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Czech University of Life Sciences Prague  
**Faculty of Tropical  
AgriSciences**

Impact Assessment and Evaluation of Czech Development Interventions in Livestock  
Production systems in Central Region of Mongolia  
Master Thesis

Prague 2014

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# Assignment

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## **Declaration**

I, Radka Velinska, declare that I worked on my Master Thesis “Impact Assessment and Evaluation of Czech Development Interventions in Livestock Production systems in Central Region of Mongolia” by myself and that I used only literature resources list in the references.

# Acknowledgement

I would not have been able to finish this master thesis without guidance of my supervisor, motivation of my friends, support and help from my family. Also, thank you to my boyfriend, David, for pretty much everything.

I would like to express my sincere gratitude to my supervisor Jiří Hejkrlík, Ph.D. for his continuous support of my master thesis, for his patience, and his motivation. Thanks to his decision, I could participate on the project (CzDA-MN-2010-1-31195/1) implementation in Mongolia, where I conducted the research and collected all the data for this master thesis. Additionally, thank you to the Czech Development Agency for providing funding for the project and enabling me to visit Mongolia to successfully gather data. I very much appreciate having had such a wonderful opportunity.

Besides my advisor I would like to thank others involved in the project, who helped me with questions preparation (Jana Mazancová, Ph.D.), and gathering, and data interpretation (Tamir Mend, MS.c. in Mongolia).

## Abstract

This master thesis presents the results of an applied research focused on the evaluation of the project “*Livestock identification System (Data Collecting), Mongolia*” Project was implemented by Czech University of Life Sciences Prague in Central region in Mongolia. For evaluation were used principles of Organisation for Economic Co-operation and Development Assistance Committee such as *relevance, effectiveness, efficiency, impact*. Impact was not assessed according the evaluation scale, because during field evaluation the project has not been terminated yet. Another evaluation criteria is *sustainability*. The paper also took in account some principles of Czech Development Agency such as *visibility*. Collection of secondary data was based on studying of available project documentation such as project proposal, annual, periodical and final reports. Primary data was gathered through pre-prepared structured and semi-structured interviews. Questions for structured and semi-structured interviews were prepared for three different groups of respondents at different levels. In total for the analysis were used answers from 104 respondents. Type of sampling used during this survey was non-random (quota sampling), because there were set specific criteria such as livestock farmers had to live in one of the evaluated districts where the project was implemented (Bornuur, Bayanchandmani, Zuunmod). Respondents had to own at least one head of cattle. Cattle had to be tagged with project ear tag. In the case of governmental animal specialists and experts of Ministry of Industry and Agriculture the key informants’ technic was not random. Concrete persons who work at office as animal specialists had to be asked. Results show that evaluated interventions were assessed as rather high; however it depends on future development.

**Keywords:** livestock identification, sustainability, efficiency, effectiveness, ear tag

## Abstrakt

Tato diplomová práce prezentuje výsledky aplikovaného výzkumu zaměřené na zhodnocení projektu s názvem Systém identifikace hospodářských zvířat – sběr dat, Mongolsko. Projekt zrealizovala Česká zemědělská univerzita v Praze v Mongolském centrálním regionu. Pro zhodnocení projektu byly použité evaluační principy Organizace pro hospodářskou spolupráci a rozvoj a rozvojovou pomoc tak jako relevance, efektivita, efektivnost a dopad. Dopad nebyl v projektu posuzován podle evaluační stupnice, jelikož evaluace proběhla před skončením projektu. Dalším evaluačním kritériem je udržitelnost. Tato práce používá některé hodnotící principy České rozvojové agentury, například viditelnost. Sběr sekundárních dat byl založen na studiu dostupné projektové dokumentace, tak jako návrh projektu, roční, průběžné a konečné zprávy. Primární data byla shromážděna skrze předpřipravené strukturované a polo strukturované rozhovory. Rozhovory byly připravené pro tři různé skupiny respondentů na různých úrovních. Celkem byly použity odpovědi od 104 respondentů. Způsob výběru respondentů nebyl náhodný (quota sampling) jelikož byla nastavená určitá kritéria, např. hospodářská zvířata musela být z jedné z evaluovaných oblastí kde byl projekt realizovaný (Bornuur, Bayanchandmani, Zuunmod). Respondenti museli vlastnit alespoň jeden kus skotu. Skot musel být označen projektovou ušní značkou. Ani v případě vládních odborníků na okresních úřadech i na ministerstvu průmyslu a zemědělství nebyl výběr respondentů náhodný. Konkrétní osoby, které pracují na daných úřadech, musely být dotazovány. Výsledky zobrazují zhodnocené intervence jako spíše vysoké, nicméně záleží na dalším vývoji.

**Klíčová slova:** identifikace hospodářských zvířat, udržitelnost, účinnost, efektivnost, ušní značkou

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## List of Abbreviations

ADB	Asian Development Bank
AHP	Animal Health Project
AHLM	Animal Health and Livestock Marketing Project
CIDA	Canadian International Development Agency
CzDA	Czech Development Agency
CRS	Concierge Research Service
CULS	Czech University of Life Sciences
DAC	Development Assistance Committee
FAO	Food and Agriculture Organization
FTA	Faculty of Tropical AgriSciences
GDP	Gross Domestic Product
HACCP	Hazard Analysis and Critical Control Points
IFAD	International Fund for Agricultural Development
IISNC	International Institute for the Study of Nomadic Civilizations in Ulaanbaatar
MFA	Ministry of Foreign Affairs of the Czech Republic
MIA	Ministry of Industry and Agriculture
MoFALI	Ministry of Food, Agriculture and Light Industry of Mongolia
MNT	Mongolian Tugrik
NSO	National Statistical Office
ODA	Official Development Agency
OECD	The Organization for Economic Co-operation and Development
ToC	Theory of Change
UNDP	United Nations Development Programme
UNEP	United Nations Environmental programme

# 1 Introduction

Mongolia is a country that has been transitioning for the past 20 years from an under-developed, poor, socialist society, to a democratic country which is gradually transitioning to a free-market economy. The resulting economic growth has had wide-spread effects on this Central Asian country, resulting in extensive property developments, changes in land-laws with regards to privatization, and uncertainty on the future of public lands including pastures (WB, 2013).

This thesis is based on the project “Livestock Identification System – Data Collecting (Mongolia)” that was implemented during 2010-2012 in the Central region of Mongolia. It is a product of an evaluation report, one which was co-authored by the same author of this thesis. The evaluation report was one of the outputs of the Livestock Identification System project. The project was implemented by the Czech University of Life Sciences Prague, in cooperation with the Mongolian government. The project was funded as a part of the Foreign Development Cooperation of the Czech Republic, supervised by the Czech Development Agency.

There are only a few countries in the world where identification and registration cover all cattle. Currently, Mongolia holds livestock in high regard, and considers it as a public wealth, therefore laws are in place to protect this commodity. Nevertheless, Mongolia is in the beginning of livestock identification transformation, and so far it does not have such high regulations as those seen in European countries (Wismans, 1999).

Secondary data was gathered before the field evaluation started. The evaluation team studied available project documentation such as the project proposal, as well as annual, periodical and final reports. Primary data was gathered during field surveys through pre-prepared, structured, and semi-structured interviews.

## 2 Literature review

### 2.1 Overview

Over the past 20 years, Mongolia has transformed itself from a socialist country to a vibrant multiparty democracy with a booming economy. With almost 3 million inhabitants<sup>1</sup>, Mongolia is the world's most sparsely populated country (FAOSTAT, 2013). The population density of Mongolia in 2011 was 1.8 people per km<sup>2</sup> in 2011 (NSO, 2011). Mongolia is at the threshold of a major transformation driven by the exploitation of its vast mineral resources. The share of mining in GDP today stands at 20 percent, twice the ratio of a decade ago. The economy grew by 12.4 percent in 2012, compared to 6.4 percent GDP growth in 2010. GDP is expected to grow at a double digit rate over the period from 2013 to 2017 (WB, 2013).

Mongolia belongs to the largest interior countries in the world. The total land fund is consisted of agricultural land; land for cities, villages and other settlements; land under roads and networks; forest land; water resource land and land for special needs. Pasturelands of Mongolia compose the world's largest contiguous area of common grazing land (WB, 2002).

The total area is 156 411.6 thousand hectares. Agricultural land composes 115 490.8 thousand hectares, land for cities, villages 667.3 thousand hectares, land under roads and networks 429.2 thousand hectares. The rest of Mongolia is covered by forests (14 260.0 thousand hectares), 686.8 thousand hectares of water, and 24 877.4 thousand hectares of land for special needs (NSOb, 2011).

It is located between the boreal forests of Siberia and the Gobi desert. The climate is continental with wide daily and seasonal temperature ranges. Due to high altitude it is

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<sup>1</sup> The total population in 2011 was 2,811,600 people, which included residents in Mongolia and Mongolian citizenships usual reside in abroad. Population, which lived abroad composed around 100 thousands people (NSOb, 2011).

colder there than in other countries on the same latitude (UNDP, 2002). These harmful conditions make agriculture very difficult, among 1986-2007, the harvesting rate decreased by 280kg/ha (Dagvadrij et al., 2009).

This economic growth has translated into some benefits for the people of Mongolia. Over past decade, poverty has been decreasing. It decreased from 38.7 percent in 2010 to 27.4 percent in 2012 (WB, 2013). Substantial progress has also been made in regard to several Millennium Development Goals (MDGs) at the national level, though significant regional disparities prevail.

## **2.2 Administrative units**

Administratively, Mongolia is divided into 21 aimags (provinces) and the capital city, Ulaanbaatar. Aimags are divided into soums (districts), which are further divided into bags (an administrative unit under sub-provinces). Ulaanbaatar is subdivided into districts, which in turn are comprised of khorroos (sub-districts).

## **2.3 Agriculture**

As in other developing countries, agriculture plays a very important role in Mongolian economy. Since 1990, when the socialist regime collapsed, Mongolia's private sector has been rapidly developing. After privatization of the national herd, many small producers started to be active in agriculture production. Even through the political changes, the system of grazing has stayed the same. For its cold climate, the way grazing is done, in most cases, is extensive and herders move with their livestock usually at least twice a year. According to Suttie (2006), the grazing lands are in good condition and the local breeds virginal and prosperous.

The increase of GDP per capita through the years has pushed Mongolia to belong among middle-income countries.

Related to the geographical location, soils quality and climate features, agricultural lands occupy three main areas (**Figure 1**). Soils of the Eastern region (blue) are mainly powdery and rich with carbonates. Steppes of this region are dry. The key region in this paper is the central region (green), which lays on forest-steppes and steppes area. Soils are



basically black earth. The Western agricultural region (beige) lays in mountains and soils are mostly brown and black earth (UNEP, 2009).

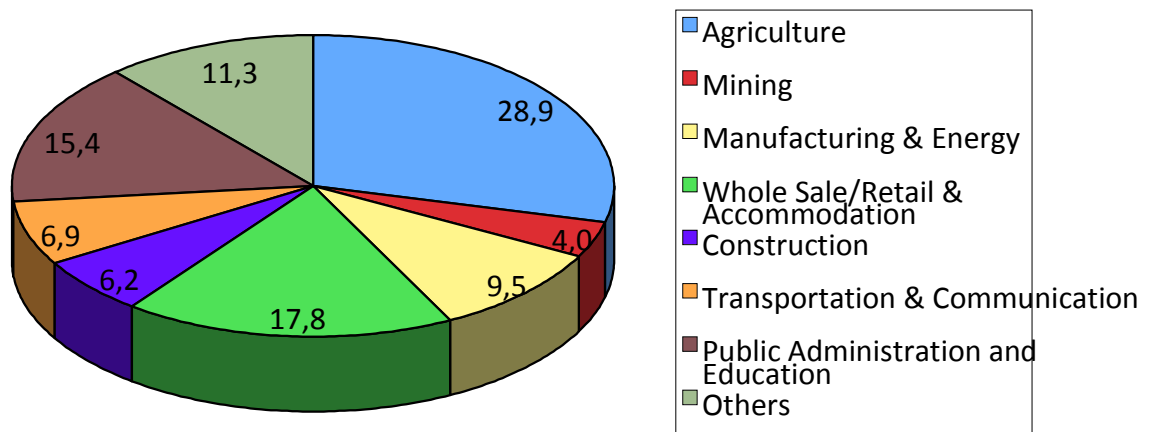


**Figure 1.** Main Locations of Agricultural Land Regions

(Source: UNEP, 2009)

In the first half of 2013, the agricultural sector increased by 11.3% year by year because of good weather conditions. Agriculture was one of the main drivers of growth (ADB, 2013). The figure is mostly influenced by livestock number, according to NSOa (2011), livestock accounts for approximately 80% on agriculture production, which is about one third of GDP and employs approximately 45% of the national workforce.

Agriculture employed approximately 30% of Mongolia's population in the second half of 2013. The number is declining when compared to 42% in 2007, however it still occupies one of main labour forces in sectoral composition. During recent years, the labour force has shifted into non-agricultural spheres, mostly into sales and accommodation. Work on construction increased 17% in second quarter 2013. The following **Figure 2** illustrates the composition of employments by sectors in 2013 (Altantsetseg et al., 2013).



**Figure 2.** Sectoral Share of Employment to Total Employment (%) in 2013, Mongolia

(Source: Altantsetseg et al., 2013)

## 2.4 Livestock Production

### 2.4.1 History of animal husbandry in Mongolia

Natural conditions of Mongolia are more than suitable for animal production. The first contact between people and animals goes far into the past, and it started through hunting. Resulting domestication of animals began between the 8<sup>th</sup> and 3<sup>rd</sup> centuries B.C. and the first domesticated animal was a horse. Mongolians very quickly enlarged their kinds of livestock such sheep, goats, cattle and camels (Baasanjav et al., 1999).

The size of the country, its unequal grassland possibilities and severe continental climate conditions lead to a nomadic way of life, which has transferred from generation to generation. Already in about 14<sup>th</sup> century, small herders used to create small nomadic settlements. These settlements were usually consisted of 7-12 households. Herders usually moved twice a year, they spent summer and winter on different places (Enkhbayar, 2002).

In the second half of the 20<sup>th</sup> century establishment of cooperatives started and it had its pros and cons on the Mongolian way of livestock husbandry. The majority of private

livestock was shifted to the collective ownership of cooperatives. Cooperatives managed the construction of wells and ensured hay for livestock for winter and early spring. They also provided livestock farms. On other hand, herders who were part of cooperatives had to follow certain rules. After 1990s with privatization, livestock was transferred back to private ownership free of charge and cooperatives ended (Baasanjav et al., 1999).

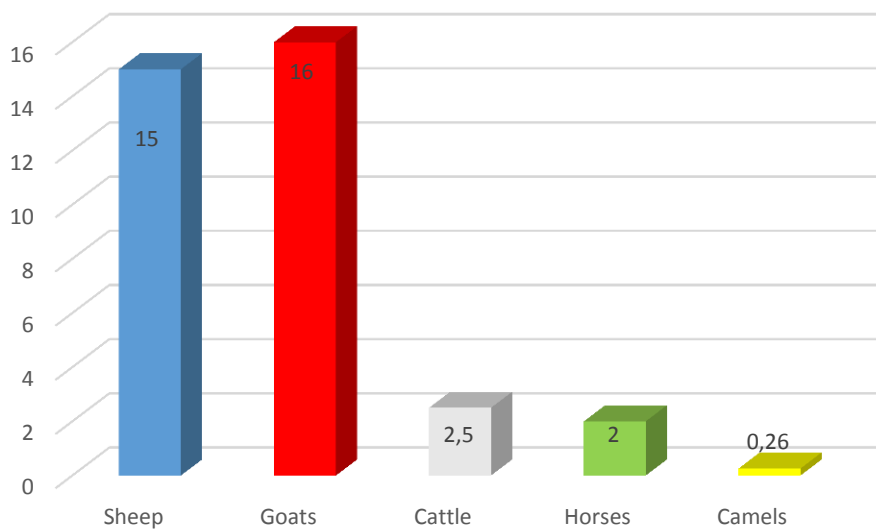
#### **2.4.2 Livestock composition**

Mongolians keep mainly sheep, goats, cattle, horses and camels. The total number of livestock was over 36 million in 2011. Mongolian lost over 11 million livestock during the dzud<sup>2</sup> in 2010, at which time they had nearly 33 million livestock. The composition of livestock for the whole Mongolia is displayed in **Figure 3** which shows a graph with the population of animals in millions, and **Figure 4** which depicts the composition of animals as a percentage in relation to the total (NSOb, 2011).

The largest number is composed of sheep and goats; in 2011 Mongolian herders had over 15 million sheep and almost 16 million goats.

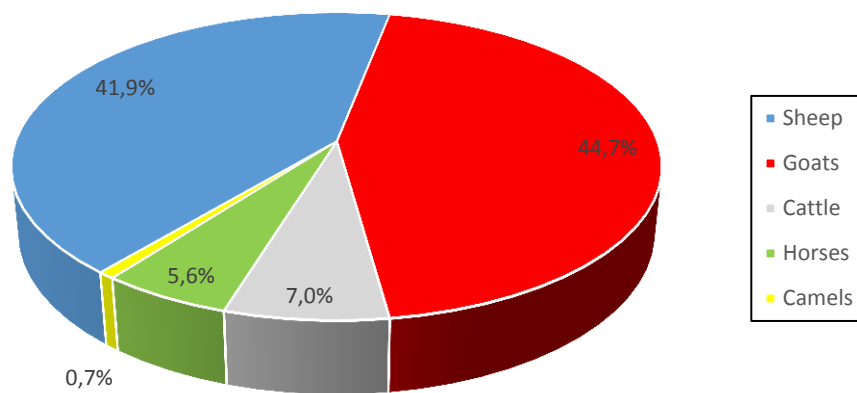
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<sup>2</sup> *Dzud*: is a Mongolian term to describe a multiple natural disaster consisting of a summer drought followed by heavy winter snow and extremely low temperatures -reaching minus 50 degrees Celsius in certain areas- in which livestock die of starvation due to inability to find grass and fodder.



**Figure 3.** Composition of livestock in Mongolia (millions)

(Source: NSOb, 2011)



**Figure 4.** Composition of livestock in Mongolia (%)

(Source: NSOb, 2011)

### 2.4.3 Grassland and livestock

While sheep and goats are kept close to a herder's shelter on grassland, horses, cattle and camels are kept further away and separately. Mares, cows and other milking livestock

are kept separate from their suckling during summer. Young livestock are kept close to a herder's shelter, sometimes even inside of the human shelter. Sheep and goats are herded together in the winter because the longer hair of sheep keeps goats warm (Tsogtbaatar, 2004).

Except for special circumstances, land is owned by the state of Mongolia. Mongolian grasslands are perhaps the largest contiguous area of common grazing in the world. The law, created in 1993 and revised in 2002, partly permits the transfer of proprietorship rights for certain types of land, such as arable land used for urban and periurban housing. Nevertheless the principle of public ownership of pastureland remained the same (Fratkin and Mearns, 2003). The same grassland is shared and rotated by neighbouring herders every day (Adyasuren, 2000). Only through rapid and frequent movement could herders be sure the grasslands remain unexhausted, especially if they live close to Gobi desert. Herders have a traditional system for the rotation of different animals over grasslands, so each type of animal can eat grass which best suits them, meanwhile grassland stays ready for another herd (Humphrey, 1978).

An enclosure for livestock is mainly made of wood and the construction of a summer enclosure is relatively simple. During summer, some herders change their location a few times per season, and therefore no pre-prepared enclosure is needed. Their unwritten rule is that each place must be cleaned before they move to other location. In the past, the great cultural value set on nomadism caused that herders did not build permanent shelters for their livestock even during winters, so if there was a deep frost or an unexpected storm, the whole herd might die due to insufficient shelter, or lack of fodder. Even though animal husbandry is mostly extensive, in more populated areas, it shifts more into intensive livestock farming. This can be beneficial in more populated areas, however the complete transformation into intensive way of farming would be inconvenient and unprofitable in Mongolia. Firstly, the infrastructure would need to be more sophisticated and the cost for such a way of farming would be much higher than is needed for extensive farming. Secondly, for intensive farming, years of breeding and crossbreeding would be required in order to accustom Mongolia's existing livestock, also a psychological side of animals play an important role (Enkhbayar, 2002).

Because of harsh weather conditions, livestock must know how to work with nutrients. They gain weight during the summer, reaching their maximum weight by fall. Their survival highly depends on the weight and energy they gained during the summertime. Livestock became adapted to such weather conditions through centuries through natural selection and selective breeding (Enkhbayar, 2002).

However, to the impact of livestock grazing is not exclusive to grasslands. Forests are affected mostly if they are located close to rivers, due to deadwood collection for heating. During the summer, forests suffer from a lack of water are sensitive to intensive land-use (Erdenechuluun, 2006).

#### **2.4.4 The Action Plan**

Mongolia is one of the countries, which defines policies for its sustainable development. In order to make Mongolia's development dynamic and sustainable it is necessary to set short, medium, long-term development strategies and policies taking in account global development trends. Development policy for agriculture and food industry shall be able to raise their capacity to compete at the market. They must satisfy needs of people for staple food such as flour, meat, milk, potato and other vegetables fully by domestic production. Objectives related to animal husbandry are to pursue the development of both nomadic and intensive animal husbandries. Regional differences, outbreak and spread of transmittable animal diseases and processing and export of animal products must be taken in account. The Action Plan of Mongolia set by the Mongolian government wants to improve animal husbandry between 2006 - 2015 through the following objectives (ADB, 2006):

- Higher productivity of well adapted local breeds and reduction of mortality

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- Breeding of livestock for specific purposes, such as milk and meat, and support production of non-traditional livestock products (pork, honey, etc.)

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- Support of intensive livestock entities in regional centres

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- Improving of animal health services and develop the capacities for laboratory diagnoses

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- Protect and improve Mongolia's livestock gene pool

- Improve water supplies in grassland areas through the rehabilitation of existing wells and development of new sources

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- Introduction of eco-friendly technologies for pest and rodent control in grasslands

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- Increase the production of fodder

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- Initiate and strengthen protection against disasters at national, aimag, and soum levels.

Some of mentioned objectives and some new are going to be more developed in the second phase from 2016 until 2021. Objectives such as introduction of biotechnology, improvement of livestock breeds are going to be ones of strategic objectives for the second phase of development.

Aside from animal husbandry improvements, the action plan was proposed for an additional four areas: creating a favourable business climate, rebuilding and expanding crop production, developing the food industry, and conducting research into the application of new technologies. The budget for the first five years was MNT 127.4 billion (USD\$ 106.2 million), of which 47% was supposed to be funded from the state budget, 35% from grant aid, and 18% from foreign loans (ADB, 2006).

#### **2.4.5 Livestock productivity**

Mongolian livestock is very well adapted to local severe climate, however the productivity levels are low. Under current management regimes, animals receive limited preventative treatment for parasites and disease, while management skills of herders are inconstant. The combination of these factors explains the current low level of productivity.

On other hand, Mongolian livestock suffer less from infectious diseases. It is partly due to the low density of livestock, but also because the government of Mongolia put an effort to quickly respond to outbreaks of infectious diseases (ADB, 2006). Nevertheless, some diseases, some of which have been exterminated in most of Europe, sometimes still occur in Mongolia, such as Foot and Mouth disease and Anthrax. Mongolian meat is considered

as ecologically clean, because livestock is grazed on grasslands without the use of fertilizers, pesticides and other chemicals, and is rarely affected by veterinary treatments. Mongolian livestock is dependent on the compound of grassland and water resources. Some areas in Mongolia contain low levels of essential minerals, so the productivity is low and it brings higher morbidity in spring.

The composition of Mongolian livestock offers varied uses in a wide range of industries. It includes meat, milk and leather processing, including leather footwear and other products made of leather, fur garments, cashmere and wool processing, etc. With the transition to a market based economy, many companies, except cashmere the basis production collapsed.

#### **2.4.6 Constraints in livestock production**

According to ADB (2006), the most constraining factors, which limit the livestock development, are the following:

- Animal nutrition
- The size distribution of herders and producers
- The marketing of livestock products
- Producer access to credit at affordable prices
- Livestock management skills of producers
- The genetic composition of the national herd

All these constraints have implications for the level of investment in production, marketing and processing of livestock products, for the sustainability of livestock activities to reach required development. Another limited factor that was not mentioned by ADB is a descending availability or quality of forage from natural grasslands (Mearns, 1996).

In comparison with other countries, the advantage to the Mongolian way of breeding is in extensive production, because it needs low-input, and due to increasing demand for natural food products in other countries. The higher input into livestock production systems may have a national comparative advantage in providing higher quality food items for domestic urban markets in the meat and dairy industries, increasing employment opportunities and developing the national economy. So far, they cannot



compete with developed countries that produce large amounts of products with affordable transport services.

## **2.5 Climate**

Mongolia has an extreme continental climate and four seasons, where, in general, winters are long and dry, while summers are warm (depending on location). Strong storms blow during spring (April to May). January is the coldest month when temperatures drop to the lowest point, and July is the hottest month of the year where temperatures can reach up to 44°C. The temperature varies in certain areas in Mongolia, including the number of rainy days and precipitation. Nevertheless, the climate is warming, exemplified by the fact that the annual temperature has increased by 2.1°C during the last 70 years (Dagvadorj et al., 2009). Hot waves come more often and for longer periods, which cause drought and temporary land degradation (Sternberg et al., 2011). In places with steady rainfalls, herders started to register that distribution of precipitation changed with higher frequencies of heavy rains. The coldest month is January, where temperatures are between -31 and -52°C.

Mongolia is also known as the land of blue sky, having approximately 250 sunny days each year.

## **2.6 Nomadism as a way of life**

Pastoral nomadism is the prevailing form of land use in Mongolia. According to Dagvadorj about one third of Mongolian population used to live as nomads. The other two thirds of population work in urban areas as drivers, traders, employees of government or in food or textile industries (Dagvadorj et al. 2009).

Although the situation is widely different in every region, it is becoming increasingly challenging to live as a nomad. Pastoralists face pressures due to several issues, such as population growth, loss of grassland to private farm, urban areas, out-migration of poor herders (Fratkin and Mearns, 2003).

During the last two decades, the political and economic situation faced strong changes. During a communist regime, livestock production was converted from a natural pastoral

economy to a system with a manipulative character. As mentioned above, most livestock became a possession of cooperatives. The communist system was replaced by a parliamentary democracy in 1990, and the centrally planned economy was subsequently converted into a market economy (Griffin, 1995; Dorj and Yavuuhulan, 2003).

The change of regime had a great consequence on the life of nomads in the whole of Mongolia. The financial support provided by the Soviet Union and Eastern Europe vanished. Until 1989, financial support of the Mongolian government by the Soviet Union amounted to one third of the GDP, but it was reduced and in 1991 fully halted.

After privatization, herders could keep as many heads of livestock as possible which resulted in a nation-wide increase of livestock numbers in Mongolia. The number almost redoubled over 10 years, and it led to grassland degradation in many places (Lise et al. 2006). Also, the composition of animal species changed, nomads started focusing on the breeding of cashmere goats as the main source of income.

## ***2.7 History related to Land Use***

The first important point in the timeline associated with Mongolian land rights was under the influence of Chinggis Khan in the beginning of 13<sup>th</sup> century. To solidify his political power, he let his political allies to operate on specific area. It means he had the authority to tax and demand labour from the inhabitants of these areas (Jagchid and Hyer, 1974 in Fernandez-Gimenez, 2006).

The second important development was when the Tibetan Buddhism was introduced again into Mongolia in the end of 16<sup>th</sup> century. High position of lamas gave them not only political power but they were granted their own territories and commanded their subordinates. Monasteries were very important in Mongolia because they had important influence on grassland use and allocation.

The year 1691 was important for western and northern Mongolia when they submitted to the authority of Manchus and became their subordinates for more than 200 years. It brought new laws, which limited the herders' movements on grasslands. They had to stay only in khoshuun of their birth (Potkanski and Szykiewicz, 1993). For poor herders the

law was limiting even more, but mostly due to the fact they did not have means to move to better grasslands. In following years with change of political regime, the territories reduced, however controls over pastoral movements and pasture allocation increased. Despite of this, during each of these past eras, governments allowed allocation during climatic disasters. There are proofs that regulation of seasonal movements was successful in conservation of sustainable patterns of herder land use (Fernandez-Gimenez, 2006).

Political situation in 20<sup>th</sup> century had important impact to economy and also to social relationships. In the beginning of the century Mongolians regained independence from the Chinese Empire, however only for eight years. In 1919 China invaded the Mongolian territory again. This invasion did not last long time, in 1921; Russian communists and some nationalists achieved full independence from China. Governance did not make significant changes during the power of communist regime. They created small pastoral cooperatives, but there were no fundamental changes in the way of herding or nomadising. The regime was more profitable for poorer herders because herds were privatized. Government in 1959 made a law on how many livestock can herders keep and it led that more than 75% livestock was in state holding (Szyrkiewicz, 1993).

After what communist regime collapsed in 1990 herds were given back to herders and in some cases it led to increase of poverty and number of herders, but lack of social services and less mobility. Declining mobility causes overgrazed pastures and sometimes it leads to conflicts among herders (Fernandez-Gimenez, 2006). To protect grassland and their access to water and other resources herders move even less. In general, only entrepreneurial herders were confident with fully privatization (Szyrkiewicz, 1993).

The current situation is held by Law on Land. It includes provisions for certificates of possession, essentially tenures, over winter. During spring and autumn, grasslands are available for all.

## ***2.8 Definition of Evaluation***

Experts who work in evaluation discipline have made various explanations. It depends if it focuses on purpose of evaluation or on the timing of the evaluation in respect to the maturity of the project, program, or policy (Mora-Imas and Rist, 2009). Although, this

paper is focused on the evaluation of the particular project evaluations might assess different stages of projects, programs or policies (OECD, 2002). Evaluation is an important tool for different units such as organizations, governments and companies, to demonstrate its accountability, improve its performance, increase its abilities for future planning, or fulfil its objectives (Zarinpoush, 2006). Information provided by evaluation should be trustworthy and helpful.

Direction of the evaluation is provided by proper type selection. According to the Mora-Imas and Rist, (2009), which is focused on evaluation conducting, evaluation can be formative, summative, or prospective.

A formative evaluation is conducted at an early stage of the evaluated project and it looks in which ways it is implemented. It is very useful to identify gaps and might suggest ways how to develop some improvements. The opposite of formative evaluation is a summative evaluation, which is conducted at the end of a project. It assesses to what extent the objectives were achieved. In the case the project has more phases, it can be conducted at the end of each phase. This type of evaluation does not improve the objectives of an evaluated project, but it provides findings, which might help with future planning and decisions. The third type of evaluation is a prospective evaluation, also called outcome evaluation, because it evaluates possible outcomes of proposed projects. It is based on studying previous evaluation findings to assess probable outcomes of planned projects.

Zarinpoush (2006) also describes the process evaluation, which is conducted during project implementation. Process evaluations have lesser extent than formative evaluations, however there are some similarities. For instance, both focus on the effectiveness and the operational aspect of the project, both start at an early stage, and both are sometimes conducted by internal staff (Mora-Imas and Rist, 2009).

### **2.8.1 Purpose of Evaluation**

Project evaluation has various purposes and it helps in understanding the progress, effectiveness, efficiency or sustainability of a project. Purpose of evaluation can be also divided according to a given context:

- Ethical purpose
- Managerial purpose
- Decisional purpose
- Educational and motivational purpose

In general, the overall purpose of any evaluation is to provide findings and information to implementers and decision makers to facilitate them to make better project decisions.

### **2.8.2 Use of Evaluation**

In general, findings provided by an evaluation report can be used by different stakeholders in many ways. Performing an evaluation of project worth is useful during a summative evaluation or during audits, accountability and for future projects. An evaluation can provide credible and objective information, which are needed during accountability assessment. Before the project terminates, the evaluation can improve project management, its quality enhancement, and improve the effectiveness. It might be also helpful during knowledge generation. Especially during project implementation in developing countries, evaluation is useful for sustainability due to provided recommendations. It might be helpful during policymaking or theory building, and it can extend principles about work (UNDP, 2009).

The project “Livestock Identification system – Data Collecting (Mongolia), which is evaluated in this paper, was evaluated before its termination. The report was written in English to be helpful for not only experts of CzDA but also for Mongolian experts who continue with animal identification. Conclusion of the evaluation report is based on facts that will be useful for future decision making of the Ministry of Foreign Affairs about the future alignment of the Czech development cooperation with Mongolia.

Uses of evaluation are clearly stated by Kusek and Rist (2004). According to them, evaluation can be used in variety of ways:

- to help make resource allocation decisions
- 
- to help rethink the causes of a problem
- 
- to identify emerging problems

- to support decision making on competing or best alternatives
- 
- to support public sector reform and innovation
- 
- to build consensus on the causes of a problem and how to react

Evaluations in the Czech Republic within Czech development cooperation were initiated in 2003 (CzDA, 2009). Only selected projects were evaluated that time. Nowadays, the number of evaluated development projects increases. Ministry of foreign affairs assigns evaluations of development projects. On the website of ministry is posted around 15 project evaluations from 8 developing countries, Mongolia is one of them (MFA, 2013).

### **2.8.3 Function of Evaluators**

The function of an evaluator can vary, but is very important. Some authors see an evaluator as a judge who justifies the project and provides a summative judgment in an evaluation report. Other authors lean toward to an opinion that the evaluator is more of a program facilitator who stands next to different stakeholders and helps them during project management. The roles of an evaluator can change during different project phases. The evaluation report also reflects values, methods, practices, background or previous working experiences of evaluators (Luo, 2010).

Evaluation can be conducted by external or internal evaluators. Both kinds are defined by OECD/DAC glossary. The internal evaluation is defined as "evaluation of a development intervention conducted by a unit and/or individuals reporting to the management of the donor, partner, or implementing organization." (OECD, 2002, p. 26).

The external evaluation is defined as "evaluation of a development intervention conducted by entities and/or individuals outside the donor and implementing organizations" (OECD, 2002, p. 23).

Related evaluation was done by an internal expert as a part of the academic exercise and training of young future professionals in development cooperation at the Faculty of Tropical AgriScience at CULS. The evaluator is well aware of possible bias on the possible bias on the positive outcomes of the project. Nevertheless, the evaluation still can bring

important insights into the improvement of the quality management of the Czech ODA projects.

There is also the third kind of evaluation, the participatory evaluation, which is different from internal and external evaluation. It is defined as “evaluation method in which representatives of agencies and stakeholders (including beneficiaries) work together in designing, carrying out and interpreting an evaluation” (OECD, 2002, p. 28). Some of participatory methods may be used during external and internal evaluations.

#### **2.8.4 Development Evaluation**

Development evaluation has become known as a sub discipline of evaluation after the Second World War. After the World Bank was founded in 1944, the first independent evaluation group was established in 1972. Then, other development groups and banks were founded, such as the Canadian International Development Agency (CIDA) and the United Kingdom’s Department for International Development (DID), and the beginning of development evaluation started.

An important moment was when the Organisation for Economic Co-operation and Development (OECD) was established in 1961. On its website, OECD states “the main mission is to promote policies that will improve the economic and social well-being of people around the world” (<http://www.oecd.org/about/>).

Currently, the important committee focused on development evaluation is Development Assistance Committee (DAC Network on Evaluation). Its definition of development evaluation is widespread. An evaluation is defined as a systematic and objective assessment of continuing or terminated project, policy or programme. The main objective is to identify the relevance, efficiency, effectiveness, impact and sustainability. An evaluation should bring credible and useful findings and recommendations that can be helpful for recipients and also for donors (OECD, 1991).

#### **2.8.5 Principles and Standards for Development Evaluation**

Most organizations and agencies focusing on evaluations use the principles, standards and criteria identified by OECD/DAC. This thesis also uses those five following criteria (OECD, 2002):

- **relevance:** it assesses if the project has achieved requirements, of beneficiaries, country needs and global priorities according to partners' and donors' policies
- **effectiveness:** it measures if the project has achieved its objectives, and which factors influenced the objectives' achievement
- **efficiency:** it measures if the project has achieved its outputs in relation to inputs. If implementers used the most effective resources to finance the project. Efficiency also measures if objectives were achieved on time
- **impact:** provides findings about positive and negative changes within project implementation. It assesses the impact on different levels (social, economic, environmental)
- **sustainability:** it assesses the probability of whether the benefits of the project will continue also after project's termination and after donors will stop with funding. Projects need to be sustainable, both environmentally and also financially.

Another element that is important for evaluation credibility is independence. An Independent evaluation is carried out by persons who are not involved or responsible for project design or implementation. It does require that evaluators are isolated from project management staff or beneficiaries. An independent evaluation provides rather an accountability purpose than a learning purpose (Patton, 2010).

## **2.9 Theory of Change**

One of the way how to interpret long term-goals step by step is through theory of change (ToC). ToC was originally invented as an evaluation tool. The long-term goal interprets connection between activities, outputs, outcomes and impacts at each stage of the project (Mora-Imas, Rist, 2009; Taplin et al., 2013).

Long-term goal: more effective animal husbandry

Preconditions:

- tagged livestock
- governmental experts have appropriate skills for livestock identification
- farmers are aware of benefits of livestock identification



## **2.10 Animal identification**

Identification and recording of animals have been traditionally practiced for herd management and genetic improvement. Nowadays, there is also traceability, which became also very important benefit of animal identification. Even though, traceability is limited to animal movements from their birth to the time when they are put into death and following processing. “Animal traceability is completely dependent upon successful identification of individual animals or groups/lots of animals first, and origin-and-movement records thereafter”(Smith et al., 2005).

According to Hoffman et al. (2012) identification plays a key role in global demands for food security and poverty reduction. “Animal identification and recording has many uses. It is necessary for better farm management, theft control, maintenance of herd books, delivery of health certificates, and for implementing agricultural policies. It is fundamental to the establishment and maintenance of breed improvement programmes.”

Historically, people used to signify their animals to prevent stealing and indicate ownership. During time identification developed more into animal health tracking and food safety measures.

### **2.10.1 Pros and Cons of animal identification**

Since an animal identification has developed it has been facing to various number of positive and negative opinions. Although, Greene (2010) in his article considers animal identification mostly in the U.S., some of his examples are applicable worldwide.

As a great benefit is improvement of animal health surveillance and disease abolition. In the case of dangerous diseases, the early detection of disease outbreaks would be easier within tagged animals. Another advantage is very beneficial for Mongolian farmers; it is minimization of economic impact of an animal disease outbreak. The quick identification of disease outbreak limits the transmission of disease and protects animals, which would have to be killed or removed from market. It limits the economic damage. It is very beneficial for export of animal food products. Purchasers are aware about the origin and health of tagged animals.

Some of animal identification opponents state that, the database collects personal identification information, which might be released to broader public. Others claim that identification requires high acquisition costs and low rate of return (Greene, 2010). The complexity of operations might go beyond an operator's capability. Some of tracing requirements make difficult business for small farmers, because of large retailers who will exercise market power to shift compliance costs backward to farms. This might be difficult for smaller farmers to stay in a business. Other opponents are from certain religious groups, who claim that the fact that farmers know the exact number of their numerous herds will cause an apocalypse. Therefore, the animal tagging should be avoided.

### **2.10.2 Animal identification in developing countries**

Animal identification in Mongolia is financed by national and international organizations and institutions but all are supervised by Mongolian government and its Mongolian Livestock National program. This program was introduced in 2009. One of the goals is to create an animal registration database and network. Every animal will be registered with individual number, which states livestock origin and health certificate. It also covers trainings at governmental and non-governmental stages, necessary equipment needed for livestock registration. The program also creates a list of main animal diseases that are obligatory to report at the national level (MIA, 2010). Mongolian government also wants to improve the genetic bank of their livestock. And this is exactly one of the reasons, why the identification system should be developed. No genetic improvement is likely to succeed without unless a system approach is applied and other system constraints are met (Marshall et al., 2011).

In the case of Mongolia, the period suitable for livestock tagging is relatively short. Livestock can be tagged neither during harsh winters due to low temperatures nor during hot summer days due to insects.

## **2.11 Cooperation between Czech Republic and Mongolia**

Since 2004, Mongolia has been among the 8 priority countries of the Czech ODA. Within Mongolia, Czech development cooperation is appreciated and accepted, since there is potential for secondary benefits in the business sector. According to the Czech Ministry of Foreigner Affairs, environment, agriculture, social development, and economic development correspond to the country's needs (MFA, 2010).

Mongolia has been an important partner to the Czech Republic since 1947. The cooperation is based on strong traditions, shared values, and also on similar historical experiences. During recent years, the Czech Republic became the third largest donor to Mongolia in the EU (Hoření, 2010).

The nature of implemented projects covers education, health care, infrastructure, water supply and sanitation, agriculture, forestry and fisheries, and energy supply.

The first cooperation between the Czech University of Life Sciences Prague and Mongolia started in 2007 with the project called "Identification in Central region (Mongolia)"<sup>3</sup>. This project lasted for three years and was focused primarily on the issues of raising awareness, building capacity and creating the institutional conditions for animal record keeping. The Ministry of Agriculture of the Czech Republic administered the project. During implementation of this project, several tens of thousands of goats, sheep and cattle were tagged.

## **2.12 Evaluated project**

To implement project in a developing country, implementers need to be aware of many aspects. They do not need to know only about economic, political and administrative situation; even more important is to study about cultural tradition and customs to avoid possible misunderstandings (Yanwen, 2012).

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<sup>3</sup> For further reading <http://www.vetnaadam.org>

Evaluated Czech interventions are based on the project implementation “Livestock Identification System – Data Collecting (Mongolia)” which started in 2010 (see Annex – Project Description). This project focused more on the issues creating a system capable of collecting electronic registration numbers of individual animals, and the communication of data from the livestock farmer to the central server, which was performed under the supervision of MIA. As part of the project, the appropriate hardware and software were designed and selected, and data flow communication lines were created. The system uses the individual ear tag barcodes with barcode and portable readers, which allow for fast and easy data collection while minimizing the error rate.

- The overall aim of the evaluated project corresponded to the Mongolian nationwide program – National Mongolian Livestock Program (2010-2021).

The program’s objective which is most relevant to the CULS’s project is called “*Creating an animal registration database and network*”, with the following priority activities (MoFALI, 2010):

- Register every animal with an individual identification number and establish an internationally compliant system for registering, monitoring, and informing livestock and livestock products.
- Establish an information database (with information about core herds, the origin of good quality male animals, and an animal’s productivity with all health indicators) at soum, aimag and national level and provide information to customers.
- Training and awareness activities on livestock registering, and establishing the livestock information network, will be delegated and executed by professional NGOs.
- Provide necessary equipment and programs for livestock registration, expanding the database network, and using advanced technology for registration that meets international requirements.
- Create a list of main animal diseases that are obligatory to report at the national level, and collect, compile, assess and create a reporting and information network on sources of disease and levels of outbreak.

- Improve monitoring scheme through and registration of livestock origin, productivity, quality, traceability and health, and livestock products' quality and safety.

### **2.12.1 Other implemented projects in Mongolia**

There are other projects that are focused on livestock production, in Mongolia.

EU – Mongolia Animal Health and Livestock Marketing Project (AHLM)

This project was implemented for 60 months, from 2008 to 2012 in Ulaanbaatar, Bulgan, Darkhan Uul, Orkhon, Selenge and Tuv aimags.

The project objective was to support the government of Mongolia in its efforts to reform its services in the rural agricultural sector, thereby alleviating rural poverty. The specific objective of the project was to improve the livelihoods of the rural population living on livestock production by establishing a productive and market oriented livestock sector.

Expected results were the following:

- Enhanced institutional capacity in the agricultural sector, including disaster risk reduction
- Improved animal health
- Increased quality and efficiency of the livestock production and marketing

One output used in achieving this result was Animal Identification and Registration. A software program of animal registration was delivered, and initial operations have been established. The plan was to supply and register 10,000 bovine ear tags. However the project's long-term expert, Ian Leach, suggested this activity will likely not be achieved.

These results and their sub-results were achieved over a five-year period with a total budget €9.3 million. The Mongolian government contributed with €323,000.

Animal Health Project (AHP)

AHP is a project implemented by the Swiss Agency for Development. The main phase was implemented during years 2009 – 2011, but this particular project is a part of the Livestock sector, which terminates in 2015. This agency has initiated several major projects to support Mongolia. AHP is one of the approved projects from the SDC. A number of small action projects related to the livestock sector are focusing on increasing

equipment capacity of the Veterinary Drug Testing Laboratory; co-funding of a livestock intensification study together with UNDP; a training seminar on brucellosis.

The main goal of AHP is to increase livestock productivity through enhancement of sustainable herd management of herder households. To reach this particular goal, the objective was set as: establish effective implementation mechanisms and demonstrate the first positive effects of increasing livestock productivity, value additions of livestock products, and income.

Target aimags of the project are western provinces of Mongolia, including Arkhangai, Bayan-ulgii, Bayankhongor, Govi-Altai, Zavkhan, Khovd and Uvs aimags.

#### Mongolia Livestock Sector Adaptation Project

The International Fund for Agricultural Development (IFAD) implemented a project named the “Mongolia Livestock Sector Adaptation Project” between 2008 – 2010. The target of the project was to increase the resilience of the Mongolian livestock system to changing climatic conditions by strengthening the adaptive capacity of the livestock system as well as the capacity of herders’ groups being able to cope with climate change impact.

The project is divided into four components:

- Increasing the climate change adaptive capacity of the Mongolian pastoral system.
- Strengthening of the capacity of Rangeland Monitoring and Management Committees and raising awareness on climate change impacts in rural communities.
- Improving rural risk management systems.
- Managing the project.

The MIA and the Ministry of Nature and Environment of Mongolia were involved in this project.

### **3 Thesis objectives and research questions**

The main objective of this thesis was to evaluate Czech development interventions in livestock production in Central region of Mongolia, which is a project implemented by CULS. The thesis evaluated particular project and it uses internationally recognized evaluation criteria, such as relevance, effectiveness, efficiency, impact, and sustainability. The thesis follows the defined logical framework specified by CzDA, and modified by CULS, which can be seen in Annex - Logical Framework. It also took into account some of standard cross-cutting principles of the Czech ODA, such as visibility and partly gender issue. Regarding the nature of the evaluated project, the criteria for environment, and governance were not assessed since the evaluator found them irrelevant for the project evaluation.

This thesis also assessed an attitude of different stakeholders such as Governmental animal specialists, experts at Gene Bank and livestock farmers.

At the end the thesis provided recommendations how to overcome some of possible problems concerning livestock identification.

In order to achieve the stated objectives, the following research questions were created:

- To what extent the proposed project is complementary to other activities and projects of state and local governments of Mongolia and other donors or implementers?
- Is livestock identification needed in Mongolia?
- To what extent is the objective still relevant to the current priorities of partner organizations, target groups and the direct development cooperation program between the Czech Republic and Mongolia?
- To what extent were the project objective fulfilled?
- To what extent were the project outputs fulfilled?
- Has livestock identification a future in Mongolia?
- Who will be responsible for animal tagging after project termination?
- What are the barriers and constraints?

## **4 Methodology**

### ***4.1 Introduction***

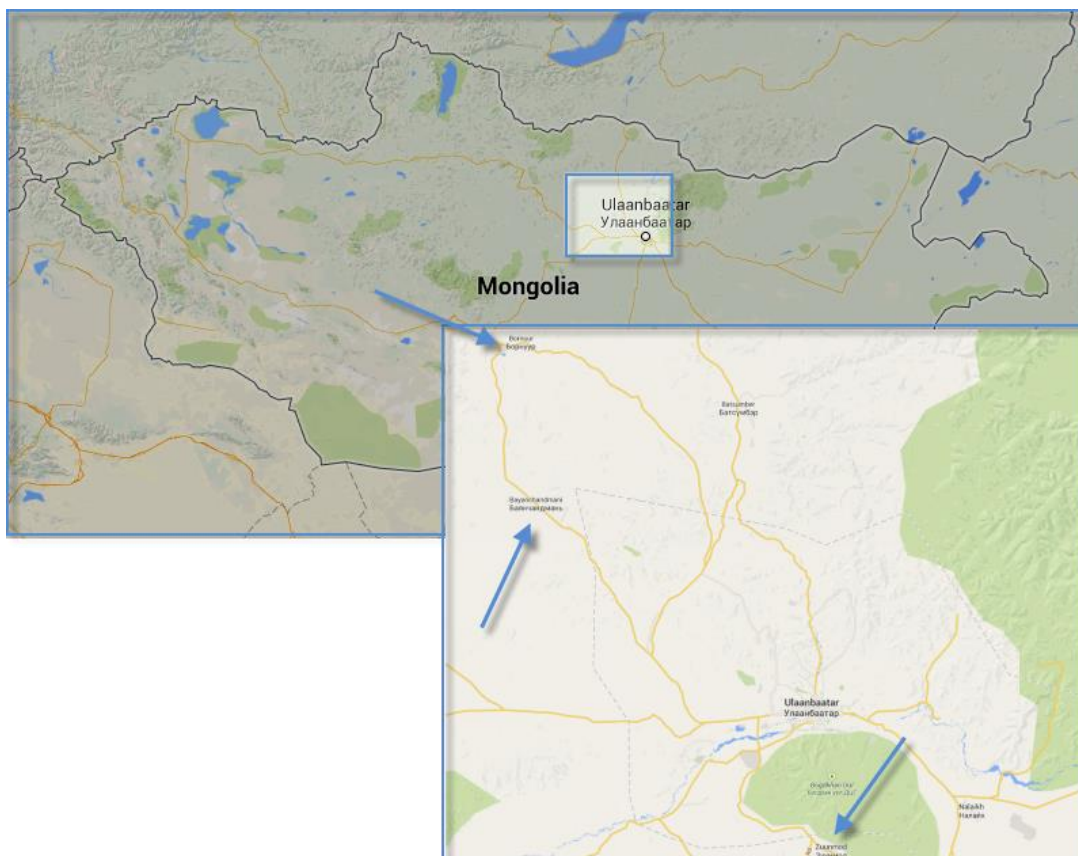
The key issue in this thesis was to use stated evaluation criteria according to OECD/DAC in development project implemented in Mongolia. This involved, first of all, study of project documentation, observation of the implemented area, identification of the stakeholders associated with the project which enabled to define the target population. This was followed by the design of a survey instrument and testing the reliability and validity of the same. Finally with the help of trained field investigators, the survey instrument was administered amongst key respondents.

### ***4.2 Data Collection***

The present study was carried out in 3 soums in the Central Mongolia, in Bayanchandmani, Zuunmod and Bornuur, see

**Figure 5.** Design of data collection was of one-shot, non-experimental nature. Data from the period prior to livestock tagging does not exist; therefore there is no possibility to compare the situation before and after livestock identification.





**Figure 5.** Surveyed Areas highlighted on a map of Mongolia

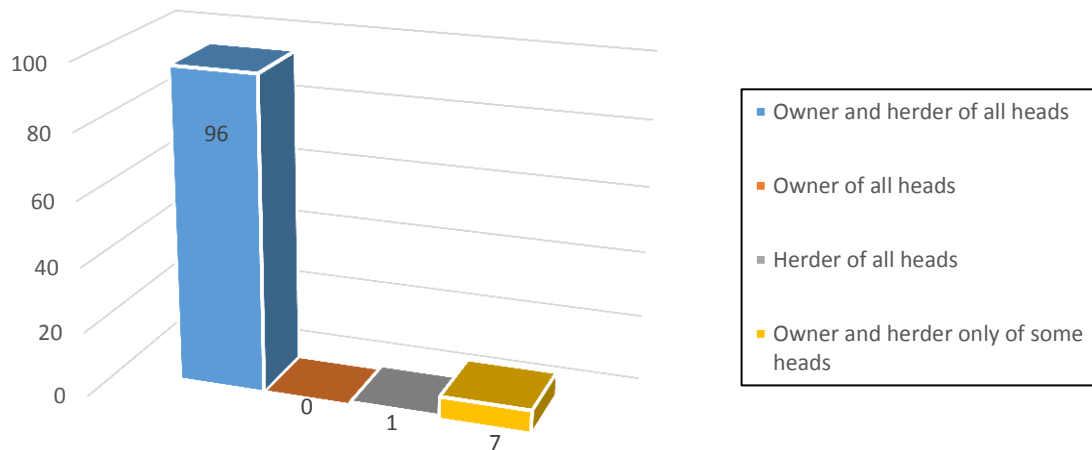
(Source: Google maps)

Type of sampling used during this survey was non-random, based on specific criteria.

The first list of questions was prepared during June and July 2012. Different questions were prepared for each stakeholder group separately namely experts at Gene Bank, governmental animal specialists and herders. The design of these questions contained mainly quantitative based questions. Respondents were questioned personally and individually to avoid misunderstandings and different interpretation of answers. Thanks to the personal contact with respondents, other related questions and issues could be discussed and used for the evaluation report.

In the end of July 2012 ten farmers with tagged cattle by Czech ear tags were questioned. Afterwards, specific questions tried to be improved, while irrelevant questions were discarded.

In Mongolia not all herders own their livestock, in some cases they only take care of livestock of others (**Figure 6**). From received numbers at the communal office was not clear exactly what the population number is.



**Figure 6.** Composition of livestock ownership in studied area(number of herders)

### 4.3 Sources of data

#### 4.3.1 Primary data

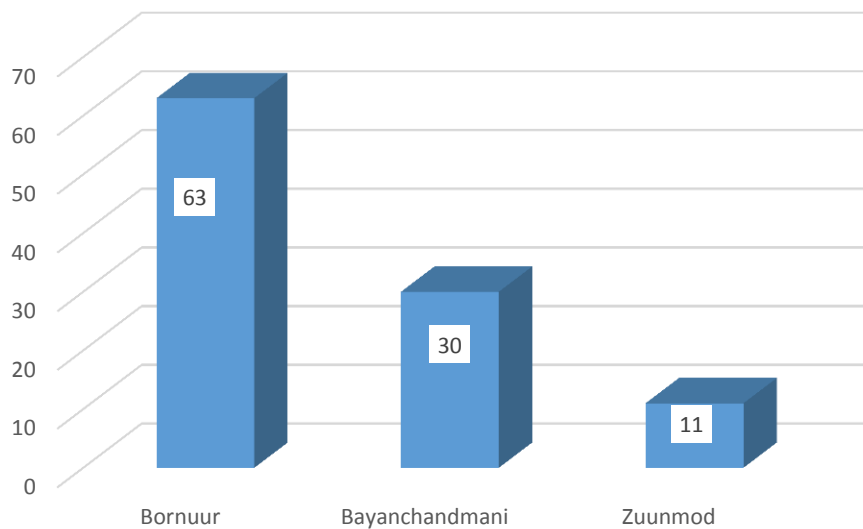
##### Interviewed livestock farmers

In total, 120 livestock farmers were individually visited, but after data cleaning only 104 completed and clear questionnaires could be used because some answers were not clear or did not fulfil criteria.

Criteria for respondents (livestock farmers) selection was following:

- Livestock farmers had to live in one of the evaluated districts where the project was implemented (Bornuur, Bayanchandmani, Zuunmod)
- Respondents had to own at least one head of cattle
- Cattle had to be tagged with ear tag of the project

**Figure 7** shows that most of livestock farmers were questioned in Bornuur soum (63 respondents) then in Bayanchandmani (30 respondents) and then in Zuunmod (11 respondents).



**Figure 7.** Number of respondents in surveyed soums

### **Interviewed governmental animal specialists**

Different kind of questions was given to governmental animal specialists, from all three districts where the survey was conducted (Bornuur, Bayanchandmani and Zuunmod). During survey, also 2 experts of Gene Bank who are involved in animal identification were asked via structured interview.

Criteria for governmental animal specialists' selection:

- Key persons working at an office as animal specialists were questioned.
- Three governmental animal specialists as deputies of following soums were questioned:
  - o Specialist in Bornuur, he works as a livestock specialist,
  - o Specialist Bayanchandmani, is a veterinarian, and specialist in Zuunmod, works as a veterinarian too.

- Each person has been responsible for animal tagging at soum where he/she works.

### **Interviewed experts at Gene bank**

There were questioned two experts who were responsible for livestock identification within implemented project. A structured interviews were conducted with the expert who is responsible for a server, flow of data and data control on the district level was and other expert who is responsible for laser machine and ear tag marking.

Interviewed expert in the Czech Republic

Via e-mails was questioned an agricultural expert and accredited consultant for agriculture. His recommendations are mentioned in part of recommendations. His opinions and recommendations are very relevant since he has long-term experiences relate to animal identification and he was also present in Mongolia so he is aware of the situation.

### **4.3.2 Secondary data**

Secondary data was studied mostly before field survey. Project proposal and all available documents, periodical and year reports were studied.

Then, the conception of cooperation between the Czech Republic and Mongolia was taken in account and information about other projects implemented in Mongolia not only by Czech implementers. Reports related to project System Implementation in Mongolia – Delivery of Equipment were also taken in account. The attention was paid also to web sites of evaluated project and also to web sites of some other projects related to animal production. Such as projects:

- Mongolia Animal Health and Livestock Marketing Project implemented by EuropeAid
- Animal Health Project implemented by Swiss Agency for Development
- Mongolia Livestock Sector Adaption Project implemented by International Fund for Agricultural Development.

#### **4.4 Ethical questions**

To keep ethical considerations, each respondent was informed about the purpose of data collection and the way how data will be used and analysed. They were also informed about data privacy and confidentiality. Interviewers tried to avoid of too personal questions, which would be uncomfortable to answer. Tracking of respondents was done by car, which was available for project use. The interviewer team was composed of a student(s) of CULS and interpreter(s). Only in Zuumnod soum, the local veterinary joined the team of researchers to show them where farmers with tagged animals live. On one hand it was very useful, because it saved some time, on other hand farmers' answers could be influenced by his presence. Interpreters for this survey were native Mongolians who studied in Czech so their knowledge of both languages is on professional level.

## **5 Results**

Results are presented through OECD evaluation criteria, as mentioned above. Extra cross-cutting principles were taken into consideration from CzDA – including the addition of visibility and gender issues.

### ***5.1 Relevance***

To what extent has the proposed project been complementary to other activities/projects of state and local governments of Mongolia, as well as other donors/implementers?

The project was implemented in the framework of development cooperation. Mongolia has several major sectors that are undergoing development. The Agriculture sector is a sector which can greatly benefit from an external cooperation.

Regarding the identification of the project, the Mongolian government (MIA) applied for intervention for the improvement of animal identification in Mongolia through the standardized procedure at the Czech embassy in Ulaanbaatar.

The aim of the current project is mainly to become part of the Mongolian nationwide program – National Mongolian Livestock Program (2010-2021).

To what extent is the objective still relevant to the current priorities of partner organizations, target groups, and the direct development cooperation program between the Czech Republic and Mongolia?

Today, livestock identification is often mandatory or, at the very least, common in many parts of the world. Livestock identification might potentially bring many advantages to Mongolian farmers and to the government.

Mongolian livestock farming has a long-standing history and is an inseparable part of Mongolian culture and their economy. Even though the products of Mongolian livestock farming are organic, tasty and of high quality, they are not a considerable part of the international market and their primary function is the self-supply of local farmers and

local public. This is mainly due to the seasonal and extensive nature of the production, non-existent product traceability, and low-quality hygiene standards.

For Mongolian production to be competitive on the international markets, many measures need to be applied. These include, for example, ensuring better veterinary conditions (eradication of livestock diseases, periodic vaccinations, etc.), the introduction of breeding practices, increasing efficiency, enforcing international standards within food production and safety (HACCP), and last but not least, the strengthening of the livestock farmers' social position. Livestock without a clear origin cannot enter the stock exchange or be used in the processing factories (ADB, 2006).

During project implementation, responses from MIA experts were positive as they indicated they were very satisfied with the cooperation from companies like JTIS, or MAVE, Ltd<sup>4</sup>, therefore there is a high probability that cooperation will continue.

Based on the findings mentioned above, **relevance** was assessed as **highly relevant**.

## ***5.2 Effectiveness***

To what extent has the project fulfilled its objective?

### **Objective: Improvement of livestock identification**

The project serves as an important model for the further spread of animal identification. Throughout 2011, tagging equipment and ear tags were used in 3 districts within the Central region in Mongolia, and over 16,000 heads of cattle were tagged. Throughout 2012, identification spread into other provinces within the Central region. Out of 100 portable barcode readers, 45 were delivered to district offices, and 55 have remained at MIA for further distribution, or for replacement in case of failures. However, due to

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<sup>4</sup> JTIS - Mongolian company that provided a supply of electronic portable readers including control software.

MAVE, Ltd.- Czech producer of plastic ear tags and tagging equipment.

reasons explained below, at the end of the project, there are only approximately 40,000 heads of cattle tagged, and 22,228 heads are recorded on the server.

**Effectiveness of achieving the objective through the outputs of the project.**

Even though all the outputs were achieved, not all were achieved with the same effectiveness.

*Output 1.1. Functional system of data transmission between district workers and central evidence.*

Even though the central identification system, developed by the company Interaktiv, had not yet been functional at the Central level, local implementations were working toward the end of the project (in MIA/Gene Bank building). However, this situation was not intended to be a permanent solution since data compatibility between two systems is crucial. Due to the delay on Interaktiv's side, it was not possible to receive the data structures from the Interaktiv system, which made it difficult to establish compatibility during the project implementation.

The current system has data from soums being sent to Gene Bank as e-mail attachments. However, the communication between soum and central level seems rather ineffective, since soum workers send data on an irregular basis, and with many errors in typing names and numbers. The system for controlling the data has not been properly implemented, and soum workers require more time to reduce the amount of errors occurring during data entry. MIA was also changing requirements of the data structure for the portable bar-code readers throughout the project, which seems likely to continue even after the project termination.

55 portable barcode readers were not distributed to soums, based on the requirement that the Gene bank will solely make decisions about distribution, and only throughout the



next year. Pressure from Allflex<sup>5</sup> and other companies to introduce their own equipment also played an important factor in this decision.

Another activity that was not fulfilled under this output was related to the marking and distribution of the 30,000 "third party" pieces of the ear tags, which were supposed to be used as a replacement to paper identification cards for each animal. MIA regards this practice as not being effective, and insists on printing traditional paper cards for each animal. Since MIA has no strategy on placing barcodes directly on the paper card, the clear relation between the barcode on a plastic card and techniques of reading the barcode with the electronic portable reader appear uncertain. This can limit the effectiveness of electronic portable barcode readers in future.

There are plenty of questions regarding the fulfilment of this output, which remain open and questionable. The majority of them were caused by the difficulties in direct cooperation with ministerial institutions, which had not previously had a clear strategy regarding the identification of animals. Often, key positions were changing based on the political decision, and the budget of the project was rather small, making it difficult to reach a better negotiating position.

Due to all mentioned reasons, effectiveness of this output was assessed as **rather low**.

"During animal tagging, we usually use paper and when we get to the office, we rewrite those data into a computer.", stated a Veterinarian and governmental animal specialist responsible for animal tagging in Zuunmod.

### *Output 1.2. Tagged livestock in the Central region*

The target number for tagged animals was not fully achieved. Failure to reach this output was largely caused by extended delays of project initiation, which occurred at the beginning of each project year. Due to this fact, many of the months best suited for tagging were missed, since during the summer months, MIA concluded that the tagging of

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<sup>5</sup> Allflex is the world leader in design, technology, manufacturing and delivery of animal identification for traceability systems across all production.

animals was inappropriate, and a large number of Mongolians were on holiday. Below, there are other reasons for failure identified during the evaluation:

- The hand out of the list with official ear tag codes was delayed each year, at the fault of MIA because MIA is responsible for submitting codes.
- Working with the laser machine was a slow process: the person in charge of working with the machine also has other work duties. Additionally, because of the distant location of the laser machine, the worker could not work there every day.
- The timeline for tagging is short because the cattle are outside in the grasslands from early morning until late in the evening. Additionally, seasonal tagging periods are short due to harsh winter conditions and due to insect occurrence throughout the summer. For the tagging of adult cattle, some extra workers must be hired to help fixate the cattle.
- Lack of financial resources: MIA committed itself to pay agricultural workers 300 Tugrik<sup>6</sup> for each tagged head of cattle, however worker pay-outs were often late, and workers were not compensated for fuel.

Number of tagged animals:

Aimag Tuv:

- Bornuur – 5,351 heads of cattle (45.2%)
- Bayanchandmani – 5,098 heads of cattle (98.1%)
- Zuunmod – 2,094 heads of cattle (100%)

During data collection, farmers were asked if they own some of the equipment which is needed for livestock tagging, such as fixation devices for cattle, fences for non-tagged cattle, or additional personnel. A typical answer is represented by one of the farmers from Bornuur *“The animal specialist came with other two men. In the case he wouldn’t, I did not have the necessary number of people. He also brought necessary fixation devices. The fence for animal we do have, because we keep cattle there during winter.”*

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<sup>6</sup> Tugrik Mongolian Currency (MNT). As of March 2014, 1 US\$ equals 1,726.93 MNT, 1 EUR equals 2,377.24 MNT and 1 CZK equals 86.91 MNT (Currency, 2014).

Due to all mentioned reasons, the effectiveness of this output was assessed as **rather low**.

### *Output 1.3. Functional Info-line at MIA*

According to the two questioned members of the Info-line, they had a possibility to be present at all important project activities, and they understand enough about the animal evidence including the portable bar-code readers. One of them participated in training in the Czech Republic and he keeps in contact with the Czech suppliers of the equipment. During the project implementation, the expert participated as a trainer on various project workshops and presentation activities.

The room where Info-line and server are located is equipped with furniture, office equipment, and functional internet access. Info-line members also received direct financial support for their activities and travels. The contact to the Info-line is mentioned on all printed and electronic materials of the project. The MIA/Gene bank also regards the Info-line as a key unit for further spreading the know-how for animal evidence.

During an interview, they also told us the Info-line is not used very frequently; however they did not have statistics or a list of received call numbers. They also indicated they receive calls also from soums and aimags where the project has not yet been implemented. They regard the Info-line as being potentially beneficial in the future.

“So far, there are not many people who call on the info-line number. We think it will be used more in the future, when more aimags will be involved in animal identification. The calls that we receive most often are from people who live in aimags where the identification is not implemented yet. They usually ask about requirements, asking what they need to start with animal identification their city aimag”, stated an expert at MIA during an interview.

Governmental animal specialists were also questioned about the info-line. Researchers asked them if they personally use it and if so, what their experiences were like. “We usually call directly to [Gene Bank expert] in a case some problems appear or if we want

*to ask about something. So far he always knew the answer or he knew how to solve the problem. Most of questions were about to the computer program”, stated a Governmental animal specialist from Bornuur.*

Due to all mentioned reasons the effectiveness of this output is assessed as **high**.

*Output 1.4. Training manual for livestock identification and tagging devised for livestock specialists and farmers*

The manual was translated from English to Mongolian and printed, and Mongolian training DVDs were distributed, both of which were generally regarded as useful. However, the manual printing was delayed, and during the first trainings, it could not be distributed to relevant workers. Subsequently, it was later sent by postal mail, or distributed personally. According to the respondents, the manual is available electronically on the project website<sup>7</sup>. Nevertheless, the created website was not used frequently (the number of visits was not available to the evaluator, so this conclusion is based on subjective opinions of respondents), and therefore there is a risk that MIA will not continue to update it.

Although the main outputs we actualized ate, they were implemented properly, and they can serve well for future expansion of the animal evidence, therefore the effectiveness of this output is assessed as **rather high**.

*Output 1.5. Trainings of experts*

Expert trainings were offered with theoretical and practical parts (out in the field). The training participants were mostly livestock specialists, which means that trainings were effectuated smoothly as most of the trainees were already thoroughly experienced with livestock. The content of trainings for experts was focused on animal identification in

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<sup>7</sup> <http://www.animal-identification.mn/>.

general, specifically about its benefits, animal identification in other countries, and about legislation. During practical trainings, experts were able to test and practice how to tag cattle.

Trainings of experts at the Gene Bank were more difficult, since these personnel had a greater responsibility of the overall system, and for this reason trainings needed to be more sophisticated. One of the experts at the Gene Bank was educated for work with Unicolector software, and during an interview he claimed that he is skilled with older versions of the software, ones which he is able to use without difficulties. However, Gene Bank upgraded to a newer version of the software, and it is unconfirmed whether he was able to continue his work without significant difficulties. For problems with software compatibilities, an important requirement was to cooperate with Mongolian companies, so that when problems arise, users of the software could contact Mongolian support for help.

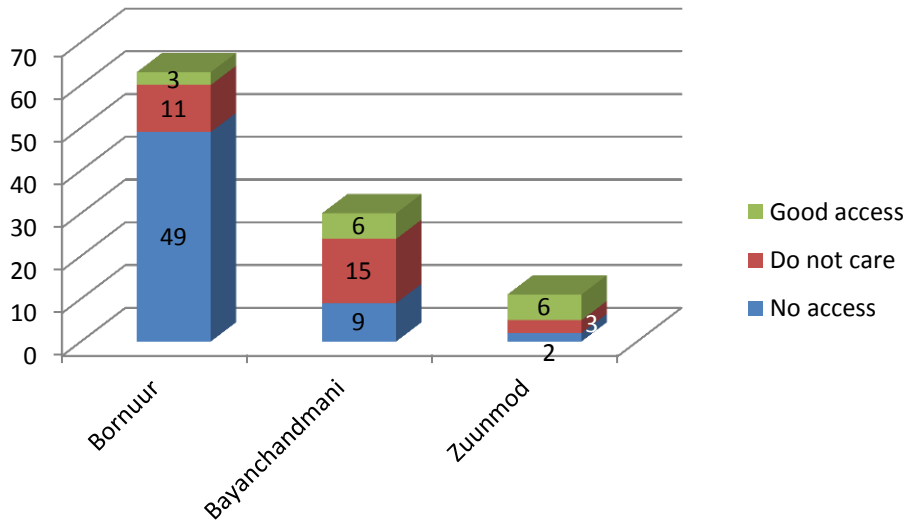
“Even most of the people who attended training are skilled in animal breeding, I found it helpful. For instance, different examples of animal tagging in other countries or practical part of training”, stated a governmental animal specialist from Bayanchandmani.

Due to all mentioned reasons, the effectiveness of this output is assessed as **high**

#### *Output 1.6. Awareness among livestock farmers*

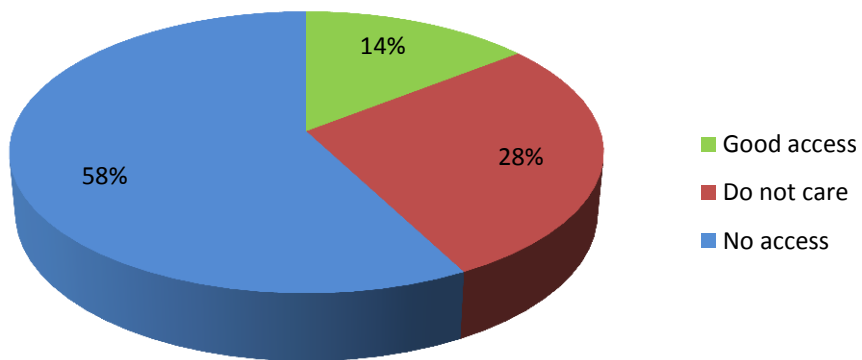
Spreading awareness of animal identification to livestock farmers is regarded as one of the most challenging problems of this project. There was plenty of coverage through the use of posters and leaflets at the soum stage. Soum offices, which were part of the pilot activities of the project, had enough materials to promote awareness. Also, at the central level, several stands, posters and leaflets were used during various events and agro-fairs. Additionally, the importance of animal evidence was presented numerous times on Mongolian television. Nevertheless, the main target group - farmers – seemed to not be well informed about the importance of animal identification. As is visible in the below figures (**Figure 8** and **Figure 9**), for all three soums, nearly 60% of respondents did not have adequate access to information about livestock identification. It is clear that the

worst situation was in Bornuur, where almost 80% of respondents did not have access to relevant informational material.



**Figure 8.** Number of farmers who have access to information about livestock identification in each soum

Source: Survey data in 2012



**Figure 9.** Farmers' access to information about livestock identification (%)

Source: Survey data in 2012

During the field research conducted among farmers, it became evident that some of them were unaware about the advantages of livestock identification, and how it can be profitable. From the 104 farmers questioned, 20 answered that their cattle had lost ear tags, where in most of the cases the loss was only one or two pieces. Nevertheless, farmers indicated they were satisfied with the quality of the ear tags provided by this project, especially when they had an opportunity to compare it with ear tags of other suppliers. The most common reason for tag loss was stated to be due to wrong application. MIA did not approve a proposal of having two ear tags per cattle, therefore at the time of this project, cattle only wear one ear tag. In the case that a livestock farmer owns a significant number of animals, the risk of losing many ear tags pieces could put them in a difficult situation.

*“Actually no body explained us the advantages of livestock identification. District agricultural worker came with some students and told us our cattle have to be tagged. It is a statutory order. “*

*“Well, I wasn’t home that day, but my wife told me, the district agricultural worker came with 2 more guys and they tagged all of our cattle. He really did not explain to her what the purpose is.”*

- Farmers from Bornuur

Most of questioned farmers did not know the main reason or some benefits of tagging. Some of them did not know they must report newly born cubs or pass ear tags of died animals to district agricultural workers.

During data collection, researchers named some of the benefits that animal identification brings, and they asked farmers if they can rate the importance of these benefits as they relate to them personally (**Table 1**). They were given a scale from 1 to 5, where 1 signifies low importance, and 5 high importance.

**Table 1:** Farmers’ ranking on the benefits of identification

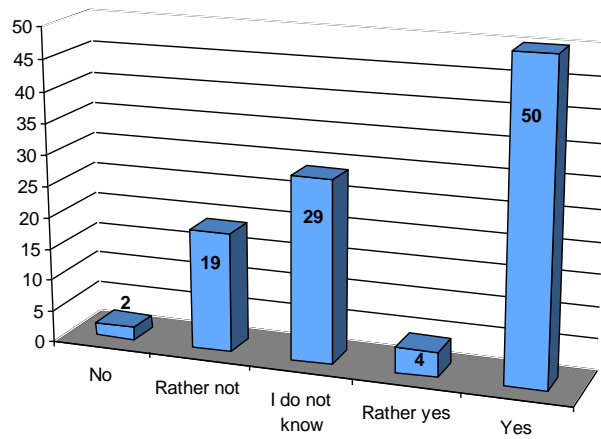
Source: Data Survey 2012

Benefit	Importance
Theft prevention	4.2
Food safety	3.6
Herd Tracking	3.4
Controlled Reproduction	3.4
Herd Turnover Planning	3.3
Higher Realization of Profit	3.2
Vaccination Planning and Records	3.0

Most of the farmers saw the benefit of planned vaccinations as not very important, because as one of the farmer from Zuunmod mentioned: *“I don’t see it that important because veterinarian comes at least twice a year.”* Farmers answered similarly in other soums.

According to **Table 1**, theft prevention was rated as the most important benefit of livestock identification, however during interview with a farmer, he mentioned *“Once happened we lost one cow. A few days later we found only a head of that cow with an ear tag on her ear. So I am not sure if steal prevention is one of the most important benefits.”* Most farmers rated this benefit highest without providing justifications for their rating. One of the questions asked to farmers was whether they were satisfied with the method of livestock identification via the use of ear tags. Their answers are depicted in **Figure 10**.

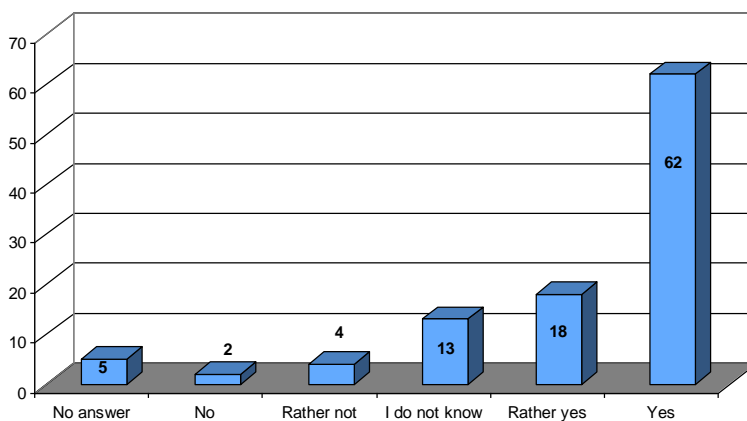




**Figure 10.** Satisfaction with modern livestock identification

Source: Data survey 2012

Many farmers did not offer much of an opinion on whether animal identification has improved, as can be seen in **Figure 10**, which shows that 29 respondents stated “I do not know”. A possible explanation for this might have been due to the lack of awareness about livestock tagging and its possible benefits. However, this possibility is contradicted in **Figure 11**, where most respondents indicated they have a good awareness about the benefits of animal identification.



**Figure 11.** Awareness about livestock identification and its possible benefits

Source: Data survey 2012

Due to all mentioned reasons the effectiveness of this output is assessed as **rather low**.

### ***5.3 Efficiency and financial analysis of the intervention***

Each year, the implementation started with delay, which decreased the project efficiency. Mongolian livestock can only be tagged during a very short period in the calendar year, and due to this delay, the opportunity to tag cattle during early spring months was missed. Cooperation with the key beneficiary, MIA – Gene bank, has been based on high personal and also financial contribution and cost-sharing.

Efficiency may have been reduced by the fact that MIA also cooperates with other suppliers such as Allflex. Allflex uses similar ear tags with bar codes; however their electronic portable readers are not compatible with Unicolector software. CULS experts tried to contact Allflex several times; however Allflex refused to meet them. The main contact persons at the MIA/Gene Bank were not willing to speak openly about the Allflex-MIA partnership, which limited, to a large extent, the possibility to better coordinate and interconnect the two systems.

One of the main roles of CULS was to assist in implementation and coordination of activities to improve the animal identification project. CULS was also supposed to control the implementation of the project and to provide solutions for possible problems. With the exception of several winter months, a local Mongolian coordinator was hired by CULS to help supervise project activities. The coordinator was present in Ulaanbaatar during the whole project implementation. From July 2011, an additional Mongolian employee was hired to help with the implementation of all project activities.

CULS rented an apartment with office room to handle administrative work. Additionally, a Toyota Land Cruiser was purchased for the purpose of transportation. The purchase of such an expensive vehicle was a topic of discussion surrounding the financial planning of the project, however due to the frequent journeys through the rough, non-industrialized terrain outside Mongolian cities, purchasing such a robust vehicle was justified on the grounds of safety.

Four students from CULS were involved in project implementation. They were responsible for the implementation of specialized activities related to the distribution of ear tags, and for field data collection, where these students were able to enrich their practical skills. Two additional experts were involved with the project, including one responsible for education, and another on animal husbandry.

During the whole project, CULS strived for the utmost involvement of Mongolian companies. The best example was the cooperation with the Mongolian company JTIS, which provided a supply of electronic portable readers. CULS recommended JTIS to MIA as a potential supplier for further hardware and software solutions. The cooperation between CULS and JTIS can be regarded as very good and efficient with a proper exit strategy. At the end of the project implementation, MIA was communicating with individual partners by themselves without the assistance of CULS.

When equipment was not available at the necessary quality in Mongolia, CULS tried to involve Czech suppliers. The Czech company Medicom, Inc. was involved to help provide a laser machine. Also, the company MAVE, Ltd. provided ear tags and equipment, and is now in direct communication with MIA. There is a chance that MAVE will be able to participate in a new governmental bid for new ear-tags.

On the other hand, communication between the Czech project leader and the Mongolian coordinator was rather poor. It was planned that the two would have video calls once per two weeks, however this rarely occurred. In some cases, the coordinator have made important decisions without first consulting the Czech project leader, and likewise, vice-versa.

The four students from CULS (FTA) who were involved in the project were supposed to help with project coordination and implementation. Unfortunately, during both years, the students who arrived during the spring had limited work to do, and students who were involved in the project from August or later had too much work. According to the Mongolian coordinator, it would be better if the first two students would have arrived in early June, and then again at the end of August, because from late July until the end of August many Mongolian employees are off work for holidays.

Regarding the financial analysis, there was not much data available, since the whole system and budgeting was handled directly by MIA/Gene bank. The most accurate data is on the price of **one tagged animal at 300 Tugrik** (4.2 CZK), which MIA paid internally to the soum workers. The amount started at 150 Tugrik in 2011, but soum workers reported this as being insufficient. After initial delays with tagging, MIA increased the price to entice participation. At the end of the project, the financing appeared to have stabilized. Another large financial burden for MIA/Gene Bank was the operational cost (especially energy costs) for **operating of the laser machine** during the winter months. The last winter bill, for electricity alone, was as high as **20,000,000 Tugrik** (around 285,000 CZK). Until the new Gene Bank Centre near Darkhan is constructed, this cost will represent a limiting factor for the sustainability of the Czech laser machine.

MIA invested a considerable amount of money into the project with the co-financing of travel, personnel, and operational costs (wages for Info-line employees, the marking of ear tags via the laser machine, involvement of dozens of specialists on the central and soum level, etc.). The specifics of these financial costs were unfortunately available to CULS.

Another important financial consideration was the price of new ear tags. Although the tender for new suppliers was supposed to be based on transparent indicators, researchers were not able to get details about the pricing and conditions under which the Allflex company supplied their ear tags. On other hand, the regular supply of ear tags gives the impression that MIA is really committed to continuing with the identification and evidence of all animals in Mongolia. According to national priorities, MIA is ready to invest considerable amounts of money into this project.

Due to all mentioned reasons the **efficiency** of this output is assessed as **rather high**.

## ***5.4 Sustainability***

Since the evaluation data gathering was completed prior to the completion of the project, sustainability and impact is mainly on the level of recommendation. Also, the numerous

personnel changes within the ministry and with the director position at Gene Bank makes the continuation of the project quite unclear.

However, the MIA has demonstrated substantial interest in the continuation of the project. In Bornuur, one of governmental animal specialists told us *“I am sure the identification will continue because of pressure from the side of MoFALI”*.

MIA is planning to use the laser machine for marking small ruminant ear tags, and asked for a sample of an ear tag with the re-designing of the laser machine. For this purpose, CULS brought specialists from Medicom, who re-adjusted the laser. The continuation of laser machine activities therefore seems very likely.

Both farmers and district agricultural workers agree that the Czech ear tags are of high quality, and nearly all cattle that were tagged at the beginning of the project implementation still have their original ear tags attached without visible damages. Unfortunately, ear tags from Czech company are quite expensive, and MIA probably will not continue with further purchases following the project termination.

Governmental specialists are an important interlink between MIA and livestock farmers. They should focus deeply on livestock farmers and their awareness because their continued involvement in the future of livestock tagging is essential, they have vast knowledge about their animals, and district workers should discuss all the benefits of livestock identification with them. For instance, one farmer in Zuunmod mentioned:

*“Identification of cattle is helpful and it does not make any health troubles to their ears, however I cannot say the same about sheep and goats tagging. These smaller animals live in closer contact and they very often suffer from running wounds. The main reason is that the hole is recovered very slowly and if the animal is tagged during summer time, any insect can infect it”*

Similar findings could improve future tagging.

One factor affecting sustainability is the location of the laser machine. The laser machine is located about 20km from Ulaanbaatar, which creates additional travel costs for employees who administer the machine as they travel from Ulaanbaatar. Also, such a sensitive machine requires specific levels of temperature and humidity to function correctly. Last winter, MIA had to heat up the room which contains the laser, and resulted

in substantial increases to the electricity bill. Therefore, the future use of the laser machine during the winter time remains unknown.

At the moment, **sustainability** was assessed as **rather high** (based on future development)

## ***5.5 Impact***

During an interview with the expert at Gene Bank, the expert indicated more money from the Czech side would be very helpful. However, he is convinced that the project objectives have been achieved, and now is discussing if they will continue to subscribe to Czech ear tags which are of high quality, or to prefer Chinese ones which are much cheaper. Right now, it is not possible to assess if rural livestock farmers actually improve their social and financial situations, because so far there is data showing advantages for tagged cattle owners. It is necessary to regard the animal evidence not only as a stand-alone exercise, but it is crucial to build on it consequent activities in veterinary, breeding or statistical practice, to widen the impact and fulfil the overall aims of the project.

At the moment, **impact** was **not assessed** according to the evaluation scale.

## ***5.6 Cross-cutting principles of the Czech Development Agency***

### **5.6.1 Visibility**

Criteria for the “visibility of the Czech development cooperation” was assessed during an observation phase. The logo of CzDA was placed on all promotional materials and equipment provided by the project implementer.

Logo of CzDA and CULS was placed on the following:

- At the building of MIA, at the office of Gene Bank (computers)
- At the district offices, large project posters were displayed
- In the training guide for livestock specialists and farmers
- On training materials provided during trainings

- On the car
- On the Information leaflets
- On posters displayed during open days of MIA and Green Days

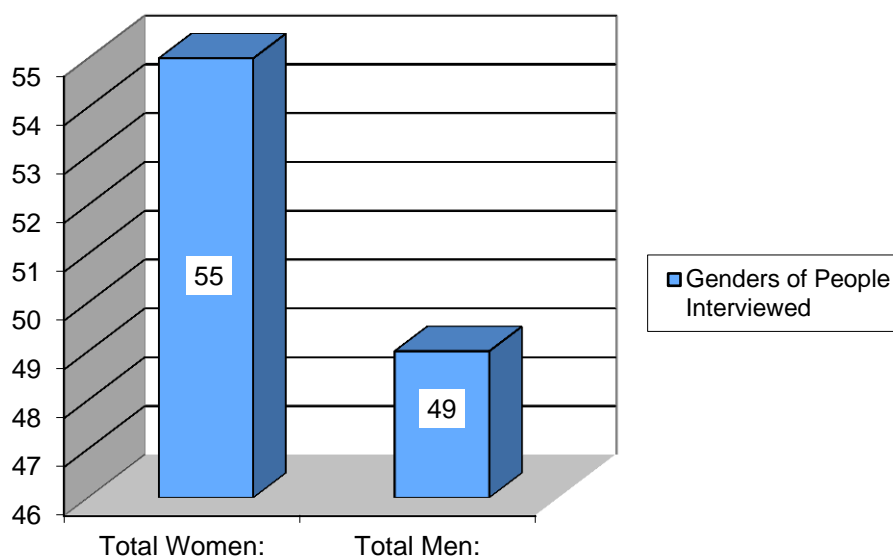
Even though information was made visible in most of the provided materials, during survey among farmers, only one quarter of farmers knew who the donor of the project was.

As it was already mentioned above, information about the project and Czech ODA was presented in local and national Mongolian TV channels and periodicals. In terms of the first project, another web site was created ([www.vetnaadam.org](http://www.vetnaadam.org)) and an article "*Healthy cattle - the basis of Mongolian agriculture, identification, evidence, livestock, Mongolia, development cooperation, pilot project*" was published in the Czech periodical called "Rozvojovka".

Therefore, **visibility** was assessed as **high**.

### **5.6.2 Gender issues**

Although this parameter was not evaluated, in general, equality of men and women in Mongolia is rather high. The level of women's education is relatively high, and women lead in education, culture, health service and other social sectors. Nevertheless, the technical nature of the project, which focused on the central ministerial level, did not allow a direct impact on improving the status of women.



**Figure 12.**The genders of interviewed herders

Regarding the involvement of workers, both genders were involved into the process connected to livestock identification. The leading positions at MIA – Gene Bank consisted of three males, while the administrative assistants consisted of females. In the districts of Bayanchandmani and Zuunmod, mostly females were responsible for livestock tagging. This parameter was not assessed according to evaluation scale.

### **5.6.3 Environment**

In general, the project had no significant impacts on the environment. Therefore, the effects of this project on the environment were not evaluated according to the evaluation scale.



## 6 Recommendations

Recommendations are directed to involved experts, scientific workers, and those who want to make animal identification sustainable.

Based on findings gained from observation and from interviews with different target groups, recommendations are divided in two sub-chapters:

### **6.1 Technical recommendations**

Farmers who own larger numbers of cattle herd are more susceptible to having more cows losing ear tags, which results in difficulty tracking on tags belong to which cows. The recommendation is for MIA to discuss the possible implementation of tagging in both ears, despite the need to increase the number of required ear tags.

Another recommendation is based on the experiences of an agriculture consultant who was conducting similar projects locally in Mongolia, who offers new insight on the main reason of livestock tagging, and discusses whether it is necessary to tag all bovine animals: *“It is necessary to fix the date of the beginning of the livestock evidence, e.g. 1<sup>st</sup> January 2013 and from this date tag all born mother and cubs. This eliminates the volume of tagged animals. Young breeding stock will be added up to the birth of a cub and it will be enough to start evidence of these animals step by step it means the latest at cub is born. We should also ask ourselves if it is necessary to tag males – other than those who are intended for breeding or how do we want record deaths, black slaughtering, other loses, animal disease but also new cubs etc.”*

### **6.2 Recommendation for its impact and sustainability**

To increase an impact parameter, it is recommended that MIA should further continue with animal tagging also in other Mongolian aimags and its soums, as well as increase tagging of new heads in Central Mongolia where the project was implemented. This will bring high expenses especially due to following investment:

- Purchase of new ear tags for different kinds of animals

- Purchase of new machines to produce ear tags in Mongolia
- Purchase of new hand portable readers, because the currently owned 100 pieces can only cover approximately 70-80 soums
- Investment into a central animal database
- Investment into a system compatible between Unicolector, JTIS and Interaktiv
- Investment into another laser machine to facilitate tagging large volumes of animals in Mongolia

Other technical questions related to sustainability and increase of impact was discussed during last months of project implementation. These questions were discussed with new managements of Gene bank and also with a project dean during a closing ceremony in presence of the Czech ambassador, the deputy minister of MIA, the director of CzDA and the director of Gene bank on 7<sup>th</sup> December 2012 in Ulaanbaatar. The follow items were discussed:

- The importance of interconnection between systems from JTIS and proposed system of Interaktiv
- The tagging of remaining animals during 2013

It is very important to utilize the identification to some other practical steps of development in animal husbandry. It is important to continue in know-how transferring from Czech experts into Mongolia. They should discuss which parameters are useful for them, such as the improvement in the quality of veterinary services, controlled breeding, increasing the quality and traceability of meat for potential export, making better use of statistics, and working with mass barcode data for additional soums.

Another way to increase sustainability would be follow-up projects connected to animal husbandry.

There is also high probability MIA will import new ear tags from China. According to farmers who have experiences with these Chinese ear tags, the farmers do not appear to be satisfied with these tags. The tag material is not of high quality, and during low winter temperatures, ear tags were falling off in a number of cases. MIA might again consider

using plastic labels with barcodes, which were used in the beginning of implementation. It is smaller than the paper cards, and the plastic is more robust and therefore has a smaller chance of being damaged.

MIA should supervise the improvement of communication between livestock farmers and governmental animal specialists. One improvement can be planning veterinary and zoo technical work with periodical livestock tagging. Even the guide that was created as one of the outputs cites that new-born cubs must be tagged; though none of the district agricultural workers followed that order. New-born cubs or purchased new heads of cattle are tagged at one time in autumn. Farmers did not have any information about tagging periods. MIA should notify district workers about tagging periods, and then MIA should supervise if the district workers spread this information to the livestock farmers, and subsequently supervise if the district workers follow the tagging period. MIA can motivate district workers by remuneration or with other improvements of district, etc. At the very least, MIA must pay the agreed amount for each animal tagged in each district; otherwise governmental animal specialists will not regard their efforts as adequately appreciated.

During October 2012, key executives of most major departments of MIA were exchanged. This fact can cause future misunderstandings, which can ultimately negatively affect sustainability. If old executives transfer all material related to livestock identification to new ones, it will increase the chance of future possibility of central evidence. The future continuation of livestock identification will be possible due to the fact that the implementation was based on participatory methods, which ensured maximum partner and project beneficiary integration, and defined responsibility for project outcomes which enhanced their sustainability for the future.

If MIA set some rules or rather schedules when and how many animals have to be tagged, we recommend conducting random supervisions to find out the awareness of livestock farmers, the attitude of farmers to livestock identification and also attitude of district agriculture farmers. We recommend doing it twice a year, the first before Naadam in July, and the second at the beginning of October, after animal tagging.

District agricultural workers should further discussions with farmers because they can have important comments which can lead to the improvement of identification. Employees of MIA should make up a plan on what is the most important parameter to measure. They can do it by themselves, or they can also cooperate with the Bohemian and Moravian breeders corporation whom they visited during their stay in the Czech Republic.

## **7 Discussion**

Over 30 million livestock are spread around the entire Mongolian territory. To improve local breeds, animal health (ADB, 2006), and to develop the possibility for export, a livestock identification system is very important. The system needs to be effective and sustainable. Not only do these objectives need to be evaluated to ensure that the quality of the identification system complies with a minimum set of standards, the evaluation should be used as a prerequisite for continued participation in refresher training activities.

Implementers of a project in a developing country need to be consistent with the local culture, with the features of the particular society, and with the formation of its political, economic and administrative system (Yanwen, 2012). The evaluated project tried to meet such a criteria with the cooperation of Mongolians who know the Mongolian culture and also Mongolian law. Incidentally, these cooperating Mongolians also understand Czech culture and Czech law, because they previously have studied and lived in the Czech Republic for more than ten years.

With use of OECD and CzDA evaluation criteria, this thesis tried to critically assess all of the project's outputs, and to provide useful recommendations. Though the thesis could not compare data with the first part of the implemented project (*Livestock Identification System Implementation in Mongolia – Delivery of equipment*) it used some of the conducted data performed by Šlocar (2012) who performed surveys throughout Mongolia in 2011. Both surveys show that farmers are not very informed about livestock identification. Also, Governmental animal specialists who are trained by MIA are not

supervised enough. Possible reasons for this could be the lack of money, time, and/or poor management.

Developing countries often try to improve their infrastructure in order to achieve and sustain economic growth to order to get closer to standards of developed nations. On the route to sustainable economic growth, they usually meet two main obstacles, which are technological know-how and financial resources. Requirements of developing countries are often much higher than donors can offer (Quartey Jnr, 1996; Yanwen, 2012). The particular project that was evaluated as part of this thesis demonstrates these aforementioned constraints. According to the expert who works at the Gene Bank, lack of infrastructure and money sources are the main problems for implementing an effective livestock identification system. On other hand, Mongolia belongs among countries the top countries with have the highest number of developing projects in progress. These projects are very well adapted (MFA, 2010).

### ***7.1 Impact of project on livestock production in Mongolia***

The goal of project was to help development a system for livestock identification, with the hopes of helping to further develop the economics and infrastructure for farming in Mongolia. By implementing a centralized identification system, it is possible to improve disease investigation and response, surveillance, safety, and market differentiation around local Mongolian animal food products

Based on the results of this study, it does not appear that the overall project was yet effective in terms of helping the local breeders. As seen in the results, few breeders were properly introduced to the scope and benefits of this project, and most often had little knowledge about the impacts of livestock identification. During initial contact farmers, most farmers were positive about the implementation of a tagging system. However, in practice, few realized any benefits, as is exemplified by the farmer whose cow was stolen and head removed to avoid exposing the thief via tracking.

Overall, livestock identification appears to benefit mainly farmers with large productions, or those focused on selling their products in larger quantities. These farmers require tagging to provide a certain guarantee of quality, as they can better track their products

which helps with logistical purposes and for disease prevention. On the other hand, smaller farmers rarely saw true benefits of animal tagging as they were able to manually keep track of their own products, and sales were typically executed on a local level.

Although it is obvious how animal identification can benefit the Mongolian economy by helping to increase and expand export production, at the time of this study, it was not yet obvious whether livestock identification was showing any positive effects in this regard.

## ***7.2 Effect of livestock identification on project stakeholders***

The different project stakeholders were categorized into three groups: government workers, animal experts and farmers.

Animal identification is a particular goal of the Mongolian Livestock National program, which is a government initiative from the Mongolian Government (MIA, 2010). As part of this project, two contacts in the Mongolian Government involved in helping execute the project goals: one contact at Gene Bank, and one contact who was handling the work involved with the laser machine. Overall, the cooperation between the two Mongolian government workers was positive, and both were regularly engaged in work surrounding the project. The project helped provide managing support for spreading livestock identification at a national level, and by providing higher quality ear tags through the Czech companies MAVÉ, Medico, tag creation and tracking was improved by the project.

One of the responsibilities of local animal experts is to spread the knowledge of animal identification to local farmers. Since one of the project focuses was to provide training and education on the physical tagging and identification procedures to local animal experts, it's possible to assess the impact of the project by comparing data acquired from local animal farmers. It is evident that the project had varied impacts on these experts, since data shows that some soums were better informed on the benefits of livestock identification than others, and the impact of the project greatly depended on the quality and level of involvement of the local animal specialists. In Zuunmod and Bayanchandmani, local specialists were more effective in consulting, training, and propagating the knowledge of livestock identification to their local farmers. From

communications with animal experts, it seems apparent that the project positively influenced their work.

### ***7.3 Limitation and validity of the project data***

One major limitation of this study was limited access to surveying project stakeholders, specifically farmers. As can be seen in the results, the total number of farmers interviewed was 104, which is a relatively small sample size and therefore leaves the question of whether the data acquired is valid. However, since the farmers interviewed are those that are in direct contact with animal specialists, it is safe to assume the data acquired relating to the effectiveness of animal specialists in the region is valid. For example, the soum Bornuur showed very poor responses on the effectiveness of local animal specialists to spread the knowledge of animal identification, and quotes from local farmers indicate that animal specialists typically arrived, tagged their cattle, and left without much explanation. To further improve the validity of data, it would be advisable to create method of surveyed larger numbers of the farming population in Mongolia.

### ***7.4 Limitation and validity of livestock identification data***

The maintenance of the centralized database for livestock identification in Mongolia is currently handled by Gene Bank. The process acquiring livestock identification is as follows:

1. Animal specialists scan identification tags with a barcode reader, or manually record data on paper
2. They download the data from the readers onto a computer
3. They send all data to Gene Bank via email
4. Gene Bank manually processes the data and enters it into their database

Since the process involves many manual steps, it is evident that there is much room for human error. Additionally, the execution of data sharing is ad-hoc and without structure, which can lead to further human error and mistakes. For example, since data is arriving in an email inbox, it's entirely possible that an employee who is not well organized might forget about receiving an email they have already opened, and never enter the data into

the system. This raises the question on whether the data on livestock identification in the centralized database is in fact valid and up-to-date.

In order to improve the validity of data in the centralized database, there are a number of improvements that could be made to standardize and automate the data collection and transfer process. For example, animal specialists that record the tag data with the barcode reader could be responsible for entering the data directly into the centralized database, without requiring someone at Gene Bank to also handle the data. Also, it might also be desirable to create a computer application that would automatically take barcode reader data and handle processing it into the database. This application could also be provided with features such as data error detection, where it could look for obvious issues in data such as missing information, or old data, and report errors or warnings to the animal specialists so that they could address and potentially fix the issues immediately.

### ***7.5 Limitation of an internal study***

As was mentioned previously, this evaluation was done internally within the confines of the project, which brings both advantages and disadvantages. For instance, the advantage of an evaluator who is involved in the project implementation means they will likely have an extensive understanding on the history, management, and nature of the project. The evaluator also knows the people who are involved, which can make the evaluation more fluent due to ease of communication. On other hand, it can be also identified as a disadvantage because sometimes internal evaluations are not very critical, and because of the evaluator's close involvement with the project, he/she may be unable to recommend any pioneering solutions to identified problems. In the case of an external evaluation, evaluators usually bring more objectivity to the evaluation report; they have a fresh and clear view without bias. Most external evaluators are experts in evaluated projects, which may bring effective findings and recommendations. A typical example was an agricultural project in Georgia. The evaluation team was composed of experts on evaluations and agricultural (Černá et al., 2012). Very often, the evaluator is present only for a limited period of time, so he/she may not fully understand why the project is



implemented in a particular way, and may not understand the project team properly, which can result in misunderstanding of particular behaviour.

Results are mostly based on answers from structured and semi-structured interviews, which results in some limitations. Although respondents were aware of the purpose of the interviews, some answers might be biased or misrepresented. Other limitations might be the fact that the evaluator was not able to meet with anyone from the Allflex company who are supplying many of the ear tags used in livestock identification in Mongolia. Nevertheless, other involved companies point at the interest of Mongolian government. Shortly before the project's termination, there was a change in the Mongolian government. Whether the change in government had an impact on sustainability and continuation of livestock identification is a subject for further studies.

## **8 Conclusion**

The purpose of this study was to assess the Czech development interventions in livestock production in the Central region of Mongolia. An effort has been made to provide useful recommendations that lead to the empowerment of stakeholders in the evaluated project. Livestock herding is, for most of the rural population, the only source of livelihood. Especially for those who own larger numbers of heads of livestock, implementing an identification system is very important.

The management of livestock identification should be re-evaluated, because the aim to only tag all bovine is not particularly effective. One recommendation is for the government to consider changing of management of identification. A more effective method for managing identification would be to focus on tagging only new-born animals, which should be made mandatory at the onset of a predefined date. Another recommendation is to encourage animal specialists at soums to focus more on propagating information about livestock identification benefits, because according to research conducted, almost 60% of interviewed farmers said they do not have access to such information, and a significant portion claimed they do not care for such information.

In order to further increase the sustainability of the livestock identification project, it would be beneficial to further develop similar projects connected to animal husbandry. Among the years 2013-2015, a new project has been implemented in the Central region called *Increasing the Efficiency of the Artificial Insemination of Cattle in Mongolia* (CzDA, 2013). However, such projects request for improvements to Gene Bank, which are also needed in order to sustain and further develop the livestock identification project.

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# Annex – Project Description

## Project description

The first cooperation between the Czech University of Life Sciences Prague and Mongolia started already in 2007 with the project called Identification in Central region (Mongolia). This project lasted for three years and was focused primarily on the issues of raising awareness, capacity building and creating the institutional conditions for animal record keeping. On the Czech side, the Ministry of Agriculture of the Czech Republic administered the project. During implementation of this project, several tens of thousands of goats, sheep and cattle were tagged. Outcomes of the project were following<sup>8</sup>:

- The new method for livestock identification and evidence developed in the central region conditions.
- The promotional farm for livestock identification evidence.
- The knowledge groups in livestock identification evidence.

During another project, called Livestock Identification System Implementation in Mongolia – Delivery of Equipment, the country received a laser machine (LASERdiode LD50C), which allows tagging of up to 1000 ear tags per day then also hand tagging tools and 100,000 ear tags provided by Czech companies. This particular project was implemented during years 2010 and 2011.

In 2010 started also the evaluated project Livestock Identification System – Data Collecting (Mongolia) This project focused more on the issues of creating the animal identification numbers data collecting electronic system and on the data communication between the livestock farmer and central server under the supervision of MIA. As part of the project, the appropriate hardware and software was designed and selected and data flow communication lines were created. The system as a whole is based on using the individual ear tag barcodes and barcode scanners in a way that allows utilizing fast and easy data collection and transfer system while keeping the error rate as close to minimum as possible.

Small-holder livestock producers will consequently benefit from improved evidence of animals and traceability of their farm products, which will bring more focused and systematic governmental veterinary and advisory support, improved possibilities of genetic improvements and increase their chances for export of their products.

Even though the project was suspended after three months from its beginning for 6 months (from 1st of January 2011 until 12<sup>th</sup> June 2011) and again for four months (since 1st of January 2012 to 10th of April 2012) all of planned activities were completed until the end of year 2012.

The financial resources for the project of total amount of CZK 8.5 millions were allocated from October 2010 to November 2012. For the first year of implementation was allocated CZK 3 millions, during the second year CZK 4 millions and during the last year CZK 1.5 millions were allocated.

The project was realized as a contract based on the tender from CZDA. Therefore **the formulation and consequent project interventional logic was designed by the CZDA** and CULS served only as subcontractor.

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<sup>8</sup> CULS Prague, 2009. *Identification of Animals in Central region (Mongolia)*. [online] Available at: <<http://www.vetnaadam.org/EN/outcomes.php>>



The **overall goal** of the project has been focused on economic development and poverty reduction of the Mongolian rural population. Its intention contributed to higher efficient animal breeding by means of improved conditions for breeding work and increase importance of animal commodities.

CZDA stipulated in the contract only one **project aim** – improvement of livestock identification. Geographically, the project was limited to Central region, with aimags Tuv, Selenge, Darkhan Uul and Ulaanbaatar.

Next to the MIA and Gene Bank as the main partners given by the CZDA contract, the project also included district agriculture authority workers and livestock farmers as secondary beneficiaries.

The project had following interventional logic partially given by CZDA contract partially designed by the CULS.

### **Objective 1. Improvement of livestock identification**

Improvement of livestock identification has been the overall aim of the whole project. Animal identification itself brings many benefits not only to the country or Mongolian government but also to farmers. It improves level of livestock production. One of the largest potential benefits is risk reduction. Thanks to animal traceability the disease outbreaks may be isolated and controlled. It might reduce spread and helps reduce the number of dead animals. Farmers with tagged animals have larger possibility to succeed on international markets. Animal identification protects health of both animals but also public.

To achieve this objective, number of outputs and activities were modified.

#### **Output 1.1. Functional system of data transmission between district workers and central evidence.**

On the basis of information from previous projects and of cooperation with MIA, some particular elements, which are necessary for animal identification and registration were identified. On this basis, a methodology of data collection and the determination of responsible staff and institutions were designed. Furthermore, data collection software for mobile terminals and computers were developed by the Mongolian company JTIS - the software was named Unicolector. JTIS communicated directly with a mongolian company Interaktiv that develops program for central evidence. Both companies communicated due to data format and compatibility. At the end of the project Interaktiv has not finished with program for central evidence, however it is still in progress. In a following phase 45 mobile terminals were delivered to the soums involved in testing in central Mongolia and the server for the central database was installed in a former building of MIA in Ulaanbaatar (now offices of Gene bank). The rest, 55 mobile terminals are kept at Gene bank as spare in the case of failure.

#### **Output 1.2. Tagged livestock in the Central region**

MIA/Gene bank were responsible for animal tagging and ear tags marking. All ear tags were marked according to a plan developed for each soum by MIA. Tagging equipment was handed over 11 soums in 4 aimags (including individual districts of Ulaanbaatar) in the Central region of Mongolia. The third parts of ear tags as “the proof of ownership” were also handed over to soums together with ear tags. However MIA has insisted on using the ‘old version’ of animal evidence - paper cards, so they are not going to use those plastic cards with barcode in future. Primary plan was to tag 100,000 cattle during project implementation. At the end of the year 2011 were tagged 16,000 of cattle. During the year 2012 tagging continued in 3 pilot soums (Bornuur, Zuunmod, Bayanchandmani but also in new aimags such as Darkhan Uul and Ulaanbaatar. However, at the end of the project only 40,000 heads of cattle were tagged.

Number of tagged animals:

Aimag Tuv:

- Ulaanbaatar – 659 heads of cattle (2.7%)
- Batsumber – 5,202 heads of cattle (49.9%)
- Bornuur – 5,351 heads of cattle (45.2%)

- Bayanchandmani – 5,098 heads of cattle (98.1%)
- Zuunmod – 2,094 heads of cattle (100%)

Aimag Darkhan Uul:

- Khongor – 2,298 heads of cattle (65.4%)
- Darkhan – 2,113 heads of cattle (55.6%)
- Shariin gol – 787 heads of cattle (55%)

In number of aimags, there are animals, which were tagged within a previous project. They will be also included into electronic animal evidence by MIA:

Ulaanbaatar – 2,180 tagged animals

Darkhan Uul – 1,096 tagged animals

Selenge – 4,404 tagged animals

### **Output 1.3. Functional info-line at MIA**

There are 3 trained workers, employees of MIA/Gene bank who can provide advices, solutions or necessary information of animal registration and identification to district agriculture workers or livestock farmers. These three workers participated in all project activities. They were present during equipment supplies and staff training in soums. In later stages of the project they even led trainings for livestock specialists by themselves. There are main persons who can continue with the system designing of animal evidence and fulfill its sustainability and impact for the future. One of the workers was in direct contact with Czech company Medicom, Ltd. The info-line room is equipped with a computer with internet access and a telephone. Those persons who mainly contact the info-line are governmental animal specialists or farmers. They received contacts also from other districts that want to tag their animals.

Two workers of Gene bank (Mr. Tumenulzii and Mr. Tumurkhuyag) came to the Czech Republic. They stayed from 7<sup>th</sup> until 14<sup>th</sup> November 2012. During their stay they visited:

- Czech Moravian Breeders' Corporation, Inc., which is responsible for animal evidence in the Czech Republic
- MAVE, Ltd., which produces ear tags and other equipments needed for animal tagging
- MediCom, Inc., producer of laser machine for MIA
- Experts of CULS who work in animal evidence.

### **Output 1.4. Training manual for livestock identification and tagging for livestock specialists and farmers**

There are 500 pieces of manuals printed. Manual has been already distributed to districts and to MIA. Manual is divided into four chapters that explain the importance of animal identification and its principles. It also describes how to use electronic portable terminal or it provides solutions in a case of injuries. Manual is also available in Mongolian and English versions at web sites of The Livestock Identification System (<http://www.animal-identification.mn/guide/>). Together with manual there is also an instructional DVD, which supports manual visually. The DVD is narrated in Mongolian and is also available on-line at the same web sites (<http://www.animal-identification.mn/video/>).

### **Output 1.5. Trainings of experts**

The introductory training was implemented in June 2011 and it was for all relevant government workers in Tuv aimag. Following trainings were executed for all of governmental animal specialists at all soums where the project has been implemented. Trained experts of MIA were already during the project able to train other governmental animal specialists who are supposed to provide animal tagging in their soums. During the first training the progress of the project, electronic registration, background information and also the new legislation on animal registration were presented. Participants also learned how to work with electronic portable terminals and how to transfer data into a computer. Altogether, there were 90 participants present from all 27 soums of Tuv aimag.

Other trainings for governmental animal specialists were implemented during September 2011 in Bayanchandmani and Bornuur soums. Then in October 2011 another training in Zuunmod soum

was implemented. After the trainings, the government specialists received tagging equipment (ear tags, tagging tools, electronic portable terminal and Unicolector program).

In 2012 the first training was in May in Ulaanbaatar. Individual persons of each soums were trained there. In June 2012 the training of governmental animal specialists were implemented in Dakhan Uul aimag. There were 12 persons trained and also one extra person who is responsible for animal registration was trained in practical and theoretical way. During August 2012 training for governmental animal specialists in soums Khongor, Orkhon, Shariin gol and Batsumber was implemented. In November, there were last trainings for Selenge aimag and for its soums such as Eruu, Mandal and Sukhbaatar. At the end of November, another training was implemented in the building of MIA in Ulaanbaatar, where 36 governmental animal specialists from soums in central region participated. Those specialists work with ear tags provided by Allflex, company, which won a tender for the supply of new ear tags.

#### **Output 1.6. Awareness among livestock farmers**

The promotion of animal identification was done through info panels, posters, leaflets about animal registration. Posters were hanged on walls at soums' offices. Info panels and leaflets were presented during Open Days of MIA or during a national agricultural fair called *Green Days*, which happens every year in September. Other leaflets were spread among farmers during livestock tagging or during data collection or trainings. The phone number and email addresses of contact persons who work at info-line were provided at all materials.

Together with Gene bank there was chosen an Internet domain [www.animal-identification.mn](http://www.animal-identification.mn), which is an informative gate into description of electronic data collection and livestock registration. There is also brief description of Czech ODA and of project itself, also contacts of involved persons and introductory video about animal registration.

The project was also promoted four times on TV screens. During a training in Darkhan there was present also a local TV channel *Darkhan TV 12* and they shot a report, which was broadcast the same evening in the main evening news. Then in November, TV channel Selenge made a report that was broadcasted on national TV channel *MNB* and *TV5*. *TV MNB* and *Ecochannel* shot a report about the project during the last training in November. A project manager, governmental animal specialists from Bayanchandmani and press officer of MIA were interviewed. Another report was prepared by the Mongolian TV during the final ceremony. Two private national TV channels were present during this final ceremony, TV UBS and TV8, then also journalists from a periodical magazine *Agricultural tomorrow* and *Zununii Medee*.

At the final ceremony participated deputies of Mongolia and also of the Czech Republic

- Mr. Tuvaan – Deputy Minister of the Ministry of Industry and Agriculture (MIA) of Mongolia
- Mrs. Grollova – Ambassador of the Czech Republic in Mongolia
- Mr. Pastvinský – Director of CDA
- Mr. Jantsankhorol – expert on monitoring and control
- Mr Erdenejargal – head of foreign affairs department
- Mrs. Zakova and Mrs. Tserendulam – for Czech Embassy
- Mr. Tsolmon – director of Gene bank
- Mr. oyunbileg – head of technology department at Gene bank
- Mr. Tumenulzii – expert responsible for the server and for artificial insemination
- Mr. Gantugs – Scientist
- Mrs. Tungalag – chief accountant
- Mrs. Munguntuya – secretary

A periodical magazine *Agricultural tomorrow* presented project also during its implementation and in November the project was also presented in Newspapers *Mongol Shuudan* and *Zuunii Honey*.

#### **Output 1.7. Estimated cost of the sustainability of the system after project termination and internal evaluation of the project**

## Annex - Logical Framework

	<b>Intervention logic</b>	<b>Indicators</b>	<b>Sources and means of verification</b>	<b>Assumptions and risks</b>
<b>Target</b>	Contribution to more effective animal husbandry, raising livestock commodities market application and consequently poverty reduction	Increasing the volume of trade in animal commodities, more accurate estimate of the number of animals and number of cattle in the performance tests	Statistical reports of trade and animal husbandry	
<b>General objective</b>	1. Improvement of livestock identification in Mongolia	Data of tagged animals in the central evidence, independent management of livestock identification and data collection by Mongolian party	Outputs of central evidence	Continuing in livestock tagging Advantages provided by government to livestock farmers with tagged animals
<b>Outputs</b>	1.1. Functional system of data transmission between district workers and central evidence	100 of readers of bar codes, software for those readers, the right way of folders order.	Documentation of software, the central evidence utilization from field	Harsh climatic conditions – mechanical resistance of equipment, capacity of batteries of readers
	1.2. Tagged livestock in the Central region	At least 100,000 heads of tagged cattle	Monitoring, database of tagged cattle	The resistance of ear tags and its proper application
	1.3. Functional info-line at MoFALI	Trained 3 persons able to answer all questions related to livestock identification	Information of field workers	Proper staffing
	1.4. Training guide to livestock identification and tagging for livestock specialists and farmers	500 pieces of printed guide	Edited publication	The right use of the guide
	1.5. Trainings of experts	15 trained experts and certification for participants and over 100 persons from particular soums	Number of participants, list of presence, evidence of trainings Certificates on training	Computer literacy
	1.6. Awareness among livestock farmers	10,000 leaflets spread among livestock farmers	Personal field controls	Distribution of materials Willingness of farmers
	1.7. Economic and financial	Document		

	viability of the project + Internal evaluation			
<b>Activities</b>	1.1.1. Establishment of a data collection system 1.1.2. Creating of software for bar code readers 1.1.3. Delivery of electronic bar code readers 1.1.4. Ensuring of communication interface with the central records 1.1.5. Provide a service of readers 1.2.1. Distribution of ear tags 1.2.2. Cattle identification of selected livestock farmers, instruction of breeders, generating files and sending into the central evidence 1.3.1. Setting up an e-mail address and telephone lines 1.3.2. Training for info line staff 1.4.1. Creating of practical guide and comprehensive information on livestock identification and data collection 1.4.2. Publication and distribution, promotion 1.5.1. Creating of curricula and teaching materials for training 1.5.2. Training of MoFALI staff 1.5.3. Training of field workers 1.6.1. Distribution of information among farmers, workers other provinces and other stakeholders 1.7.1. Estimated cost of the sustainability of	<b>Means:</b> Summary of required inputs for the implementation of activities by indicators	<b>Costs:</b> Summary of the financial resources required to provide inputs	Agreement on the operation and subsequent maintenance of hardware and software, another separate funding

	the system after project termination and internal evaluation of the project			
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