, revenues of the chosen farmer and knowledge from the theoretical background. Based on the combination of findings was made a proposal of possible improvements in case of the chosen farm and the whole sheep sector in the Czech Republic.

The number of sheep is negligible in comparison to other kinds of animals, such as pigs, cows or chickens in the Czech Republic. However, the status of sheep increases since 2001 and in 2015 in the Czech Republic was bred 231,694 sheep. The consumption of sheep meat which equaled to 0.4 kg/person in 2014 is very low in comparison to other kinds of meat and stays the same in last 5 years. Sheep wool is considered as a by-product since the Australian and New Zealand wool has entered the European market in 90´s and its price does not cover shearing costs.

The trade balance in case of live sheep remained positive in the period 2005-2015 with main trading partners as Austria, Germany, Slovakia and France. The opposite situation is in case of sheep meat with negative trade balance caused by already low level of production on the domestic market.

Based on the assessment of the combination of increasing number of sheep in the Czech Republic on one side and quite invariably low consumption of sheep meat on the other side was concluded, that for farmers must exist another motivation for sheep breeding besides the sales revenues such as subsidies. To determine the effects of subsidies on the farmer's economy focused on sheep breeding were calculated costs, revenues and profitability ratios of the chosen organic farm.

The chosen organic farm with its leased area of 221.18 ha and with 994 heads of sheep in 2015 is focused on production of Suffolk breeding lambs with own production of feed. From the analysis of the farm´s costs and revenues is obvious that without subisidies, which represent 71% from total farm´s revenues in average, the farm would not be profitable at all. Major part of subsidies create SAPS (39 %), Agro-environmental measures (36%), LFA payment (19%) and payment for Ewes, goats pastured on grassland (4%) in average. In 2014 and 2015 was granted Transitional National Aid represented by Payment on agricultural land. Total amount of granted subsidies (Operational revenues) equaled CZK 8,398,000.00 in 2015 including a subsidy for Composting plant project (CZK 4,558,720.00) realized in 2015.

Revenues from performance of the farm represented 20-30 % in average (CZK 2,493,000 in 2015) with negligible share of sold wool. Costs of the farm consist mainly from Performance consumption (CZK 4,130,000 in 2015) and depreciation (CZK1,485,000 in 2015). Without subsidies the farmer would be in loss permanently (CZK – 8.3 mil. in 2015), but with subsidies the profit equaled CZK 138,000 in 2015.

From the calculation of profitability ratios is obvious, that subsidies play a key role on the farm. Subsidies that have strong influence on the profit are not considered in majority of ratios and therefore the values of ratios are very low.

The purpose of the subsidies should be to stimul the farmer for higher production followed by higher sales. In the observed period are, however, subsidies used as a source for maintaining the farm in operating. From internal data of the farm was calculated that in 2021 should be depreciated all invested machinery and therefore the costs for depreciation should decrease. However, the farmer will still pay the leased land and farmhouse in the future, because the purchase of land in current situation would not be profitable for the farmer.

The farmer has several plans to the future without mentioning the specific year of realization. It is planned to cooperate with the project “Milk from farm”, in which should be delivered the sheep meat directly from the farm to the cities and increased the number of customers and general awareness about the healthy sheep meat. As other plan for extension of meat sale is considered establishment of farm´s own slaughter and establishment of drying room for production of sausages.

The farmer´s herd was extended by new cross-bred sheep with higher fertility and therefore with higher production of meat. Farmer could also open the farm to the public for the purpose of agrotourism.

Currently, it is not customary to eat lamb meat in the Czech Republic, therefore farmers can target their production on Muslim minorities in the Czech Republic or on neigbouring countries as the chosen farmer does. If the subsidy system will be still so beneficial as it is now, then the sheep number development will probably continue to increase. However, it should not be relied on subsidies only and it should be taken into account possible decrease in payments in the future. If farmers want to become independent on subsidies, first step forward should be to breed mainly fertile breeds with higher productivity. The herd and sales should be increased as much as possible while spending least possible costs, however, every enlargement is followed by initial investment and on top, the sheep products are not appreciated enough. Without a product price change in favor of farmers the sheep breeding is under current conditions considered as not profitable wtihout being provided by subsidies.

8 References

Book references

Freiberg, František and Zralý, Martin. 2008. *Ekonomika Podniku.* 2nd. Prague : České vysoké učení technické v Praze, 2008. p. 126. ISBN 978-80-01-04144-4.

Horák, František. 2001. *Chov ovcí.* Praha : Nakladatelství Brázda, s.r.o., 2001. ISBN 80-209-0284-8.

—. 2012. *Chováme ovce.* Praha : Nakladatelství Brázda, s.r.o., 2012. p. 384. ISBN 978-80-209-0390-7.

Humpál, Jarslav. 2008. *Mechanizační a technologické vybavení farem.* Brno : Svaz chovatelů ovcí a koz v ČR, 2008. ISBN 978-80-904140-2-0.

Kuchtík, J. and Novotná, L. 2006. Chov dojných ovcí - opomíjený prostředek údržby trvalých travních porostů a krajiny. [book auth.] Kolektiv autorů. *Sborník přednášek ze setkání chovatelů a mezinárodní konference.* s.l. : Svaz chovatelů ovcí a koz v ČR a Mendelova zemědělská a lesnická univerzita v Brně, 2006, p. 132.

Kuchtík, Jan, et al. 2007. *Chov ovcí.* Brno : Mendelova zemědělská a lesnická univerzita v Brně, 2007. p. 112. ISBN 978-80-7375-094-7.

—. 2016. Způsoby a termíny označování ovcí a koz. *eAGRI.* [Online] 2016. [Cited: 3 10 2016.] http://eagri.cz/public/web/mze/legislativa/pravni-predpisy-mze/tematicky-prehled/100056772.html.

Peterová, Jarmila. 2010. *Ekonomika výroby a zpracování zemědělských produktů.* Praha : Česká zemědělská univerzita v Praze, Provozně ekonomická fakulta, 2010. ISBN 978-80-213-2053-6.

Peterson, Pamela P. and Fabozzi, Frank J. 1999. *Analysis of Financial Statements.* s.l., United States of America : Frank J. Fabozzi Associates, 1999. ISBN: 1-883249-59-7.

—. 2015. Přímé platby. *Státní zemědělský intervenční fond .* [Online] 2015. [Cited: 16 11 2016.] https://www.szif.cz/cs/prime-platby.

Štolc, Ladislav and Nohejlová, Lenka. 2007. *Základy chovu ovcí.* Praha : Ústav zemědělských a potravinářských informací, 2007. p. 78. ISBN 978-80-7271-000-3.

Štolc, Ladislav. 1999. *Chov hospodářských zvířat (chov skotu, ovcí a koní).* Praha : Česká zemědělská univerzita v Praze a ISV Praha, 1999. ISBN 80-213-0478-2.

Electronic references

Hinloopen, Jeroen and Van Marrewijk, Charles. 2001. On the empirical distribution of the Balassa index. *SpringerLink*. [Online] 2001. http://download.springer.com.ezproxy.techlib.cz/static/pdf/670/art%253A10.1007%252FBF02707598.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2FBF02707598&token2=exp=1480252271~acl=%2Fstatic%2Fpdf%2F670%2Fart%25253A10.1007%25252FBF0270759.

KalorickéTabulky.cz. Mléko ovčí. *KalorickéTabulky.cz.* [Online] http://www.kaloricketabulky.cz/mleko-ovci/.

McLaren, Alain. 2015. Asymmetry in Price Transmission in Agricultural Markets. [Online] May 2015. http://web.a.ebscohost.com.ezproxy.techlib.cz/ehost/pdfviewer/pdfviewer?sid=d166363c-6195-4711-9e3f-e54bf85310dc%40sessionmgr4007&vid=1&hid=4109.

Ministerstvo vnitra ČR. 2015. Nařízení vlády č. 50/2015 Sb.o stanovení některých podmínek poskytování přímých plateb zemědělcům a o změně některých souvisejících nařízení vlády. *Ministerstvo vnitra České Republiky.* [Online] 27 March 2015. http://aplikace.mvcr.cz/sbirka-zakonu/ViewFile.aspx?type=z&id=2755.

Ministerstvo vnitra. 2008. Nařízení vlády č. 112/2008 Sb., o stanovení některých podmínek poskytování národních doplňkových plateb k přímým podporám § 6. *Ministerstvo vnitra České republiky* . [Online] 2008. [Cited: 11 November 2016.] http://aplikace.mvcr.cz/sbirka-zakonu/ViewFile.aspx?type=c&id=5261.

—. 2015. Nařízení vlády č. 112/2008 Sb., o stanovení některých podmínek poskytování národních doplňkových plateb k přímým podporám § 7. *eAGRI.* [Online] 2015. [Cited: 11 November 2016.] http://eagri.cz/public/web/mze/zemedelstvi/rostlinne-komodity/cukrova-repa-a-cukr/dotacni-predpisy-cr/100049357.html.

—. 2016. Nařízení vlády č. 112/2008 Sb., o stanovení některých podmínek poskytování národních doplňkových plateb k přímým podporám Příl. *eAGRi.* [Online] 2016. [Cited: 19 November 2016.] http://aplikace.mvcr.cz/sbirka-zakonu/ViewFile.aspx?type=c&id=5261. ISSN 1211-1244.

—. 2015. Nařízení vlády č. 73/2015 Sb., o podmínkách poskytování plateb v oblastech Natura 2000 na zemědělské půdě. *Ministerstvo vnitra České republiky.* [Online] 2015. [Cited: 16 November 2016.] http://aplikace.mvcr.cz/sbirka-zakonu/ViewFile.aspx?type=z&id=28778.

—. 2015. Nařízení vlády č. 75/2015 Sb., o podmínkách provádění agroenvironmentálně-klimatických opatření a o změně nařízení vlády č. 79/2007 Sb., o podmínkách provádění agroenvironmentálních opatření, ve znění pozdějších předpisů. *Ministerstvo vnitra České republiky .* [Online] 15 April 2015. [Cited: 17 November 2016.] http://aplikace.mvcr.cz/sbirka-zakonu/ViewFile.aspx?type=z&id=28780.

—. 2015. Nařízení vlády č. 76/2015 Sb. o podmínkách provádění opatření ekologické zemědělství. *Ministerstvo vnitra České republiky .* [Online] 15 April 2015. [Cited: 17 November 2016.] http://aplikace.mvcr.cz/sbirka-zakonu/ViewFile.aspx?type=z&id=28781.

Ministerstvo zemědělství. 2016. Cross Compliance. *eAGRI.* [Online] 2016. [Cited: 16 November 2016.] http://eagri.cz/public/web/mze/dotace/kontroly-podminenosti-cross-compliance/.

—. 2015. Jednotná platba na plochu zemědělské půdy. *eAGRI.* [Online] 2015. [Cited: September 3, 2015.] http://eagri.cz/public/web/mze/dotace/prime-platby/jednotna-platba-na-plochu/.

—. 2016. Ovce a kozy. *eAGRI.* [Online] 2016. [Cited: 5 November 2016.] http://eagri.cz/public/web/file/505870/kk_kozy.doc.

—. 2011-2016. Ovce a kozy. *eAGRI.* [Online] 2011-2016. [Cited: 15 November 2016.] http://eagri.cz/public/web/mze/zemedelstvi/zivocisne-komodity/ovce-a-kozy/?pageSize=50.

—. 2015. *Vyhláška Ministerstva zemědělství č. 274/1998 Sb., o skladování a způsobu používání hnojiv Příl.3.* 2015.

—. 2016. Základní evidované údaje o hospodářství. *eAGRI Registr příjemců dotací.* [Online] 2016. [Cited: 19 November 2016.] http://eagri.cz/public/app/SZR/SubsidyReports/Registr/Subsidies/1002118392.

—. 2014. *Základní informace.* [web site] 2014. Program rozvoje venkova ČR na období 2014-2020.

—. 2016. Zásady, kterými se stanovují podmínky pro poskytování dotací pro rok 2016. *eAGRI.* [Online] 18 January 2016. [Cited: 24 November 2016.] http://eagri.cz/public/web/file/440420/Zasady_pro_rok_2016.pdf.

Ministry of Regional Development CZ. 2015. Operational Programme Environment. *Ministry of Regional Development CZ.* [Online] 2015. [Cited: 17 November 2016.] https://www.strukturalni-fondy.cz/en/Fondy-EU/2014-2020/Operacni-programy/OP-Zivotni-prostredi.

PGRLF, a.s. 2016. Podpora pojištění. *Podpůrný a garanční rolnický a lesnický fond a.s.* [Online] 2016. [Cited: 17 November 2016.] https://www.pgrlf.cz/programy/podpora-pojisteni-2/podpora-pojisteni/.

—. 2016. Program Zemědělec. *Podpůrný a garanční rolnický a lesnický fond a.s.* [Online] 2016. [Cited: 17 November 2016.] https://www.pgrlf.cz/programy/podpora-uveru/program-zemedelec/.

PGRLF,a.s. 2015. Náplň činnosti. [Online] 2015. [Cited: 17 November 2016.] https://www.pgrlf.cz/o-spolecnosti/napln-cinnosti/.

—. 2016. Podpora nákupu půdy. *Podpůrný a garanční rolnický a lesnický fond, a.s.* [Online] 2016. [Cited: 17 November 2016.] https://www.pgrlf.cz/programy/podpora-uveru/podpora-nakupu-pudy/.

—. 2016. Program Zpracovatel. *Podpůrný a garanční rolnický a lesnický fond a.s.* [Online] 2016. [Cited: 17 November 2016.] https://www.pgrlf.cz/programy/podpora-uveru/program-zpracovatel/.

Poláčková, Jana. 2010. Metodika kalkulací nákladů a výnosů v zemědělství. [Online] 2010. http://www.uzei.cz/data/usr_001_cz_soubory/metodika_kalkulace.pdf. ISBN 978-80-86671-75-8.

Růčková , Petra and Roubíčková, Michaela. 2012. Finanční management. *Google.* [Online] Grada Publishing, a.s., 2012. [Cited: 20 November 2016.] https://books.google.cz/books?id=1aZtto3T8D4C&printsec=frontcover&hl=cs#v=onepage&q&f=true. ISBN 978-80-247-4047-8.

Státní zemědělský intervenční fond. 2015. Platby pro oblasti s přírodními či jinými zvláštními omezeními (LFA). *Státní zemědělský intervenční fond.* [Online] 2015. [Cited: September 3, 2015.] https://www.szif.cz/cs/prv2014-m13#.

—. 2015. Přechodné vnitrostátní podpory (PVP). *Státní zemědělský intervenční fond.* [Online] 2015. [Cited: 16 November 2016.] https://www.szif.cz/cs/prechodne-vnitrostatni-podpory.

—. 2015. Přímé platby. *Státní zemědělský intervenční fond .* [Online] 2015. [Cited: 16 11 2016.] https://www.szif.cz/cs/prime-platby.

Státní zemědělsý intervenční fond. 2016. Jednotná žádost. *Státní zemědělský intervenční fond.* [Online] 2016. [Cited: 29 September 2016.] https://www.szif.cz/cs/jednotna-zadost.

—. 2015. Přímé platby. *Státní zemědělský intervenční fond .* [Online] 2015. [Cited: 16 11 2016.] https://www.szif.cz/cs/prime-platby.

Štolc, Ladislav, et al. 1999. Význam ovčího mléka a možnosti jeho využití v ČR. *Agris.cz - agrární www portál.* [Online] 20 May 1999. http://www.agris.cz/clanek/111241/vyznam-ovciho-mleka-a-moznosti-jeho-vyuziti-v-cr.

Thukaram, Rao M.E. 2006. Management Accounting. *Google.* [Online] New Age International (P), 2006. https://books.google.cz/books?id=SvUSaGLEXyUC&printsec=frontcover&hl=cs#v=onepage&q&f=true. ISBN: 81-224-1439-7.

9 Appendix

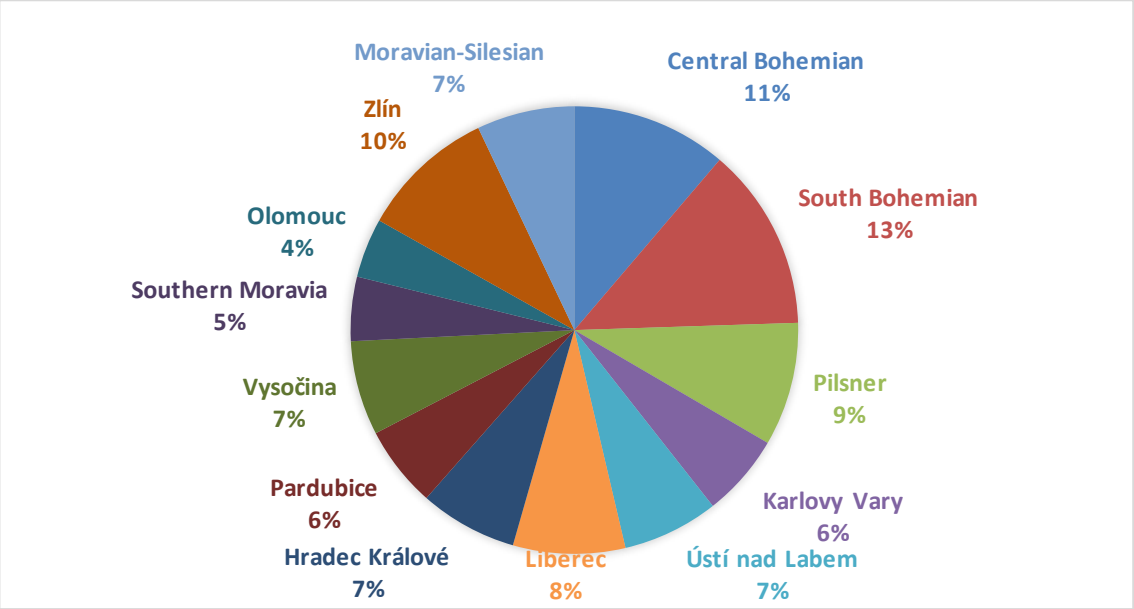
Attachment 1 Number of sheep in Czech regions in the period 2001-2015

Region/year	2001	2002	2003	2004	2005	2006	2007	2008
Central Bohemian	6,760	7,606	7,763	10,388	12,247	13,293	16,913	17,966
South Bohemian	13,652	16,167	15,761	17,583	21,244	21,533	23,969	25,489
Pilsner	10,408	11,070	13,526	13,690	14,547	17,832	20,210	19,367
Karlovy Vary	9,074	9,827	10,553	10,474	13,276	12,083	11,599	11,538
Ústí nad Labem	6,121	6,355	7,404	8,421	10,379	10,386	10,488	11,366
Liberec	4,903	5,102	5,969	5,923	7,529	7,862	10,677	12,594
Hradec Králové	5,861	6,457	6,844	7,096	8,863	9,070	10,835	12,368
Pardubice	4,083	4,432	4,558	6,578	8,678	9,292	10,451	11,894
Vysočina	5,016	5,822	6,530	6,560	7,655	7,642	8,101	10,735
Southern Moravia	3,212	3,587	3,673	3,849	4,104	5,092	7,448	7,006
Olomouc	3,140	3,300	3,536	4,032	5,517	5,893	6,067	7,606
Zlín	7,457	8,628	9,542	11,432	14,321	15,858	18,192	20,261
Moravian-Silesian	7,852	8,293	7,470	9,826	11,837	12,576	13,960	15,428
Czech Republic	**87,539**	**96,646**	**103,129**	**115,852**	**140,197**	**148,412**	**168,910**	**183,618**

Region/year	2009	2010	2011	2012	2013	2014	2015
Central Bohemian	17,617	20,624	22,670	24,797	23,692	25,378	26,054
South Bohemian	25,791	26,499	27,047	27,275	27,821	29,023	30,671
Pilsner	19,526	18,695	19,929	20,268	20,499	20,484	20,683
Karlovy Vary	12,499	12,779	13,485	13,716	13,268	13,774	13,845
Ústí nad Labem	10,497	11,225	11,154	13,226	14,757	15,717	16,089
Liberec	12,270	15,252	16,656	17,314	17,979	18,254	18,773
Hradec Králové	12,955	13,218	15,214	16,567	16,303	16,910	16,366
Pardubice	12,390	13,085	13,739	14,401	13,727	13,066	13,629
Vysočina	10,854	12,387	12,994	14,337	14,706	14,658	15,816
Southern Moravia	8,109	9,085	9,510	9,956	9,342	9,855	10,747
Olomouc	7,872	9,175	9,164	10,405	10,266	10,133	9,962
Zlín	18,646	19,295	20,103	22,073	22,092	22,031	22,694
Moravian-Silesian	14,058	15,594	17,387	16,679	16,069	16,114	16,365
Czech Republic	**183,084**	**196,913**	**209,052**	**221,014**	**220,521**	**225,397**	**231,694**

Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Attachment 2 Share of Czech regions in total number of sheep in CR in 2015



Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Attachment 3 The growth year-to-year indexes of number of sheep in Czech regions with index > 118.2 (red colour)

Region/year	2001	2002	2003	2004	2005	2006	2007	2008
Central Bohemian		112.5	102.1	133.8	117.9	108.5	127.2	106.2
South Bohemian		118.4	97.5	111.6	120.8	101.4	111.3	106.3
Pilsner		106.4	122.2	101.2	106.3	122.6	113.3	95.8
Karlovy Vary		108.3	107.4	99.3	126.8	91.0	96.0	99.5
Ústí nad Labem		103.8	116.5	113.7	123.3	100.1	101.0	108.4
Liberec		104.1	117.0	99.2	127.1	104.4	135.8	118.0
Hradec Králové		110.2	106.0	103.7	124.9	102.3	119.5	114.1
Pardubice		108.5	102.8	144.3	131.9	107.1	112.5	113.8
Vysočina		116.1	112.2	100.5	116.7	99.8	106.0	132.5
Southern Moravia		111.7	102.4	104.8	106.6	124.1	146.3	94.1
Olomouc		105.1	107.2	114.0	136.8	106.8	103.0	125.4
Zlín		115.7	110.6	119.8	125.3	110.7	114.7	111.4
Moravian-Silesian		105.6	90.1	131.5	120.5	106.2	111.0	110.5
Czech Republic		110.4	106.7	112.3	121.0	105.9	113.8	108.7

Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Attachment 4 The growth year-to-year indexes of number of agricultural companies in CR with index >130 (green colour), index < 100 (red colour)

Number of sheep (pcs)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1 to 10	135	174.7	129.6	151.5	133.6	113.6	112.8	106.9	110.8	107.6
11 to 50	104	108.0	101.3	116.3	116.5	103.4	97.6	109.2	108.6	97.7
51 to 100	112	108.5	106.0	131.4	102.6	102.4	86.3	105.6	134.6	75.3
above 100	109	104.5	106.9	125.0	105.9	103.0	83.0	108.2	134.0	72.0
Total	114	131.2	115.2	136.2	125.2	109.7	106.4	107.4	111.7	102.6

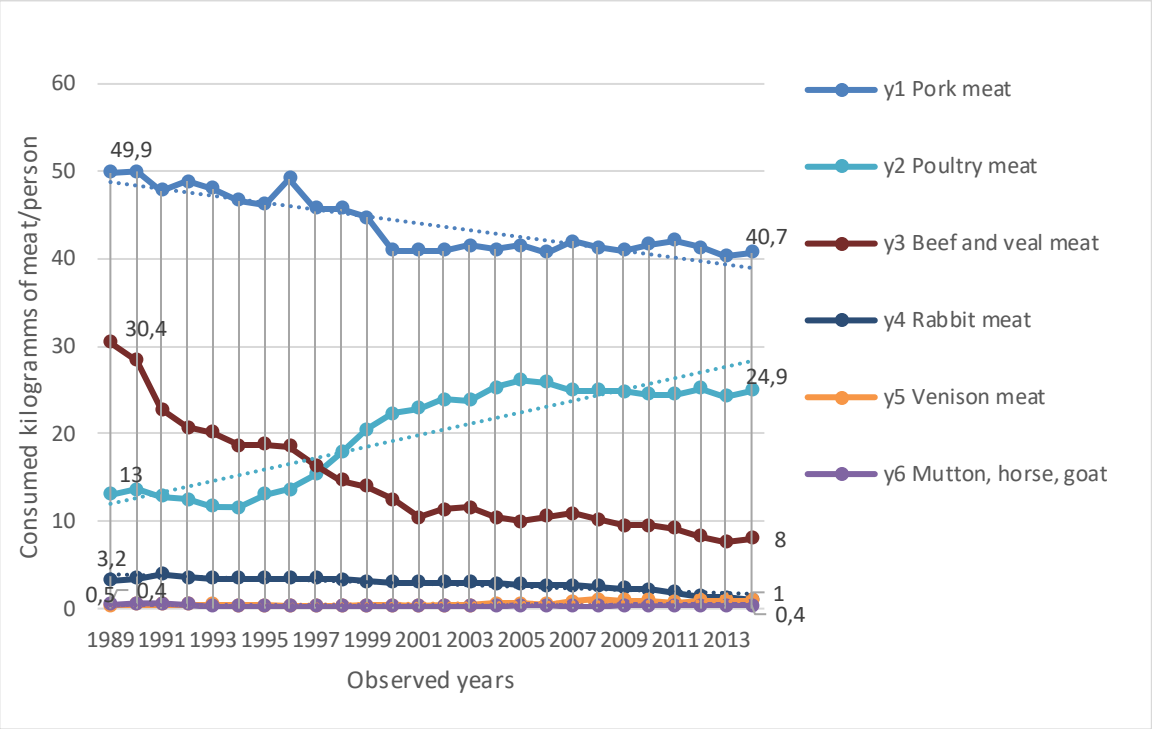
Source: own processing according to the data from *Ročenka chovu ovcí a koz* from years 2004-2014, (Bucek, 2005-2015)

Attachment 5 Overall meat consumption in Czech Republic from 1950-2010 (in kg)

	1950	1965	1980	1995	2010	2014
Pork	25.1	38.6	44.9	46.2	41.6	40.7
Beef	15	18.5	29.2	18.5	9.4	7.9
Veal	3	2	0.8	0.3	0.1	0.1
Mutton, horse, goat	0.7	0.5	0.3	0.2	0.4	0.4
Poultry	2.4	4.8	11.6	13	24.5	24.9
Vension	0.4	0.3	0.3	0.4	0.9	0.9
Rabbit	2	1.5	3.2	3.4	2.2	1
Fishes in total	3.5	5.3	5.8	4.9	5.6	5.4
Meat in total without fish (value on the bone)	48.6	66.2	90.3	82	79.1	75.9

Source: own processing according to data accessible on: (Český statistický úřad , 2016)

Attachment 6 Development of meat consumption in the Czech Republic from 1989-2014 in kg/person/year



Source: own processing acoording to data accessible on: (Český statistický úřad, 2016)

Attachment 7 Export and import of live sheep (2005-2015)

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Export	2276	7431	2596	2269	2302	1855	2019
Import	0	5	400	10	56	31	65
Balance	2276	7426	2196	2259	2246	1824	1954
	2012	**2013**	**2014**	**2015**	**2016**		
Export	2502	1789	3013	3768	779		
Import	0	29	2	4			
Balance	2502	1760	3011	3764	779		

Source: own processing according to data accesible on: Komoditní karta Ovce a kozy 2011-2016, (Ministerstvo zemědělství, 2011-2016)

Attachment 8 Live sheep exported to individual countries in the period 2005-2014 (in pieces)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	In Total
Austria	540	4,005	578		719	650	1,368	3,846	6,646	7,838	26,190
Germany	214	1,282	1,434	1,919	649	31	55	2,832	3,723	2,211	14,350
Slovakia		274					7	3,171	1,244	2,316	7,012
Hungary					212			1,978	211	1,697	4,098
Italy	221	534	493	311					1,527		3,086
France					644	468	493	511		186	2,302
Greece	580	1,308						10	59	14	1,971
the Netherlands	480							596	429		1,505
Lebanon	178					706					884
Malta										444	444
Romania								104	16	120	240
Poland								5	12	128	145
Croatia					58			28	9	40	135
RUSSIA							102	22			124
Bulgaria	47	52									99
Bosnia and H.			45	37							82
Jordan	40	21	14								75
Ukraine					40		2		31		73
Slovenia			44					16		0	60
Lithuania								50			50
Serbia										24	24
Kazakhstan			2	4					3		9
Latvia								1			1
Belgium								1			1
In total	**2,300**	**7,476**	**2,610**	**2,271**	**2,322**	**1,855**	**2,027**	**13,171**	**13,910**	**15,018**	

Source: Own processing according to the data accessible on: (Český statistický úřad , 2016)

Attachment 9 Live sheep imported from individual countries to CR in the period 2005-2014 (in pieces)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	In total
Romania			400								**400**
France								167	206	13	**386**
Germany				1				54	223	14	**292**
Slovakia					50		60	22	28	9	**169**
Austria					6	31		56	61	4	**158**
Hungary								47	70	26	**143**
the Netherlands								10	32	15	**57**
Switzerland							5		25	10	**40**
Great Britain								2		15	**17**
Poland								4	3		**7**
Sweden									2		**2**
Belgium										1	**1**
In total	**0**	**0**	**400**	**1**	**56**	**31**	**65**	**362**	**650**	**107**	

Source: Own processing according to the data accessible on (Český statistický úřad , 2016)

Attachment 10 Structure of granted subsidies in 2013 (2014)

Granted subsidies in 2013 (2014)	Granted in CR in CZK	Details
Animals in Control of utility	4,278,084.00	up to CZK 150/sheep
- Ram in Control of utility	7,826,202.00	CZK 17/ feeding day
- Rams with breeding value	3,024,000.00	CZK 3500/ram
National programme - Maintenance and utilization of genetic resources (2014)	-	-
- Šumava sheep	-	CZK 800/ewe*, CZK 500/ewe*
- Wallachian sheep	-	up to CZK 1500/ewe*
RDP -modernisation of agricultural companies	10,500,000.00	21 applications for modernisation of stables
SAPS	21,428,664,000.00	in total
Ewes (goats) pastured on grassland	36,849,682.64	in total
Top-up (TNA) - sheep, goats	37,559,683.00	in total
Ecological Agriculture (2014)	2,179.00/ha	
-treatment of grassland (meadows)	from 1,836.00 to 10,208.00/ha	
-treatment of grassland (pastures)	from 2,742.00 to 7,540.00/ha	

Source: Situační a výhledová zpráva za rok 2014

Attachment 11 Accounting units used for profitability ratios calculation

Accounting Unit/Year	2011	2012	2013	2014	2015
Total Assets	4,347,000	5,683,000	5,745,000	4,799,000	7,252,000
Liabilities	4,347,000	5,683,000	5,745,000	4,799,000	7,252,000
Equity	1,245,000	1,354,000	1,560,000	1,754,000	1,858,000
Long-term liabilities	717,000	356,000	0	0	0
Long-term bank loans	2,184,000	3,807,000	3,084,000	2,280,000	2,196,000
Revenues (Sales)	856,000	1,404,000	1,394,000	1,660,000	2,493,000
Operating income	2,619,000	3,092,000	3,245,000	3,536,000	8,398,000
Extraordinary revenues				13,000	
Costs	3,364,000	4,387,000	4,458,000	5,099,000	10,787,000
Costs of goods sold (Performance consumption)	1,992,000	2,394,000	2,161,000	2,870,000	4,130,000
Profit	111,000	109,000	182,000	248,000	138,000
EBIT	137,000	134,000	182,000	248,000	138,000
Income tax	26,000	25,000	0	0	0

Source: own processing according to financial statements of the farmer