**CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE**

**Faculty of Economics and Management**

**Department of Economics**


# Bachelor Thesis

# Economic Analysis of Equine Welfare - Stallions

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Department of Economics

Faculty of Economics and Management

# BACHELOR THESIS ASSIGNMENT

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Agricultural Economics and Management

Thesis title

**Economic Analysis of Equine Welfare - Stallions**

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**Objectives of thesis**

The aims are to provide wider and deeper information about how to breed stallions and to keep them in more natural conditions for them which are basically known, but not observe enough and ascertain if the life of stallion in animal welfare conditions is more profitable than in non- welfare conditions.

**Methodology**

Cost- benefit analysis, synthesis, induction, deduction, extraction

**Schedule for processing**

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**The proposed extent of the thesis**

30 - 40 pages

**Keywords**

stallion, breeding, cost- benefit analysis, animal welfare

**Recommended information sources**

BIRD Jo, PARELLI Pat. Keeping a horse the natural way: a natural approach to horse management for optimum health and performance. 1 edition. Barron's, 2002. 206 p. ISBN 0764154117, 9780764154119.

C. G. Mina, MOREL Davies. Equine Reproductive Physiology, Breeding and Stud Management. 3rd revised edition. CABI Publishing, 2008. 400 p. ISBN 978-1845934507.

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DUŠEK Jaromír a kol. Chov koní. 3. edition, Brázda, 2011. 398 p. ISBN: 978-80-209-0388-4

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Dean

Prague March 5. 2012

# DECLARATION

I hereby declare that I have worked on my Bachelor Thesis titled "Economic Analysis of Equine Welfare- Stallions" solely and I have used the literature and sources listed in bibliography.

In Prague, 29th March 2012

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Kristýna Koděrová

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# Economic Analysis of Equine Welfare - Stallions

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# Ekonomická analýza welfare koní - hřebců


**Summary**

The bachelor thesis themed "Economic Analysis of Equine Welfare - Stallions" focuses on equine welfare analysis from economical point of view. The theoretical part discusses mainly a topic of equine welfare with special focus on stallions. The practical part is based on the assumptions from the theory and uses comparison of cost- benefit analysis on sample of 20 Akhal- Teke stallions divided into two groups- welfare and non-welfare. The analysis compares total costs and benefits from year 2010 for each stallion. Data are gathered from two questionnaires for breeders of stallions. The aim of the thesis is to evaluate what type of keeping a horse is more profitable both for horses and breeders. The obtained results are summarized in the end of the study.



**Keywords:** stallion, breeding, cost- benefit analysis, animal welfare



**Souhrn**

**Bakalářská práce na téma „**Ekonomická analýza welfare koní – hřebců" se zaměřuje na analýzu welfare koní z ekonomického pohledu. Teoretická část pojednává o teorii a problematice chovu koní v dobrých životních podmínkách zaměřenou především na hřebce. Praktická část založená na předpokladech z teorie analyzuje náklady a přínosy na vzorku 20 Achaltekinských hřebců rozdělených do dvou skupin- welfare a non- welfare. Analýza porovnává celkové náklady a přínosy z roku 2010 pro každého hřebce. Data jsou shromážděna ze dvou dotazníků pro chovatele hřebců. Cílem práce je ohodnotit, jaké podmínky chovů koní jsou výhodnější jak pro koně, tak pro chovatele. Získané poznatky jsou shrnuty na závěr práce.



**Klíčová slova:** hřebec, chov, analýza nákladů a přínosů, welfare zvířat

# Contents

# 1 INTRODUCTION

The horse was used by people over centuries for many purposes. For the ancient civilizations, the horse provided food and material. Later, the horse was often used in wars for the cavalry, for transportation of people and it also played an important role had also in agriculture. The importance of horses in these areas was gradually decreased with the development of modern technologies. Today, the utilization of horses is mainly for leisure activities.

The horse industry is very large and involves business, sport and recreation. It offers many opportunities for business, for example industry of horse racing or hippo-tourism. And it also provides many offers for people who only want to spend some time with these animals. But a lot of people own a horse only for purpose to ride on horseback- it is not business for them it is only their hobby. Owning a horse is relatively expensive hobby compared for example to owning a dog. The modern trend is that the owners of horses become breeders to get some profit.

To run a profitable business with breeding animals, not only horses, it is necessary to observe many rules from microeconomics, macroeconomics, management, marketing, accounting, and also to have knowledge of animal breeding, genetics, animal ethology etc. But unfortunately, many breeders only want to profit from animals and they do not take welfare of animals into account.

The welfare of horses and especially stallions is often very poor and insufficient. The scientific information on how to keep horses in welfare is available for public but not followed enough. The reason for this situation is the fact that many breeders are conservative and use only traditional methods which were used in past. The traditional methods are profitable but they do not very often comply with welfare. This problem can be especially seen in stallion welfare.

# 2 OBJECTIVES OF THESIS AND METHODOLOGY

## Objectives of Thesis

The main objective of the bachelor thesis is to analyze costs and benefits of stallions living in different conditions- equine welfare and poor equine welfare, and to prove if the life of stallion in equine welfare is more profitable**.** Evidential differences will be disclosed by a mutual comparison.

The analysis focused mainly on the problem of stallion welfare as one of the important characteristics for the equine breeding business. The aim is to analyze main costs and benefits of stallions and to compare them in situation of welfare and non- welfare.

The next aim is to show the advantages and disadvantages to keep stallions in welfare which follows natural requirements of all horses not only stallions.

The final aim of the entire analysis is to summarize results and conclusions about studied topic and eventually provide relevant recommendations and suggestions.

## Methodology

Data for the theoretical part of the bachelor thesis were collected from the available professional sources focused on the topic of equine welfare and economic impacts of keeping stallions by extraction. As a source, appropriate books, web pages and magazines were used.

The practical part, based on synthesis and induction in problem resolution, uses economical methods for verification of theory in practice. SWOT Analysis and Cost-Benefit Analysis were selected as appropriate methods.

The SWOT Analysis factors were determined by deduction of processed data from the theoretical part.

Two self- prepared questionnaires for breeders of Akhal- Teke stallions were processed by qualitative and quantitative methods and provided all data for Cost- Benefit Analysis.

Calculations were processed in Microsoft Excel by using basic mathematical formulations, arithmetic averages, net value (Benefits – Costs) and efficiency (Benefits/ Costs). All currencies were converted to Euro by Cross Rates.

The results were compared both by using the value differences mainly expressed in percentages and qualitative methods based on differences between theory and data from the research.

# 3 LITERATURE OVERVIEW

## 3.1 Horse Population Worldwide and in the Czech Republic

The number of horse population worldwide is estimated at 59,232,378 in the year 2009 according to the Food and Agriculture Organization of the United Nations (FAOSTAT) statistics. The trend from the year 2000 to 2009 is increasing, exceptions are years 2002 and 2003. The assumption is that the number will still be increasing because of the current trend of keeping a horse as a hobby.

The table 1 shows the number of horse population worldwide from year 2000 to 2009.

**Table 1: Number of horse population in years 2000- 2009**

| Year | Horse Population |
|---|---|
| 2000 | 57,223,059 |
| 2001 | 57,242,068 |
| 2002 | 56,338,865 |
| 2003 | 57,146,823 |
| 2004 | 57,880,122 |
| 2005 | 58,827,190 |
| 2006 | 58,938,892 |
| 2007 | 59,083,104 |
| 2008 | 59,086,856 |
| 2009 | 59,232,378 |

Source: Own elaboration based on FAOSTAT data [1]

Ten countries in the world are estimated to be keeping more than 1 million of horses. The highest number of horses is in the USA with 9 500 000 items estimated in 2009 by FAOSTAT. The other countries with horse population over 1 million are China (6 823 360); Mexico (6 350 000); Brazil (5 496 820); Argentina (3 680 000); Columbia (2 505 580); Mongolia (2 221 300); Ethiopia (1 995 310); Kazakhstan (1 370 500); and Russian Federation (1 353 180).

In the Europe the main countries with the highest number of horses are already mentioned, Russian Federation is the only one country in Europe with horse population of over 1 million horses; Romania (820 000); Germany (545 000); Ukraine (465 800); France (453 483); and Great Britain (384 000). [1, 2]

## Horse Population in the Czech Republic

Keeping a horse has a long tradition in the Czech Republic. In the year 1993 the population was 18 792 horses. Since 2006 the trend in the increase of horse population is still growing. In the end of year 2010 the number of horses in the Czech Republic was 73 932**.** Out of that, 985were stallions and 21 592 were mares for breeding. Breeding stallions accounted for only 1.33 % of the whole population, breeding mares significantly more- 29. 21 %. The number of born foals was 4 390 in 2003, 4 408 in 2004, 4 060 in 2009 and 3 150 in 2010. On the average the number of born foals is decreasing in spite of increasing horse population in the Czech Republic.

## Import and Export in the Czech Republic

In the last few years the import of horses is higher than the export. In 2010 the import was 1 350 horses and the number of export horses was 820. Almost all exports and imports are through the EU countries, especially through Germany where the cooperation with the Czech Republic is the greatest.

More detailed information about import and export of all equines- horses, donkeys, mules and hinnies were founded by using the data from Custom Service - the foreign trade. The balances (export – import) were still negative in years 1996 - 2009, only in the year 1998 there was a positive balance. [3]

## 3.2 Utilization of Horses

The relationship between people and horses is known for a very long time and as the time goes on the horse changed its position next to the human. Cave paintings in Lascaux in France approximately 15 000 years old or hundreds of skeletal remains in Solutré in France provide some evidence of horses being used mainly as food during those times.

Domestication of horse came approximately 5000- 4000 years BC in steps around the Caspian and Black Sea and in the Middle Asia. The reason for domestication was to use horse's excellent movement abilities to help people. Initially, horses were used as draught animals and later they were used for riding and as a packhorse.

In the Middle Ages the horse was very useful and beneficial for every army in the wars. It was also indispensable in agriculture and transport. It really helped people with their work.

The expansion of modern technologies and machineries reduced utilization of horses. Nowadays horses are mainly used for pleasure as a hobby or a business. They are also used in ecology, pharmacy and industry. However in developing countries the horse is still indispensable in agriculture and as a packhorse. [4, 5]

Nowadays, a horse is mainly used for pleasure and commercially. The study from the American Horse Council from the year 2005 done by Deloitte Consulting LLP provides data on how are horses used in the USA – the table 2. It gives a total number of 9.2 million horses. The study includes horses used for racing, showing, competition, sport, breeding, recreation and work. The whole horse population is divided into 5 groups depending on horse activity. [6]

**Table 2: Division of Utilization of Horses in the USA**

| Activity | Number of horses |
|---|---|
| Recreation | 3,906,923 |
| Showing | 2,718,954 |
| Other* | 1,752,439 |
| Racing | 844,531 |
| **Total** | **9,222,847** |

Source: Own elaboration based on data [6]

* "Other" activities are farm and ranch work, rodeo, carriage horses, polo, police work, informal competitions, etc.

From the data of the table 2 it is significantly apparent that horses are mainly used for recreation and showing. And the result is valid almost in all modern countries. [6]

## 3.3 Specific Utilization of Stallions

### 3.3.1 Breeding

The main aim of utilization of stallions is breeding. But because almost all horses are kept by people it is necessary to use only the best stallions without any physical defects and with great character.

The reason is that because in the past when horses lived without any contact with people and run wild, only the strongest and most dominant stallion had a herd of mares which could breed. The herd was also made up of foals and youngsters, both fillies and colts. When the colts reached an age when they were old enough to breed they were very often expelled from the herd by the most dominant stallion because the colts were now rivals and competitors, but they were not strong enough to win. They had to find another herd with mares where there was a stallion they could defeat and appropriated the herd. The stallion always lived under stress because of fear of losing his position in the herd. Only the best stallions could survive and pass their genetic information to their offspring. It was natural selection of the best stallions.

In modern times stallions are not as stressed by having to fight for their position in the herd, but there is not natural selection anymore. The selection of a suitable stallion for

breeding is determined by humans. People have to use only the best stallions without any imperfections both physical and mental. The aim of all breeders should be to produce healthy and strong foals from excellent parents. [7]

### 3.3.2 Stallion as a Riding Horse

In the past, stallions were mainly used for riding. They are higher and stronger than mares which were used only for breeding. Also the body constitution is harder. Some special exercises as piaffe and passage (dressage elements) are based on natural stallion movements. It is very natural for stallions to show this. Stallions were used in the wars where they were able to learn to kill another horses because of their spontaneity.

Excellent stallion also represented a large fortune and a sign of strength for his owner. Stallions were very well appreciated and it was often a very good spoil of war. The price of excellent stallions was much higher than the price of excellent mares.

In some countries the trend to ride only on stallions still exists. The example is Iberian Peninsula where the only stallions are ridden because of their movement and body composition. Mares are kept mostly in herds in large pastures and they are used only for breeding. The breeding stallions are kept together with mares for spring months in the pastures to naturally breed from them.

But almost in all modern countries the riding tradition is different- for example in Germany or in the Czech Republic where both stallions and mares as well as geldings are ridden. The problem is that in many stables there is not enough space to keep stallions and mares together in one place in good welfare conditions. The riding centers do not have pastures for all horses or they are very limited and occupied by many mares and geldings together in a big herd. It is not possible to use it for some small herd of stallions together with geldings or only for one stallion. The consequence is that stallions are very often kept all the day only in boxes and used for one hour for riding. They are kept without any other contact with other horses. These conditions are really not good welfare for these stallions. [7,8]

## 3.4 Equine Welfare

### 3.4.1 Animal Welfare, Policy and Legislation

One of the most popular and used definition of **animal welfare** is 'five freedoms' defined by the Farm Animal Welfare Council (FAWC) in Britain during the 1970s.

"We believe that an animal's welfare, whether on farm, in transit, at market or at a place of slaughter should be considered in terms of 'five freedoms'. These freedoms define ideal states rather than standards for acceptable welfare. They form a logical and comprehensive framework for analysis of welfare within any system together with the steps and compromises necessary to safeguard and improve welfare within the proper constraints of an effective livestock industry.

**1. Freedom from Hunger and Thirst** - by ready access to fresh water and a diet to maintain full health and vigour.

**2. Freedom from Discomfort** - by providing an appropriate environment including shelter and a comfortable resting area.

**3. Freedom from Pain, Injury or Disease** - by prevention or rapid diagnosis and treatment.

**4. Freedom to Express Normal Behaviour** - by providing sufficient space, proper facilities and company of the animal's own kind.

**5. Freedom from Fear and Distress** - by ensuring conditions and treatment which avoid mental suffering. " [9]

Very different definition of animal welfare was written in the early 1980s in the Council for Agricultural Science and Technology (CAST). In the report was affirmed: "the necessary and sufficient conditions for attributing positive welfare to an animal were represented by the animals' productivity. A productive animal enjoyed positive welfare; a non-productive animal enjoyed poor welfare. " [10]

These two mentioned definitions are absolutely different and then it exists a huge number of other definitions. “And it is not possible to tell what definition is correct because we cannot do some researches or experiments and decided by these results. Which is correct, of course, cannot be decided by gathering facts or doing experiments – indeed, which ethical framework one adopts will in fact determine the shape of science studying animal welfare! ” [10]

The welfare science according to a definition from the FAWC should be focused on natural behaviours of animals and how to avoid or minimize their pain, fear, stress and discomfort of them. On the other hand CAST report science should be in what conditions-feed, bedding, etc. animals will be the most profitable. [10]

In every country the **policy and legislations** of animal welfare are very different. The concepts are based on definitions of animal welfare, mainly from 'five freedoms' from FAWC. Many countries define some legislation with many regulations, but there are still a lot of permissions which do not comply with the idea of 'five freedoms'. [10]

For example in the European Union the one of the first Protocols concerned with animal welfare which was officially signed by the European Union Member States was mentioned in The Treaty of Amsterdam 1997:

"The High Contracting Parties,
Desiring to ensure improved protection and respect for the welfare of animals as sentient beings, have agreed upon the following provision, which shall be annexed to the Treaty establishing the European Community, in formulating and implementing the Community's agricultural, transport, internal market and research policies, the Community and the Member States shall pay full regard to the welfare requirements of animals, while respecting the legislative or administrative provisions and customs of the Member States relating in particular to religious rites, cultural traditions and regional heritage".[11]

The Protocol became effective from the 1st May 1999. Firstly it was mentioned and signed that animal is sentient being and it needs to be protected and use welfare by humans. But what is missing is the legal basis for creating a united legislation in EU. The Protocol also permits Member States to do own national legislations which follow their national traditions. By this the Protocol allows the national animal activities such as animal welfare in circuses, equine competitions, greyhound racing, hunting with hounds, and

bullfighting because of the tradition, but it shows a lot of poor welfare. But the base for animal welfare should still be the same. [11]

### 3.4.2 Definition of Equine Welfare, Specifics and Utilization in Practice

The **definition of equine welfare is** worldwide very often based on 'five freedoms' (FAWC). The reason is that for the vast majority of people horse is an animal for pleasure not an animal for food. Equine industry exists, but only a small number of people knows about it. To use for example CAST report is not possible or only very limitedly for equine welfare nowadays. In past when the horse was a livestock was possible to use it.

Bernard Rollin said in his talk to the American Association of Equine Practitioners (AAEP) in the early 1990s: "One can have racing without racing horses who are not biologically ready and without drug abuse; one can have horse training which works with the horse's nature, and not against it, brutally bending it to our will (such training is in any event more beautiful and elegant). One can have horse shows that celebrate and exhibit the horse's *telos*, not our skill at abusive artifice. One can enjoy the horse for what it is, and what we can perfect genetically and environmentally, not for our unfortunate skill in putting square pegs into round holes. In conclusion, I would argue that we should keep as our root metaphor what must surely have informed the ancient vision of the centaur, the symbiotic unity of man and animal, mutually interdependent, rising to heights neither could scale alone." [10]

To apply equine welfare theory in practice it is important to base it on animal welfare definitions already stated and all other available verified researches and knowledges about horse and its natural physiological and mental habits. The starting point is 'five freedoms' from FAWC- freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express normal behaviour and freedom from fear and distress. [10]

## Freedom from Hunger and Thirst

Nowadays the traditional horse feed ration consists of the three main items- green fodder, hay and racy feed. The amount and proportion of these three items depends on the horse size, breed, age and of course utilization of the horse. Some horses also need some feed supplements such as minerals, joint care for older ones or electrolytes before and after competitions. In past wild horses found out all necessary feed, minerals and vitamins in their natural environment, but nowadays horses kept by people have limited sources of feed and demands on the horse in sport are high.

In their natural habitat a horse can eat for the whole day small portions of feed (especially grass or hay) and their digestive tract is adapted for it. Feeding a horse twice a day which is very common habit is not sufficient. A horse has to eat a long time and slowly to well process the feed. As an example 1 kg of hay is processed by the horse in 40 minutes compared of processing 1kg of oats in 10 minutes. To feed a horse from the ground is also more natural and healthier than from the manger often situated at the height of horse's shoulder.

The horse also needs a lot of saliva when it is eating so the permanent access to clean and fresh water is indispensable. Water consumption for 500 kilograms weight horse is 30- 50 litres per day. It depends on the weather, temperature and also how much the horse works.

Horses have to been kept in good nutritional conditions. Both undernourishment and obesity are not desirable and they can cause many health problems. But it is necessary to be careful in the evaluation of horse body condition because of the breed differences of body constitution. The age of the horse is also an important parameter. [7, 12, 13]

## Freedom from Discomfort

The meaning of the Freedom from Discomfort is to provide a suitable environment for horses including shelter and place for rest. These days horses are kept mainly in their stables for some part of the day and especially at night and for the rest of the time they are in the pastures or paddocks. As an example in the Czech Republic in ecological agriculture it is prohibited to keep horses only in the stables without any possibilities to let them out on the pasture or paddock. But in many sports and riding stables in this country and also

worldwide the free movement of horses in the pastures or paddock does not exist or it is very limited both by size of pastures and large number of horses. But the free movement is one of the main natural requirements for horses. To keep a horse in the pasture at least for some part of the day is the most natural and economically favourable both for horses and breeders.

The main conditions for stabling are the elimination of all possibilities to injure a horse and also to comply with behavioural requirements of horses. In the stables it is necessary to have the optimal conditions such as temperature (optimally 6- 16 °C), humidity (60- 80%) and very good ventilation. The minimal size for stabling one horse is very often mentioned as 3 x 3 or 4 x 4 metres but it of course depends on the height of the horse. The types of stabling are traditional stabling where each horse has a single stable; barn stabling where several horses are stabled in one large space; binding stabling where the horse cannot move a lot and which is really not welfare. The next possibility is keeping horses out on the pasture with some shelter which is good welfare but it is necessary to respect basic rules for example as permanent access to fresh water throughout the year, also in the winter or to have an alternative stable in case of illness of horse or some really bad weather conditions. [7, 13]

**Freedom from Pain, Injury or Disease**

The mission of the third Freedom is to provide and keep horses in safe conditions and thus eliminate possible pain and injuries caused by human negligence. Riding horses have to take a saddle, bridle with bit and other equipments as knee guards, bandages etc. All this equipment when not well fitted can cause pain. It is necessary to use only very well fitted equipment and check it regularly.

While working with horses it is essential to use only the force that can not cause any pain. The spurs, bits, whips and other equipment should be only auxiliary and warning tools not punishing for a horse.

It is also necessary to maintain horse hooves in good conditions. We can keep horses without or with shoes but it is more natural for a horse to be without shoes although in some cases horse shoeing is necessary. Hooves need some corrections done by farrier every 6- 8 weeks on average. Before and after any work with a horse we have to check and

remove all stones and dirt from the hooves by using hoof pick. For healthy and elastic hooves the moisture from water is indispensable.

When the horse gets sick in spite of all care we have to provide a sufficient medical treatment under the supervision of a veterinarian immediately. To find a cause of injury or disease is good for future prevention. [7]

**Freedom to Express Normal Behaviour**

The basic natural requirement for horses is movement in the fresh air and contact with other horse in the work herd. Being in the work herd means that every horse knows its position and all horses are members of the group, no horse is oppressed by the herd. This condition can be valid only if the space where the horses are kept together is large enough. The literature states the dimension 0.4 hectare per 3 horses for paddock used only for a few hours a day but for year- round pasture 0.5 or 1 hectare per one horse is necessary.

Maximum size of the herd depends on the size of the place where the horses are held. Horses are also very friendly and they make relationship with each other. It is not good to have a herd with odd number of horses. The odd horse may not have a partner and could be oppressed by other members of the herd. The herd should be stable and it is not good to make changes if it is not absolutely necessary. Horses do not like changes.

A horse held without any other horses will suffer both physically and mentally! And it could be dangerous for people because it will try to for example play with humans as their horse colleagues. All foals have to grow up with other horses to learn an equine language and to know how the herd and positions in it work. [7, 13]

**Freedom from Fear and Distress**

Some points to prevent fear and distress of horses were already mentioned. The main items are good working herd where every horse has its friend. Horses also need some mental work to not be bored and especially horses kept in the stables without any or very limited possibility to be on pasture with each other may have a mental problems. They can started to get some bad habits such as weaving, crib biting, wind sucking, wood chewing and stall walking.

To stress a horse is very easy if we want it to do some exercises which it does not know or if it does not understand us in spite of very horse opened and assiduous character. When the work with horses is systematic, conscientious, calm and understandable for them and the requirements are adequate to age, current knowledge and physical fitness horses like communication and work with humans. [7, 14]

### 3.4.3 Summary of Equine Welfare

**Table 3: Summary of Equine welfare**

| | |
|---|---|
| Freedom from Hunger and Thirst | • Unlimited access of hay and clean fresh water<br>• Feed a horse by concentrated feed 3- 5x per a day<br>• Feed from the ground<br>• Good quality pasture |
| Freedom from Discomfort | • Size of boxes at least 3x 3 or 4x 4 metres<br>• Optimal temperature, humidity and<br>• ventilation in stables<br>• Free movement on the pasture or paddock |
| Freedom from Pain, Injury or Disease | • Eliminate all possible injures caused by human negligence<br>• Use only fitting equipment<br>• Check and remove hooves regularly and have corrections done by farrier<br>• Provide first aid for injuries and illnesses |
| Freedom to Express Normal Behaviour | • Movement in the fresh air<br>• Sufficient size of pasture or paddock<br>• Good working herd with even number of horses |
| Freedom from Fear and Distress | • Requirements from people adequate to horse age, current knowledge and physical fitness |

Source: Own elaboration based on literature review

The table 3 summarizes all main points of equine welfare based on 'five freedoms' from FAWC for clear arrangement.

### 3.4.4 Stallion Welfare

**Differences of Keeping a Stallion**

Stallion welfare is one specific part of equine welfare which is not very often known and mentioned but the basics are absolutely the same for all horses. It does not matter on their sex. But there are some rules which have to be strictly respected but it is not possible to limit stallions in their natural requirements. A lot of stallions are kept in absolutely poor welfare. There are many stereotypes and traditions from the past. But nowadays with all definitions of welfare and researches and behavioural knowledge also with unlimited possibilities to find out much information through the internet or a lot published professional books it is very startling that stallion welfare is too poor and there is only low legislation. The topic is also very controversial and people who want to enforce better conditions for stallions are very often negatively accepted by the other breeders because of the rooted stereotypes. [7, 8, 13]

**Traditional way of keeping a stallion**

The main difference between keeping a stallion or mare and gelding is that the stallion is often mainly in the stable in its own box without any physical contact with other horses and unfortunately sometimes without any eye contact with other horses. Stallions do not spend any time in pastures or paddocks or the time is only very limited- about 2- 3 hours per day. If they are out, stallions are almost always kept individually. Sometimes they are completely separated, but sometimes they can have some eye and physical contact with other stallions and geldings over the fencing system. If they are not let out they work one hour on the lounge or under the saddle every day. People very often say the horse is working every day, so it is all right but they often do not realize how long the horse is in the box. If the horse works one day in the morning at 9 o'clock for one hour under the saddle and next day it works in the evening at 6 o'clock it spends about 32 hours in the box- in such a very limited space for the horse! Firstly, these are really not natural conditions for horses and secondly, people want after many hours a good work from a horse which is very stiff and not relaxed because of very limited possibility of movement in the box.

There are a lot of reasons why stallions are kept in poor welfare, but there are two main causes. The first thing which many breeders accepted is that the excellent breeding stallion is very expensive. It depends on the breed, age, sport performance and other factors. The price can be from thousands of Euros up to millions of Euros. But the average prices of stallions are higher than the prices of mares or geldings. And because of the prices of stallion many breeders do not want to let it out especially not with other horses to the paddock or pasture. The breeders are scared that the horse could induce some injury and the price of the horse will decrease. The argument is right per se, but it is not possible to accept it in relation to equine welfare.

The second main problem the breeders feel is that stallions cannot be kept in pasture together with other stallions or geldings. The principle exists because breeders also mainly want to eliminate stallion injuries. But a lot of breeders also say that stallions kill each other. It is basically not true. There are some stallions which are not able to be together with other horses, but it is really very rare. Respecting basic rules it is common in already many stables worldwide to keep stallions together with other horses without any problems. [7, 8, 13]

**Main Rules of Keeping a Stallion**

The rules which have to be strictly respected when a breeder wants to keep a stallion are:

- Stallion has to be well educated, respect people and have good manners. The manipulation has to be easy and not dangerous. This is really main rule which reduce injuries of both people and other horses when we are working with stallions.

- Only educated people can manipulate with stallion- not children!

- Stallion cannot spend any time together with the mares if the breeder does not want to have a foal.

- Stallion has same natural requirements for living as mares and geldings. It is poor welfare if it is kept only in a box without any physical or eye contact with other horses.

- Stallions can be and should be kept in pastures or paddocks with other stallions or geldings. It is important to be careful to build a herd and select the individuals to the herd. But unfortunately some stallions, very often kept for a long time alone, are not able to live with other stallions or gelding. But they can still have at least eye contact with other horses!

- Every stallion is individuality and it is necessary to keep and work with it as well as we are able to do it. To keep stallions is more difficult than mares and geldings but it is not a reason why to keep them in poor welfare! [7, 8, 15]

**Summary of Stallion Welfare**

To keep stallions in equine welfare it is necessary to base it on the definitions of animal welfare- the most frequently used definition is 'five freedoms' defined by the Farm Animal Welfare Council (FAWC) in Britain during the 1970s. The next step is to implement some specifics of keeping a stallion, already mentioned in the previous chapter, to be in good welfare and to realize that to own a stallion is often a business where the breeders want to make a profit, but the priority should always be the stallion which should be in excellent physical and mental condition and which should be kept in good environment. [7, 8, 10, 15]

# 4 ECONOMIC COMPARATIVE STUDY OF STALLION WELFARE AND NON- WELFARE

Literature overview provides theory of studied topic. The economic comparison study of stallion welfare and non- welfare is focused on theory used in real practice.

The SWOT Analysis of stallion welfare aim is through the theory point out the internal and external factors which can influence the breeders especially in non- monetary items and show them where strengths and opportunities and also weaknesses and threats are.

The Cost- Benefit Analysis aim is to compare the profitability of stallions in good welfare in contrast to stallions kept in poor welfare. The assumption based on the theory is that the good stallion welfare costs are from economic point of view lower than in poor stallion welfare. The benefits, especially non- monetary items are assumed to be higher in welfare compared to non- welfare living stallions.

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## 4.1 SWOT Analysis

**Table 4: Swot Analysis of Stallion Welfare**

| SWOT Analysis of Stallion Welfare | |
|---|---|
| **Internal** | **External** |
| Strengths | Opportunities |
| • Free movement of stallion on pastures or in paddocks and physical contact with other horses→ better physical and mental condition of stallion<br>• Lower costs than in traditional stabling of stallions<br>• Low necessity of labour force- e. g. no mucking every day | • Lack of this type of stabling stallions- new business<br>• Increasing interest to keep animals in welfare<br>• Public support to better protection and keeping of all animals included also stallions |
| Weaknesses | Threats |
| • Necessity to have or rent lands for pastures or paddocks<br>• Higher possibility stallions can leave themselves or by human inattention from the pastures or paddocks than from stables→ higher risk of injuries<br>• Higher possibility of injuries from the other horses | • Higher risk of stallion leaving pastures or paddocks because of external effects- unfavourable weather conditions, rioters<br>• Higher risk of stealing or poisoning a stallion<br>• Many opponents to keep stallions in good welfare( e. g. in the herd)<br>• No uniform laws worldwide |

Source: Own elaboration based on literature review

The SWOT analysis - the table 4 shows the internal strengths and weaknesses and external opportunities and threats of stallion welfare. It is a good complement for Cost-Benefit Analysis. The SWOT analysis gives the other facet for analysing if it is advantageous for the breeders and their business to keep stallions in welfare appointing strengths and opportunities and show where there are weaknesses and threats and gives the opportunity to make up how to eliminate them.

## 4.2 Cost- Benefit Analysis

Cost- Benefit Analysis (CBA) is methodological procedure used for evaluation of total costs of a business or project compared to the total benefits. For the costs and benefits it is necessary to identify both monetary and non- monetary items and then evaluate and quantify them. All monetary and non- monetary costs and benefits have to be converted to the same measurement value. The output of analysis suggests whether the evaluated business or project is worthwhile. The cost- benefit analysis is relatively easy method for processing but the problem is that very often it is very difficult to transfer non- monetary items to the equal measurement value as monetary items and have to be sometimes evaluated by qualitative methods. This problematic does often occur when we transfer benefits rather than costs.

The aim of the comparison of cost- benefit analyses of stallions in welfare compared to stallions living in non- welfare is to ascertain what type of stabling is more advantageous from an economical point of view and thus cheaper for breeders. The case study does not solve the ethical aspects of stallion breeding in poor welfare when gathering and processing data. The research only evaluates and compares the total costs and benefits of both conditions of living for stallions. The data for the research were gathered from the two questionnaires created for the purpose of this case study. [16, 17]

### 4.2.1 Expected Results

The expected result from the research which is based on the theory of welfare and non-welfare is that the costs of the stallions kept in good welfare conditions are lower than the costs of the stallions living in non- welfare conditions. From the theory the difference should be caused by for example elimination of using the stables– elimination of bedding and lower consumption of concentrated feeding. This is because stallions kept in good welfare conditions can be grazing in pasture as much as possible and can also take other advantages of these natural conditions. It means they will not need any or only a lower amount of concentrated feeding because they will be able to get all the minerals, vitamins and energy from the pasture which is the most natural feed for horses together with hay. Stallions used mainly for breeding will probably not need any horseshoes because their

hooves will be stimulated in the pasture and they will work better and more naturally so there is also expectation to save some costs. But it is important to point out that all these mentioned theory opinions do not necessarily apply to all stallions because every stallion is different and has different needs.

The expected benefits in this level of research are approximately the same for welfare and non- welfare kept stallions- mainly from the stud fees or born foals if the breeder owns both stallion and mare. The reason for the similar level of benefits is that stallions in the research are mainly used for breeding and both welfare and non- welfare stallions are able to breed mares and have an offspring. The difference should be expected, for example, in the quality of seminal fluid. Quality of seminal fluid is mainly determined by individual characteristics of the stallion, but also some external factors such as feeding as well as mental condition influence the quality of semen. But to confirm the theory it would be necessary to do exact tests of quality of sperm of each stallion in the research which is really very expensive. However, from the gathered data for this research it will not be possible to do very accurate analysis of this problem. [18]

### 4.2.2 Data Gathering of Questionnaires

#### Basic Information about Questionnaires

Comparison of Cost- Benefit Analyses of stallions in welfare compared to stallions in non- welfare is based on data from the two questionnaires which were created to provide data which are necessary for the research. The data were provided by and then collected from the owners and breeders of pure- breed Akhal- teke breeding stallions from around the world. It was sent to 40 random owners and breeders of Akhal- teke breeding stallions by e- mail. The contacts to the breeders were founded through the internet website of Czech Akhal Teke Association (www.achalteke.cz). The e- mail consists of an introduction letter, power point presentation giving basic information about the bachelor thesis and two questionnaires with detailed guidelines how to complete it. (Appendix 1, 2)

For the research it was chosen only one breed of horse- Akhal- Teke to provide more accurate results. Each breed is unique and has for example specific feed requirements or the difference of price scale of breeding fee is for the breed minimal with of course some deviations because of excellent stallions or on the other hand poor stallions.

Other reasons to choose Akhal- Teke was it is really very rare and unique breed which is not very well known. But the main reason is only my own preference of this breed and also friendly contacts to breeders of Akhal- Teke.

The questions for the questionnaires were created to provide basic data for use in the research which will be sufficient and they will have an interpretative value. The aim of the questionnaires was not to gather as much data as possible but only the main data which will be necessary to provide valid results.

**Questionnaire – Welfare and Non- welfare Division of Stallions**

The first questionnaire is used for dividing conditions of stallions life into two groups, welfare and non- welfare. It has two parts: basic information about the breeder and the stallion and part with nine questions which is focused on the basic needs of the horses based on 'five freedoms' defined by the Farm Animal Welfare Council already written in the literature overview and a second part including also nine questions more concentrated on welfare or non- welfare breeding and handling of stallions. The main aim of this questionnaire is to use the data to divide stallions into welfare or non- welfare groups and also to discover how and in what type of living conditions are Akhal- teke stallions breed. Splitting the stallions into groups is necessary, as this principle will be used in the second questionnaire which collects data for a cost- benefit analysis which compares the costs and the incomes of the two division groups. (Appendix 1)

**Questionnaire- Cost- Benefit Analysis**

The second questionnaire collects the data for a cost- benefit analysis. It consists of three parts. In the first part there are basic questions about the breeder, stallion and main breeding information about the stallion in the breeding year 2010/2011 (all costs, benefits

and breeding in 2010, but born of the foal in 2011) as well as the currency used in the country where the stallion is kept. This part has seven questions.

The previous two parts cover costs and benefits of the stallion. All answers are expressed in prices per month or year in the currency which is specified in the first part of the questionnaire. The costs part has nine questions and includes all costs for food, water, feeding supplements, veterinary examinations, vaccinations, worming and medicals, special veterinary examination for stallions- AIE and CEM, treatment of hooves and shoeing, bedding, training of the horses and item other costs. The benefits part has only six questions: incomes from breeding, sold foals, winning exhibitions and competitions and income from the state subsidies and other incomes. (Appendix 2)

These benefits do not contain benefits that cannot be evaluated easily monetarily which in the opinion of the author may prevail. These benefits will be mentioned in the summary of the analysis.

### 4.2.3 Data processing of Questionnaires

24 from the 40 addressed breeders and owners of Akhal- teke breeding stallions filled in the questionnaires. Eight breeders answered that they do not want to participate in the research because they do not want to provide the data which are included in the questionnaires in spite of the option of not having to provide any name of breeder or stallion in the research and use the completed questionnaires only for my own needs for the research. Eight breeders did not answer at all. Sample consists of 24 stallions from the Czech Republic, USA, Canada, Denmark, Germany and France.

For the research there were used questions which covered sensitive data such as the costs of the feeding, incomes from breeding etc. Every breeder or owner had the option to withhold that the data which were provided for this bachelor thesis were only for my own processing and could not be made public or shown to anybody else. This was requested by 20 breeders out of 24 (83 %). Therefore, the results do not contain any names of the breeders or stallions or any information which could damage the breeders.

The number of the breeding stallions of Akhal- Teke was 406 in 2009 in Akhal-Teke Sire Catalogue Studbooks 2009. The sample size was determined with 95 %

confidence level and confidence interval of 22 so the sample size needed is 20. The sample size is relatively small, but the reason is that many breeders or owners have more than one breeding stallion. As an example the breeder Petra Marešová, Farm Achalteke Tukleky from the Czech Republic has five breeding stallions. And using more stallions from one breeder for the research is not useful because the conditions of stallion life and costs and benefits would be almost same for these stallions.

Some parts of the questionnaires especially about breeding were not used. They will be used for further research in future. [18]

## Processing of Questionnaire – Welfare and Non- welfare division of Stallions- Conditions for Stallions Divisions

The first step of the research processing was to divide stallions into groups welfare or non- welfare from the first questionnaire. The conditions for division were determined from the first part of the questionnaire following:

The stallion could be classified in the welfare group when at least five questions out of ten (in questionnaire nine questions- but first question has two parts) were completed as "Yes". The other conditions for welfare classification were that questions number one, three and five had to be also filled as "Yes". Question number one had some more specific conditions attached. To fulfill requirements of welfare a stallions had to be more than 10 hours a day on the pasture or in the paddock and it had to have a shelter in Question one. In summary of all the conditions the stallions were classified to welfare when they fulfilled this mathematical statement:

$$n^*(Q=\text{“Yes”}) \geq 5 \wedge (Q1a=\text{“Yes”}) \wedge (Q1a \geq 10H) \wedge (Q1b=\text{“Yes”}) \wedge (Q3=\text{“Yes”}) \wedge (Q5=\text{“Yes”})$$

n*Q……..... Number of questions

Q1a…… Question number one part one

H…… Hours

Q1b…… Question number one part two

Q3 ……. Question number three

Q5 ……. Question number five

**Results**

After processing the gathered data from the questionnaire the result was 14 stallions in welfare and 10 stallions in non- welfare conditions and then it was randomly chosen 10 welfare and all sample of 10 non- welfare living stallions. All the processed data are researched for the Cost- Benefit Analyses from the sample of 20 stallions, not 24 stallions. 20 examined stallions (confidence level: 95 %, confidence interval 22) divided into groups welfare and non-welfare per 10 in each one were selected as a sufficient sample size for the next research- Cost- Benefit analysis.

### 4.2.4 Processing of Cost- Benefit Analysis

**Processing of Questionnaire- Cost- Benefit Analysis**

The data for the Cost- Benefit Analyses were processed from the second questionnaire (Appendix 2). The number of sample was 20 stallions- 10 stallions in welfare and 10 stallions in non- welfare. The division was determined according to the gathered and processed data from the first questionnaire (Appendix 1).

In the research the period of study was selected only as one year namely 2010. But the data for benefits- born foals were also from 2011. The reason is that breeding season starts in the spring so the stallion impregnated mares in spring 2010 but the benefit- born foal will be known after approximately 11 months thus in spring 2011.

The next step was to evaluate and count total costs and total benefits. Some costs in the questionnaire were counted as the cost per one month some as the cost per one year, so it was necessary to count all data as value per one year. The questionnaire was intended for different countries (the Czech Republic, USA, Canada, Denmark, Germany and France),

therefore, it was necessary to convert all foreign currencies to one. The selected currency for the research was chosen Euro. All other currencies were converted by using cross rates from the 26th of February 2012. The table 5 shows the cross rates of necessary currencies.

**Table 5: Cross Rates of Selected Currencies**

| Cross Rates | |
|---|---|
| | EUR |
| 1 USD | 0.74365 |
| Inverse: | 1.34472 |
| 1 EUR | 1.00000 |
| Inverse: | 1.00000 |
| 1 GBP | 1.18058 |
| Inverse: | 0.84704 |
| 1 CZK | 0.04001 |
| Inverse: | 24.9956 |
| 1 DKK | 0.13448 |
| Inverse: | 7.43623 |
| 1 CAD | 0.74398 |
| Inverse: | 1.34411 |
| 2012-02-26 16:51 UTC | |

Source: Own elaboration based on XE Quick Cross Rate data [20]

## 4.3 Results from the research

### 4.3.1 Costs

**Table 6: Averages Costs per year 2010 in welfare and non- welfare**

| Average Costs per year 2010 ( EUR) | | | |
|---|---|---|---|
| | Welfare | Non- Welfare | Difference* in % |
| **Feed and Water** | 723.22 | 851.35 | **15.05** |
| **Hay** | 622.58 | 647.91 | **3.91** |
| **Supplements** | 580.08 | 638.94 | **9.21** |
| **Veterinary examination, vaccination, worming and medicals** | 141.97 | 152.07 | **6.64** |
| **Special veterinary examination for stallions- AIE and CEM** | 47.21 | 39.24 | **-20.31** |
| **Treatment of hooves and shoeing** | 157.04 | 264.56 | **40.64** |
| **Bedding** | 204.42 | 450.29 | **54.60** |
| **Training of the horse** | 520.17 | 470.12 | **-10.65** |
| **Other payments** | 0.00 | 0.00 | **0.00** |
| **Sum of Averages** | **2996.69** | **3514.48** | **14.73** |

Source: Own elaboration based on data from own questionnaire

*The difference is calculated from the base values of non- welfare→ (Non-Welfare-Welfare)/Non- Welfare*100

After processing data from the second questionnaire the table 6 shows the results for average total costs per year 2010 per one stallion which are 2,996.69 € in welfare and 3,514.48 € in non- welfare, the difference between the values is 14.73 %. There are significant differences between each evaluated costs. The highest differences between welfare and non-welfare, cases where the welfare is significantly cheaper are in **bedding** (54.6 %), followed by **treatment of hooves and shoeing** (40.64 %) and **feed and water** (15.05 %). In two measured items- **special veterinary examination for stallions- AIE and CEM** and **training of the horse** the average costs are lower for stallions in non-welfare conditions.

**Feed and water** in both welfare and non- welfare of stallions is the most expensive item of all total average costs. Feed and water form almost 25 % from the total costs in both division groups. The average price in welfare is 723.22 € and 851.35 €.
The difference is 15.05 % which is mainly caused by welfare stallion lower needs for concentrated feed.

**Hay** is the item with the lowest difference between the welfare and non- welfare. The average price in welfare is 622.58 and in non- welfare 647.91. The difference is 3.91 %. The difference is relatively small in spite of the possibility of a stallion in welfare being able to eat a grass. The reason for that is that the horses in welfare are outside every day in the winter and they need to eat a hay to warm up. The consumption of hay is for equine welfare in winter higher than in summer or for horses kept only in the stables.

The item **supplements** has also one of the most expensive costs. The average price in welfare is 580.08 € and 638.94 € in non- welfare with the difference 9.21 %. The stallion has to be in excellent condition especially in breeding season and the supplements can for example complete lack of vitamins or minerals.

**Veterinary examination, vaccination, worming and medicals** is the item where only the average prices of basic veterinarian operations were counted. If the stallion has to be operated because of some injury the cost is much higher than the averages from the questionnaire, but in the research breeders did not note the stallion had some extra costs in this item. The average price in welfare is 141.97 € and in non- welfare 152.07 €. The difference is 6.64 %. In the level of the research it is not possible to determine whether the difference is caused by some exact reason from one type of breeding of stallions. The prices are different especially because of the various prices of veterinarian work.

For the first value where the average price is higher in welfare - **special veterinary examination for stallions- AIE and CEM** the reason for the highest price is not caused by differences in keeping stallions. The average price for special veterinary examination per year is 47.21 € in welfare and 39.24 € in non- welfare. The difference is 20.31 % higher than the average price in welfare. The price of veterinary examination for stallions is determined by veterinary surgeon and it could be different in some countries and the price can also vary in only one country. The example was two prices from the same country from the questionnaire where the difference in price differed by 24 %.

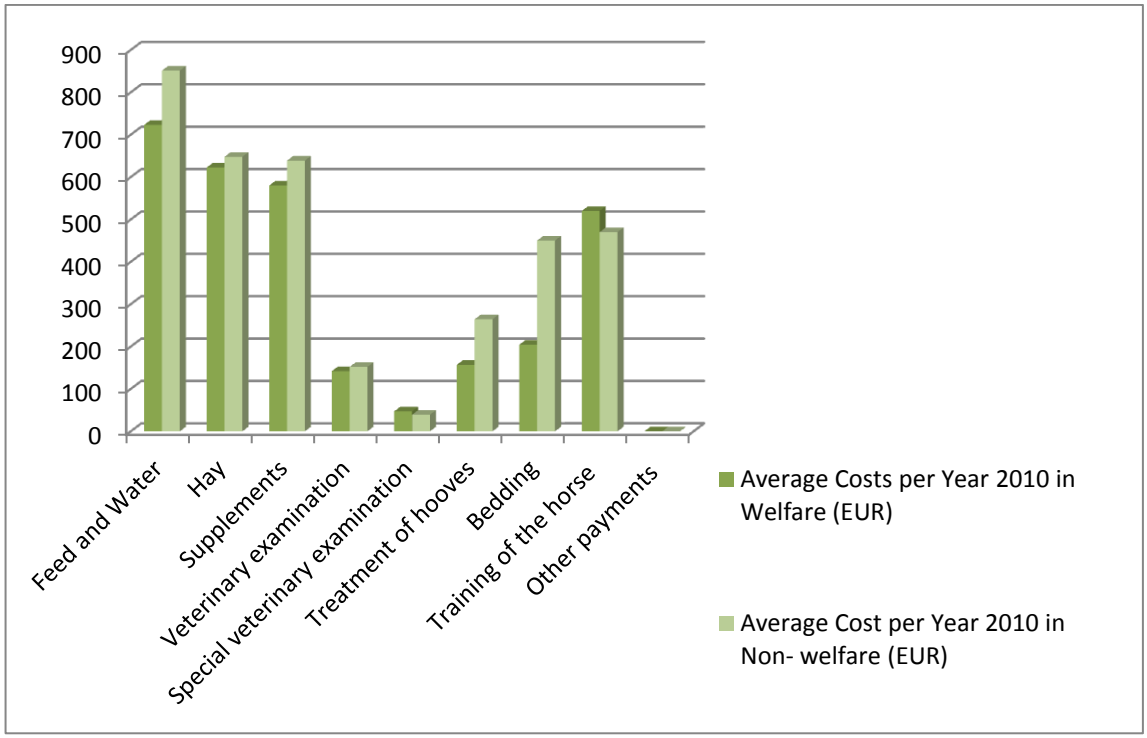
**Treatment of hooves and shoeing** is the item with the second highest difference- the average price in welfare is 40.64 % lower than in non- welfare. The average prices are 157.04 € in welfare and 264.56 € in non- welfare. The reason is that the stallions living at least 10 hours outside every day walk significantly more and the hooves are naturally abrade and all mechanisms in the hoof work when a horse has a lot of movement and it also very often does not need any shoeing because the hooves which are regularly strained are hardy and they only sometimes need some corrections.

The highest difference 54.60 % where the welfare is significantly cheaper is in the item **bedding.** The average price in welfare is 204.42 € and 450.29 in non- welfare. The high difference was expected. The consumption of bedding is higher for stallions kept in the stables where it is necessary for daily use compared stallions in welfare where they are outside and do not need any bedding except sometimes in the winter in their shelter. The difference should be higher when all examined stallions in welfare live outside all the time and are not be stabled at night.

The costs of **training of the horse** in welfare was evaluated by average price of 520.17 € and in non- welfare the average price was 470.12 €. The price of training in welfare is 10.65 % higher than in non- welfare. The data from the questionnaires showed the training of all stallions was conducted approximately 2 times a month with an equestrian trainer. It is also not possible to evaluate the result as it is caused by welfare. The training of a horse can be influenced by many factors such as feeding, physical and mental conditions etc. The stallion in welfare has significantly better initial conditions for training. If the horse spends every day more than 10 hours a day in the paddock or on the pasture its physical condition is better and the stallion muscles are relaxed compared to a stallion which spends about 23 hours per day in the stable with limited movement. The difference between averages of price is caused by different prices of the equestrian trainer. It depends on the level of education of the trainer and also on the level of horse skills. The prices for one hour training varied from 10 € up to 25 € and the highest price came from one stallion in welfare.

Item **other payments** were not supplied in any questionnaire of the sample of 20 stallions. [7, 13]

**Chart 1: Bar chart of comparison of costs in welfare and non- welfare**




Source: Own elaboration based on data from own questionnaire

The chart 1 ilustrated cost differences of individual analyzed items in welfare and non- welfare from the processed data from the questionnaire.

### 4.3.2 Benefits

**Table 7: Results of Benefits**

| Benefits* in Year 2010 (2011*) for stallions (EUR) | | | |
|---|---|---|---|
| **Stallions** | **Welfare** | **Stallions** | **Non- Welfare** |
| Stallion 1 | 6,875.54 | Stallion 11 | 2,602.78 |
| Stallion 2 | 0.00 | Stallion 12 | 0.00 |
| Stallion 3 | 4,345.28 | Stallion 13 | 0.00 |
| Stallion 4 | 4,233.73 | Stallion 14 | 6,350.61 |
| Stallion 5 | 743.65 | Stallion 15 | 0.00 |
| Stallion 6 | 0.00 | Stallion 16 | 4,233.73 |
| Stallion 7 | 10,023.66 | Stallion 17 | 2,116.87 |
| Stallion 8 | 1,487.3 | Stallion 18 | 0.00 |
| Stallion 9 | 0.00 | Stallion 19 | 2,116.87 |
| Stallion 10 | 2,116.87 | Stallion 20 | 12,675.12 |
| **Average** | **2,982.603** | **Average** | **3,009.598** |

Source: Own elaboration based on data from own questionnaire

***** Do not contain benefits that cannot be evaluated easily monetarily; breeding year 2010/2011 (all costs, benefits and breeding in 2010, but born of the foal in 2011)

In the table 7 the results of the benefits of the sample of 20 stallions are very different. The average benefit was higher 0.89 % in non- welfare. The values of benefits varied from 0 € to 10,023.66 € per breeding year 2010/ 2011. The evaluation of the gathered data to the monetary items was difficult. It was necessary to set some conditions on how to evaluate and transform benefits to the monetary items. Seven stallions did not have any benefits from the completed questionnaire. The other benefits were incomes from breeding, sold foals or other activities as loaning out a horse for riding.

The first two questions from the questionnaire- **incomes from breeding** were evaluated easily, but not many breeders had any benefits asked about in these two questions- only 5 breeders (25%). The reason is that they owned both the stallion and the mare and they did not do any breeding without their own mare. It is a standard practice especially with young stallions to keep them for the first one or two breeding seasons in order to breed from their own mares and have offspring from the stallion earlier than it would be otherwise. The benefits from the payments varied from 371.83 € to 1,200.30 €.

The main problem was that 7 breeders also owned the mare and the only benefit from the stallion was the born foals and they did not answer question three- **average income from the born foal sold in 6 months** because they wanted to keep the foal for their own purposes. It was necessary to determine the benefits of these foals. The benefit was counted as sum of all indicated prices of average income from the born foal sold in 6 months divided by the number of these indicated prices. But because all these breeders owned both the stallion and the mare the benefit was divided by two. This number was determined as benefit from one foal in cases where there were no exact prices given in the questionnaire. The mathematical statement is:

$$P = (\sum Q3a / n*Q3a)/ 2$$

P……. Average price of 6 months old foal in EUR
Q3a…… Question number three part one in EUR
n*Q3a …… Number of questions number three part one

The result was: **P= 2,116.87 €**

The value P= 2,116.87 € was counted to the benefits in the stallion 1 (1 foal), stallion 4 (2*P- 2 foals), stallion 10 (1 foal), stallion 14 (3*P- 3 foals), stallion 16 (2*P- 2 foals), stallion 17 (1 foal) and stallion 19 (1 foal).

On the level of the research to determine the price of the 6 months old foal there are no significant differences between keeping stallions in welfare and non- welfare. The price was determined from all appropriate sample data.

There were no benefits at all in questions number four and five. None of the breeders supplied any **incomes from winning the exhibitions and competitions,** but it is certain that when a stallion wins an exhibition its price goes up because of the excellent evaluation and potential. But the Akhal- Teke is a rare breed and there are not a lot of exhibitions for them. **Financial support from the state or some organizations for stallion** did not offer any monetary help.

The last item **other benefits and incomes from the stallion** was not very often filled in. Only 4 breeders had some other benefits. It was only loaning a horse for riding.

### 4.3.3 Comparison of Stallion Welfare and Non-welfare

The average cost of ten stallions in welfare for year 2010 was 2,996.691 € and the average benefit was 2,982.603 €. The average net value was –14.088 €. Costs ranged from 1,846.11€ to 3,935.20 and benefits varied from 0 € to 10,023.66 €. The zero benefits were determined from 3 stallions in welfare.

The maximum net value was 6610.67 € for stallion 7. The minimum net value was -3618.9 € for stallion 9. The maximum efficiency was 3.72 € for stallion 1. The minimum efficiency was 0 € because of no benefits and the indication was for 3 stallions (stallion 2, stallion 6 and stallion 9). The average efficiency was 0.995 €. (Table 8)

**Table 8: Complete gathered and processed data of stallion welfare in year 2010**

| Welfare | | | | |
|---|---|---|---|---|
| **Stallions** | **Costs (EUR)** | **Benefits (EUR)*** | **Net Value(EUR) (Benefits-Costs)** | **Efficiency (EUR) (Benefits/Costs)** |
| Stallion 1 | 1,846.11 | 6,875.54 | 5,029.43 | 3.72 |
| Stallion 2 | 2,008.75 | 0.00 | -2,008.75 | 0.00 |
| Stallion 3 | 2,555.80 | 4,345.28 | 1,789.48 | 1.70 |
| Stallion 4 | 2,892.85 | 4,233.73 | 1,340.88 | 1.46 |
| Stallion 5 | 2,915.42 | 743.65 | -2,171.77 | 0.26 |
| Stallion 6 | 3,300.89 | 0.00 | -3,300.89 | 0.00 |
| Stallion 7 | 3,412.99 | 10,023.66 | 6,610.67 | 2.94 |
| Stallion 8 | 3,480.00 | 1,487.30 | -1,992.70 | 0.43 |
| Stallion 9 | 3,618.90 | 0.00 | -3,618.90 | 0.00 |
| Stallion 10 | 3,935.20 | 2,116.87 | -1,818.33 | 0.54 |
| **Average** | **2,996.691** | **2,982.603** | **-14.088** | **0.995** |

Source: Own elaboration based on data from own questionnaire

* Do not contain benefits that cannot be evaluated easily monetarily

The average cost of ten stallions in non- welfare for year 2010 was 3,514.482 € and the average benefit was 3,009.598 €. The average net value was – 504.884 €. Costs ranged from 2,695.46 € to 3,935.20 € and benefits varied from 0 € to 12,675.12 €. The zero benefits were determined from 4 stallions in non- welfare.

The maximum net value was 8,184.84 € for stallion 20. The minimum value was -3888.34 € for stallion 18. The maximum efficiency was 2.82 € for stallion 20. The minimum efficiency was 0 € because of no benefits and the indication was for 4 stallions (stallion 12, stallion 13, stallion 15 and stallion 18). The average efficiency is 0.856 €. (Table 9)

**Table 9: Complete gathered and processed data of stallion non-welfare in year 2010**

| Non-Welfare | | | | |
|---|---|---|---|---|
| **Stallions** | **Costs (EUR)** | **Benefits* (EUR)** | **Net value (EUR) (Benefits-Costs)** | **Efficiency (EUR) (Benefits/Costs)** |
| Stallion 11 | 2,695.46 | 2,602.78 | -92.68 | 0.97 |
| Stallion 12 | 2,943.62 | 0.00 | -2,943.62 | 0.00 |
| Stallion 13 | 3,058.67 | 0.00 | -3,058.67 | 0.00 |
| Stallion 14 | 3,146.57 | 6,350.61 | 3,204.04 | 2.02 |
| Stallion 15 | 3,379.50 | 0.00 | -3,379.5 | 0.00 |
| Stallion 16 | 3,401.12 | 4,233.73 | 832.61 | 1.24 |
| Stallion 17 | 3,750.50 | 2,116.87 | -1,633.63 | 0.56 |
| Stallion 18 | 3,888.34 | 0.00 | -3,888.34 | 0.00 |
| Stallion 19 | 4,390.76 | 2,116.87 | -2,273.89 | 0.48 |
| Stallion 20 | 4,490.28 | 12,675.12 | 8,18484 | 2.82 |
| **Average** | **3,514.482** | **3,009.598** | **-504.884** | **0.856** |

Source: Own elaboration based on data from own questionnaire

* Do not contain benefits that cannot be evaluated easily monetarily

### 4.3.4 Summary of Cost- Benefit Analysis and SWOT Analysis

The applied **Cost- Benefit Analysis** confirmed that the costs in stallion welfare are lower than the costs of the stallions not living in such favourable conditions. The total average cost, shown on sample of 20 Akhal- Teke stallions was, about 14.73 % lower in welfare compared to non- welfare.

The highest differences between welfare and non-welfare, cases where the welfare is significantly cheaper are following: **bedding** (54.60 %), **treatment of hooves and shoeing** (40.64 %) and **feed and water** (15.05 %). In two measured items- **special veterinary examination for stallions- AIE and CEM** and **training of the horse,** the average costs are lower for stallions in non- welfare conditions. However, it cannot be proved that this is caused by applying good stallion welfare.

In average, the benefits of welfare were only 0.89 % higher than in non- welfare. In both examined groups of stallions, the main benefit is **born foals**. In this case the financial benefit from one foal had to be determined so that financial benefit can be shown. On the level of the research, it has not been proved the good or poor welfare can influence the benefits.

Average net values were negative in both cases but significantly different. The average net value in welfare was –14.088 € and –504.884 € in non- welfare.

But, on the other hand, the average efficiencies are quite similar. The efficiency of 1 € is 0.995 € in good stallion welfare and 0.856 in stallion non- welfare.

Any breeders did not mention any other costs and benefits. When people keep horses, not only stallions, it is not only because of business but especially because of pleasure to spend the time with these animals. So, as benefit it can be indicated the time with horse. The most favourite utilization of horse is riding. As one of non- financial costs, we can mention time used for commuting in case the breeder does not have the stallion near his/her home and has to travel to the farm where the horse is stalled.

The **SWOT Analysis** result shows that the main and very important strength of stallion welfare is better physical and mental condition of the horse. The other important strengths are lower costs which were confirmed in both theory and in practice. On the other hand, the SWOT Analysis shows owning or renting lands for horses as a main weakness. The external factors prove the interest of people in this topic and also this type of stalling.

Some internal and external effects influence negatively rather horses in welfare conditions than horses kept in a stable. For example, there is a higher risk of injury caused by unfavourable weather conditions, or stealing of the stallion by rioters.

# 5 CONCLUSION

The main objective of the bachelor thesis was to analyze costs and benefits of stallions living in different conditions- equine welfare and poor equine welfare and to prove if the life of stallion in equine welfare is more profitable**.** The analysis was based on previous study of theoretical basis and the knowledge was applied in practice. The analysis focused mainly on the problem of stallion welfare as one of the important characteristic for the equine breeding business.

The result of the Cost- Benefits Analysis shows that costs are basically lower in good stallion welfare compared to poor welfare. The differences were confirmed both in theory and practice. The total average cost, shown on sample of 20 Akhal- Teke stallions, was about 14.73 % lower in welfare compared to non- welfare. In practice, following three categories show lower costs in welfare conditions compared to non-welfare: bedding (54.60 %), followed by treatment of hooves and shoeing (40.64 %) and feed and water (15.05 %).

The results of benefits analysis did not provide sufficient data to confirm or reject the hypotheses the stallions in welfare are more profitable than stallions in non- welfare. The reason of insufficient results in the benefits is that the research is not in professional level of exploration and the data which were gathered did not reveal any exact tendencies.

While costs are substantially lower in stallion welfare, both type of keeping of stallions are non- profitable based on stipulated items of evaluation.

Since horse keeping is in many cases not profit-aimed, keeping and breeding horses, not only stallions, cannot be viewed only from profit point of view. The equine business can provide many non-financial benefits, as for example pleasure from riding on horseback.

It can be concluded and suggested that it is advantageous for both the horse and the breeder to keep good welfare conditions for stallions. Also, it can be said every breeder who kept stallion in poor welfare can try to improve the conditions. This should be done firstly because of animal welfare which should be followed. Secondly, thanks to keeping animals in good welfare, the breeder can decrease own costs of the stallion.

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## List of tables



## List of Charts

# 7 SUPPLEMENTS

**Appendix 1** Questionnaire - Stallion Welfare

1. Part- general questions

Name of the breeder:
Name of the stallion:
Age of the stallion:
Price value of the horse (voluntary question):

1. Does your stallion spend some time in pasture or paddock every day? How many hours every day? Does your stallion have some shelter in pasture or paddock?
Yes / No Hours: Shelter: Yes / No
2. Does your stallion have some physical contact with other stallions or geldings?
Yes / No If no why?:
3. Does your stallion have some contact (e. g. in the box- they can see each other) with other stallions or geldings?
Yes / No
4. Does the box of the stallion have larger size than 3 x 3 metres?
Yes / No
5. Does your stallion have still access to fresh water?
Yes / No
6. Does your stallion have still access to grass or hay?
Yes / No
7. Is your stallion feed 2 x per day or more?
Yes / No
8. Is your stallion controlled every day (his general health and mental conditions)?
Yes / No
9. Do you work with your horse every day? (riding, jumping, ground work, lounging, etc.)
Yes / No If no, how many times per week? :

2. Part- questions about breeding and behaviour of stallion

1. Number of born foals from the stallion in the year 2011:
2. Number of attempts of breeding, but no gravidity of mare in the year 2010:
3. Average number of stallion attempts of breeding to mare is pregnant in the year 2010 (or how many doses of semen were necessary to use?) :
4. Do you use natural breeding (horses are together in pasture or animals are kept by people)?
Yes / No
5. Do you breed with doses of fresh semen?
Yes / No

6. Do you breed with doses of frozen semen?
Yes / No
7. Is it possible to manipulate with your stallion without any problems?
Yes / No
8. Is it possible to walk your stallion in hand only with a halter?
Yes / No
9. Is your stallion aggressive to people?
Yes / No
Notes:

Source: Own elaboration

**Appendix 2** Questionnaire – Cost - Benefit Analysis

**Basic Information**

Can I use the name of the owner and the stallion in the BT? :

1. Name of the owner:
2. Name of the stallion:
3. Age of the stallion:
4. Born Foals from the stallion in the year 2011 from your own mare:
5. Born Foals from the stallion in the year 2011 from the mare of the other owner:
6. How many attempts were to breed the mare, but there was no gravidity?
   It means: how many payments you earn? :
7. Your currency:

**Cost- benefit analysis**
**Costs**

1. Price of feed and water (no hay and special supplements for health) per one month:
2. Price of hay per one month:
3. Price of special supplements for health
(special vitamins, supplements for hoof care, etc.) per one month:
4. Average price for veterinary examination, vaccination, worming and medicals per one year:
5. Price of special veterinary examination for stallions- AIE and CEM per one year:
6. Price of treatment of hooves and shoeing per one year:
7. Price of bedding per one month:
8. Price of training of the horse per one month:
9. Other payments e. g. shearing, transport to the training, massages per one year:

Your Notes:

**Cost- benefit analysis**
**Benefits**

1. Income from the breeding per one born foal:
(payment for the natural breeding or insemination + payment for the gravidity of the mare):

2. Income from the natural breeding or insemination, but no gravidity of the mare:

3. Average incomes from the born foal sold in 6 months or 3 years old when you own the stallion and also the mare:

4. Income from winning the exhibitions and competitions per one year:

5. Financial support from the state or some organizations for stallion per one year:

6. Other income from the stallion per one year:

Your notes:

Source: Own elaboration