## CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Tropical AgriSciences



# Impact of Agriculture Cooperatives on the Smallholder Vegetable Farmers in Central Region of Mongolia

Master's thesis

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Supervisor:

Ing. Jiri Hejkrlik, Ph.D

Author: Bc. Anudari Enkhtur

## Declaration

I hereby declare that this thesis entitled "The impact of agricultural cooperatives on the smallholder vegetable farmers in Central Region of Mongolia" is my own work and all the sources have been quoted and acknowledged by means of complete references.

April 23<sup>rd</sup>, 2017, Prague

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Bc. Anudari Enkhtur

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#### Abstract

Agricultural cooperatives have existed in Mongolia for almost a century. Despite its long presence a little research has been done about structure, benefits and impact of modern type of cooperatives. This study investigates the benefits and impact of agricultural cooperative organizations on the livelihood of smallholder vegetable farmers in Central Mongolia. Using propensity score matching (PSM) method the study explains the impact of cooperatives on the economic outcomes of small scale farmers. Study data were obtained from a primary research questionnaire completed by 43 members of agricultural cooperatives suggest that majority of agricultural cooperatives in the region are service cooperatives focused on providing extension services to members. The idea of shared value and collective incentives mainly motivated farmers to join cooperatives. The benefits that farmers received from group membership are access to market, trainings and improved access to farm inputs. The PSM results show that cooperative groups have positive effect on farmer's average output price and crop diversity. There is no significant influence on income, land productivity and yield, when ATT is estimated on one specific crop.

**Key words:** farmer groups, members' motivation, benefit of collective action, rural agriculture development, PSM, Mongolia

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## List of abbreviations used in the thesis

ADRA	Adventist development and relief agency
ATT	Average Treatment Effect on the Treated
COFISA	Co-operative financial institute of South Africa
EUR	Euro currency
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GIZ	The German Development Agency
ICA	International Co-operative Alliance
IFAD	International Fund for Agriculture Development
IFPRI	International Food policy research institute
ILO	International Labor Organization
IOF	Investor-owned firms
MCTIC	Mongolian Cooperative Training and Information Center
MNT	Mongolian national tugrik, currency
MULS	Mongolian University of Life Sciences
NAMAC	National Association of Mongolian Agricultural Cooperatives
NGO	Non-governmental organization
NSO	National Statistical Office of Mongolia
OBG	Oxford Business Group
PSM	Propensity Score Matching
SDC	Swiss Development and Cooperation Agency
UN	The United Nations
USDA	The United States Department of Agriculture
WFO	World Farmers Organization
WFP	World Food Program
FRD	Federal Research Division of Library of Congress

## **1. Introduction**

Many of Mongolian rural population are directly or indirectly depend on agriculture for their livelihoods. Most of the rural people are small scale herders and farmers. Given the harsh climatic conditions, short crop season, distant markets rural farmers are highly vulnerable to any small change in the environment and economy. Facing many difficulties during the countries' transition from centrally planned to free market, agriculture sector in Mongolia is slowly developing due to increased interest and projects from the government, as well as numerous international organizations. Today, Mongolia is self-sufficient in meat and potatoes, but vegetable sector still only meets approximately 55% of the domestic need (World Bank, 2015). With the change of life style from rural to more modern, consumers' demand of vegetables is increasing in bigger cities in Mongolia (World Bank, 2015). Therefore, farmers need to increase their production and productivity. However, small scale farmers with few assets often face constraints with information obtaining, access to services such as extension and credit, and face high transaction cost (Fischer and Qaim, 2012). Policymakers and community development agents are increasingly interested in different models that will be highly beneficial for both small scale farmers and consumers. Without appropriate institutional mechanisms to improve the market incentives for production, rural farmers are likely to stay dependent on external aid projects for a longer time (Fischer and Qaim, 2012). One of such important institutional mechanisms is agricultural cooperatives (Bernard et al., 2010). Cooperatives play a vital and direct role in rural development (USDA, 2002) and are avenues to reduce high transaction cost (Fischer and Qaim, 2012). Through cooperatives farmers can achieve economies of scale, by reducing the unit costs of inputs and services, to improve products and service quality, reduce risk and to address common problems and develop new market opportunities.

While there are numerous studies focusing on impact and benefits of agricultural cooperatives on small scale farmers in various countries (see Lerman, 2006 for Central Asian and the post-Soviet countries; Zheng et al., 2001 for China; Nigussie, 2010 for Ethiopia) there is limited number of studies done in Mongolia, even though cooperatives have existed in the country for almost over hundred years. Despite the government interest

and attempts to develop cooperatives, the participation of farmers and society is very low. Little is known about typology, membership and activities of agricultural cooperatives. Although legislation of the law in 1995, has promoted and created the favorable environment for many cooperatives it has also led in establishment of "on paper" cooperatives which do not benefit farmers and herders as it aims. Many farmers do not have full understanding about values, principles and benefits of modern types cooperatives which might has an influence on their low level of participation. Therefore, this thesis will try to address this knowledge gap and contribute to the further studies of cooperatives in Mongolia.

## 2. Background

#### 2.1 Agricultural cooperatives

From the time that the first modern type of agricultural cooperative was established in England in 1844 (Ortmann and King, 2007) the topic of cooperatives has been a great interest of many researchers for over a century. Theoreticians have tended to view the farmer cooperative in three distinct ways: (1) as a form of vertical integration by otherwise independent firms; (2) as an independent business enterprise, which could be analyzed as a variant of the investor owned firm; and (3) as a coalition of firms (Staatz, 1987).

According to Thompson (1994), cooperatives are often understood wrongly and neglected by the public. Most often governments want the power over cooperatives and in its history co-op leaders in Europe, Latin America and Asia were being attacked by others because of their aim "to give power to powerless".

Cooperatives are important drivers for the development of communities as they help to efficiently mobilize resources and their organizational structure allows them to be more community-oriented (Fairbarn et al, 1991; Wilkinson and Quarter, 1996 cited in Zeuli and Radel, 2005). Cooperatives are a form of organizations that are developed in response to small producers wanting to reach self-efficiency and to compete against large groups (Zeuli and Radel, 2005). The cooperative enterprise model exists in many sectors including agriculture, consumer, marketing, financial services, and housing (FAO, 2012).

Modern types of cooperatives have been defined by the International Cooperative Alliance (ICA, 2016) as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically controlled enterprise". Agricultural cooperatives have seven main principles and ICA defined them in detailed as following:

1. Voluntary and Open Membership

Cooperatives are voluntary organizations that are open to everyone without discriminating people by gender, social status, race, and political or religious view 2. Democratic Member Control

Co-operatives are democratic organizations controlled by their members, who actively participate in setting their policies and making decisions. Member of co-operatives have equal voting rights (one member-one vote).

3. Member Economic Participation

Members contribute and control the capital of their co-operative equally. Members allocate profits for any or all of the following purposes: developing their co-operative, by setting up reserves, part of which at least would be indivisible; benefiting members in proportion to their transactions with the co-operative; and supporting other activities approved by the membership.

4. Autonomy and Independence

Co-operatives are autonomous, self-help organizations. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their co-operative autonomy.

5. Education, Training and Information

Co-operatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of the organization. They inform the general publicparticularly young people and opinion leaders - about the nature and benefits of co-operation.

6. Co-operation among Co-operatives

Co-operatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional and international structures.

7. Concern for Community

Co-operatives work for the sustainable development of their communities through policies approved by their members.

Co-operatives exist on their main values of *self-help, self-responsibility, democracy, equality, equity and solidarity* (ICA, 2017). The principles and values of cooperatives are important factors that differentiate them from the other types of businesses. However, cooperatives take many different forms in different countries (ILO, 2014) and there is no cooperative that follows all these principles at once (Tchami, 2007).

The cooperatives were first introduced to the developing countries after the Industrial Revolution when developed countries started their colonization over the Africa, Asia and Latin America (Tchami, 2007). In those countries cooperatives served as a strategic tool to organize people efficiently in groups and produce good such as cocoa, coffee, etc for exporting (Tchami, 2007).

According to Tchami (2007) depending on the country structure that colonized developing countries, cooperative development took different forms from being more voluntary (Latin America, African countries colonized by British, etc.,) to centrally planned, ruled by the government (Asia, Countries ruled by the French). After the collapse of colonies, in most of the countries cooperatives remained as state-owned tool and the number of membership declined significantly. According to the International Labor Organization (2002) Post Soviet, Asian (China and Vietnam) and African Countries (Ethiopia, Uganda, Ghana) are experiencing the change in the cooperative development.

Although cooperatives in Asian countries are regaining their autonomous status and democratic character, they face many challenges in their membership relationships as they have been dependent on the government for a very long time. What was common in the membership relations in Chinese, Vietnamese, Central and East European cooperatives was the mistrust of people in the cooperatives as genuine cooperatives are hardly existed (ILO, 2002).

Today, ranging from small-scale to multi-million dollar businesses, cooperatives are active in many sectors having more than 800 million members and providing 100 million jobs worldwide (IFAD, 2011).

## 2.2 Types of agricultural cooperatives

The agricultural cooperatives could be organized based on its level, types of services, location and organizational structure. In broad understanding, agriculture cooperatives could be classified into three main categories as Ortmann and King (2007) have classified. These are:

- 1. <u>Marketing cooperatives:</u> cooperatives that help in the marketing of products of its members. They provide services such as bargaining for better prices, handle, process or manufacture and selling the farm products. Moreover, some of these types cooperatives also grade, package, label and store products of its members (Zeuli and Cropp, 2004). Initially they buy products from their members and then sell it under the cooperative to the market.
- <u>Farm Supply cooperatives</u>: cooperatives that focus on supplying farm inputs such as seeds, fertilizer, feed, chemicals, petroleum products, farm equipment to its members. They provide its members with dependable inputs at competitive price (Zeuli and Cropp, 2004).
- 3. <u>Service Cooperatives</u>: cooperatives that provide its members various kinds of services such as tracking, storage, helping in farming, education, irrigation, credit, insurance etc. According to Zeuli and Cropp (2004) these services vary greatly from specific (crop drying, harvesting, shipping, etc) to more common services (finance, electric, communication, health care, and education, housing and insurance).

In addition to the types mentioned above Zeuli and Cropp (2004) have also defined agriculture production and consumer cooperatives.

According to them agriculture producer cooperatives are broad types of cooperatives that collectively producing products using collectively owned production resources as land, labor and equipment. Production cooperatives or collective farming still exist in Russia and in other former Soviet countries (Zeuli and Cropp, 2004). These types of cooperatives were famous in Mongolia and other centrally planned economies before the transitional times. Farmers work as employees, owning no resources and properties for their own. They get share or a portion of farm's produce in certain defined time (Zeuli and Cropp, 2004).

Additional to the producer cooperatives, there are also Consumer cooperatives. These types of cooperatives are famous and successful in Northern European countries as UK, Denmark, Sweden and also Asian countries as Japan and Korea. Consumer cooperatives are specific types of purchasing cooperatives, where they provide its members/costumers good quality products at advantageous price. They are mainly active in food sector (Zeuli and Cropp, 2004). Based on its high numerical importance, these types of cooperatives are usually treated separately from its similar type of cooperatives, supply/purchasing cooperatives (Lerman, 2013).

Cooperatives could also be classified according to their level of organization as Primary, Secondary and Tertiary cooperatives. Primary cooperatives are cooperatives consisting of individuals formed to tackle common problems together pooling resources and providing services directly to its members. Secondary cooperatives are formed by two or more cooperatives to provide more broad service to its members. Tertiary cooperatives are formed by members of secondary cooperatives and have a goal to advocate and engage in its activities actors from public and private sector (COFISA, 2017)

Also, from the functional point of view, cooperatives could be distinguished into three broad categories: market failure groups, claims groups and empowerment groups (Hanisch M, 2016).



Figure 1: Cooperative groups, by function

Source: Hanisch, 2016

Market failure groups are farmers groups that are formed with the main aim of tackling economic problems as reducing the loan interest for members and realizing the economies of scale by bulking resources. Claim groups cooperate to solve the problems of members associated with social exclusion from use of natural resources and deprivation of basic needs and empowerment groups aim to improve the political and social power of members (Hanisch, 2016). These groups (Figure 1) could perform more than their initial functions. Market failure groups, while performing their functions, could also empower their members political decision making power and access to collective resources. Due to the overlapping functions the role of cooperative membership are often a complicated estimation.

## 2.3 Agricultural cooperatives as institutions

A cooperative is a member-owned, member-controlled business meaning that users/beneficiaries own the organization and at some aspects they are quite similar to other business firm models (USDA, 2002). They are more than just culturally limited organizations but rather, big business of modern types (Hansmann, 1999). The far most important difference in principles between corporations and cooperatives is in their view on making profits: companies only aim to maximize its profit, where as cooperatives aim at maximizing member's benefits (Cobi, 1998 cited in Lerman, 2013). The core differences between corporations and cooperatives are defined by Lerman (2013) is shown in the Table 1.

Attribute	Cooperative	Corporation
Owners	Members	Shareholders-investors
Owners' objective	Use of services provided by the	Earning income
	cooperative	
Organization's objective	Maximize member's benefits from	Maximize corporate
	working with the cooperative	profits
Voting rights	One member-one vote, regardless	Number of votes
	of share contribution	proportional to number of
		shares (share contribution)

Table 1: Comparative attributes of a cooperative and shareholder corporation

Income distribution rules	Income distributed to members in	Income distributed to
	proportion to their participation in	shareholders in proportion
	the activity of the cooperative	to the number of shares
		held

## Source: Lerman, 2013

In transaction economies farmers often have unclear understanding about cooperatives as a business model. They still see cooperatives only as collective action of people, not being able to compete with the bigger companies.

In his study "Cooperative development in Central Asia" Zev Lerman (2013) discusses about differences between western-type of cooperatives with formers centrally planned types of cooperatives. He found out that in Central Asia, difference between production and service cooperatives are not clear defined therefore, confusing farmers in joining cooperatives. This shows that the cooperatives and their classification is complex and could be understood improperly depending on the country and region.

The relationship between the investor owned firms and input suppliers are a zero-sum game where an increase in payments to suppliers is a decrease in owners' income resulting in higher market failure (Sykuta and Cook, 2001). In contrast, in cooperatives the relationship between both sides is not a zero-sum game as the higher price paid for the input means the equivalent payment to investors resulting in higher degree of trust and less information asymmetry (Sykuta and Cook, 2001). The ownership of their own organization allows farmers to define activities in such way that will maximize their own profit rather than the profit of the organization (Mather and Preston, 1980).

## 3. The impact of agricultural cooperatives in rural development

## 3.1 The benefits of agricultural cooperatives

Most cooperatives regardless of their sector and type promote economic development if the community by paying taxes, generating employment, promoting more sustainable business practices and increasing the social bonding of the rural areas (Nembhard, 2014). Their impact is much more than just economic but also social. Cooperatives are businesses that fill the sectors where conventional business actors do not or will not be willing to work (Zeuli and Deller, 2007). Whether it is service, marketing or production cooperatives they are a response to the market failures in the economic system and their contribution to local economic stability, and long term growth is probably the most important benefit (Zeuli and Deller, 2007).

Cooperative benefits (Mather and Preston, 1980) with regards to their impact on rural communities and individual farmers are briefly described in the Table 2.

Actors	Main benefits they get from	Description
	cooperatives	
Rural	Added Community Income	Spending of cooperatives in the local
community	economic development of the area	
	Stronger rural communities	Increased interaction within the community members result in united solving of community problems
	Goods and Service to Non- farmers	Serving even the non-members allows the whole community development. Supporting the other sectors by using their services and providing agriculture services to others

Table 2: Main	benefits	of cooper	atives
---------------	----------	-----------	--------

		Raising the general market price level,
		lowering the level for purchased
	Increased farm income	supply, develop new markets, increase
		the quality of farm inputs thus
		increasing the productivity
	· · · · · · · · · · · · · · · · · · ·	
	Improved services	Improved services to members in labor
		shortage, farm equipment, provision of
		loans, trainings, etc
	Improved quality of farm inputs	Provision of good quality farm inputs
		such as seeds, fertilizers, equipment
	Expanded market	Trainings and knowladge sharing on
	Expanded market	Trainings and knowledge sharing on
	Expanded market	Trainings and knowledge sharing on the farm management
	Expanded market	Trainings and knowledge sharing on the farm managementThroughpooledresources,
	Expanded market Improved farm management	Trainings and knowledge sharing on the farm managementThroughpooledresources,cooperatives allow individual farmers
	Expanded market Improved farm management	Trainings and knowledge sharing on the farm managementThroughpooledresources, cooperatives allow individual farmers to sell their products on a large-scale
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	Expanded market Improved farm management Local leadership development	Trainings and knowledge sharing on the farm managementThroughpooledresources,cooperatives allow individual farmers to sell their products on a large-scale marketlarge-scaleDevelopingleaders,managers,directors.Members become more self- reliant and informed citizens in their
	Expanded market Improved farm management Local leadership development	Trainings and knowledge sharing on the farm managementThroughpooledresources,cooperatives allow individual farmers to sell their products on a large-scale marketlarge-scale scaleDevelopingleaders,managers,directors. Members become more self- reliant and informed citizens in their communitiesin their

Source: Developed by authors from (Mather and Preston, 1980)

Farmers

From the Table 2 we can see that cooperatives in their theory provide benefits to both rural societies and individuals. For instance, social and individual incentives of members were studied in the theory shaping the motivation of farmers in joining cooperatives (Birchall and Simmons, 2004). Every individual seeks benefit whether it is individualistic, collective or just habit in every action. Cooperatives are member based organization therefore it should be studied from the members' perspective (Nigussie, 2011). When defining the conceptualization of member's motivation in joining cooperatives Birchall and Simmons (2004) proposed two main approaches: 1) individualistic approach, an approach that assumes that reward or punishment are the factors that motivate individuals to cooperate; 2)

collective approach, an approach that takes the opposite side of the first one, stating that participation in groups is motivated by shared goals, shared values and sense of community.

In their framework (Figure 2) authors present the benefits as a positive individual incentive trigger that affects the farmers' participation.



## Figure 2: Individual incentives of member's participation

Source: Adopted by authors from (Birchall and Simmons, 2004)

They have further classified the benefits as external (more tangible benefits) and internal (more subjectively perceived benefits).



**Figure 3: Collective incentives of member's participation** Source: Adopted by authors from (Birchall and Simmons, 2004)

From the collective point, concept of collective incentives (Figure 3) state that with the increase of three incentives, the overall motivation for participation of members' increase.

Three main incentives are defined as following (Birchall and Simmons, 2004):

- Shared value: a sense of duty to participate as an expression to participate
- Shared goals: an expression of mutual needs that translate into common goals
- Sense of community: people care, like or respect people who live in the same area

In practice, the role of cooperatives is studied by many scholars and these are described in the following chapter.

## **3.2** The role of agricultural cooperatives

Food and Agriculture Organization (FAO, 2012) defines agriculture and food cooperatives as an important vehicles for reducing poverty and generating employment, therefore contributing to socio-economic development and food security. Agricultural producer cooperatives allow rural community people to obtain better training, technologies, access to information, innovations and extension services (IFAD, 2011).

In practice, the role of agricultural cooperatives has been studied by many scholars in various countries from different perspectives. Some scholars focus on the benefits of cooperatives for the communities, some focus on the benefits they provide for individual farmers and families. Special interest is given to the cooperative study in developing countries and transitional economics.

The farmer cooperatives are one of the most important solutions when small farmers face small-scale production problems, powerful intermediaries or retailers, and missing market (Liang and Hendrikse, 2013). Farmers join cooperatives to realize economies of scale, to build countervailing power and to gain access to services. The motivation of farmers to participate in the cooperatives are mainly to pool risk and to obtain services such as input supply and marketing services (Liang and Hendrikse, 2013).

The importance, efficiency, role and difficulties of agricultural cooperatives in the transitional economies were studied mainly in the example of post Soviet Union Countries such as Russia (Golovina and Nilsson, 2009), and Central Asian Countries (Gardner and Lerman, 2006). For instance, Gardner and Lerman (2006) showed that "Agriculture cooperatives" are one of the corporate forms explicitly recognized by company laws in transition countries for the successors of former collectives. They especially have addressed problems and opportunities of cooperatives in former Soviet Union Countries and have

studied new kinds of cooperatives within the core principles of cooperatives defined by the International Cooperative Alliance. Farmer-owned cooperatives can be useful in strengthening the competition and break the monopoly, a common market failure seen in transitional countries resulting in fostering the market access for the farmers (Gardner and Lerman, 2006).

The impact of cooperatives in the household welfare in China in a case of apple farmers (Wanglin and Awudu, 2016) were positive in strengthening farmers' negotiation abilities in the markets to obtain better input and output prices, reduce transaction cost and information asymmetry (Bernard and Spielman, 2010; Wollni and Zeller, 2007; Shiferaw et al., 2011).

Furthermore, cooperative positively influence the income and profits of producers in developing countries (Fischer and Qaim, 2012; Wanglin and Awadu, 2016; Mojo et al, 2017) from their sales. Particularly for farmers in distant market and for those, who specialized in one type of crops, cooperatives benefited in gaining market power over bigger market-dominating competitors (Bijman et al., 2016).

#### Challenges that cooperatives face

Although there are many cases were cooperatives are noted to be successful in achieving their desired results in improving farmer's livelihood and wellbeing, we should also talk about the complex internal and external challenges they face. Most often, targeting too many objectives starting from providing public services (agriculture extension, advocacy, market information) to operating in different agriculture sectors (Shiferaw et al., 2016) cooperatives face hard time in finding balance between social inclusiveness and economic efficiency (World Bank, 2008 and Bernard and Spielman, 2010 cited in Shiferaw et al., 2016). The poor governance, management and marketing affect negatively the sustainability of cooperatives (Nkhoma, 2011; Anteneh et al., 2011) and the low business capacity due to the low participation of members (Nkhoma, 2011; Ahmed and Mesfin, 2017) affects their competitiveness negatively in rapidly changing world economy. The low participation of members in marketing of the products choosing to market individually over collectively (Nkhoma, 2011; Fischer and Qaim, 2012; Hilliova, 2016; Anteneh et al., 2011) challenges

the economic efficiency of cooperatives regardless of the activity, whether its coffee, fruits or wool production.

Furthermore, Bijman et al. (2016) raise two arguments against cooperatives: management of such collective action requires both short-term and long-term costs, and only certain types of farmers benefit from cooperatives. Membership in cooperatives usually involves several types of cost including membership cost, collective action cost, management cost, and more non-monetary costs such as trust, time, effort and leadership.

## 4. Mongolia

## 4.1 Agriculture in Mongolia

The Mongolian agriculture sector has always been playing a major role in the Mongolian economy. The livestock sector dominates, contributing 84.9% of total agricultural production and the rest is crop production.

Agriculture remains a mainstay of Mongolia's economy, both as a source of national revenue and employment. Agriculture and herding generate, directly or indirectly, more than half of the country's jobs. In 2015, the National Statistics Office of Mongolia reported that the sector generated 13.7 percent of Mongolia's GDP. The growth of the output of the sector in 2015 was 48 percent relatively to the year 2000, as opposed to 0.5 percent the year before (NSO, 2016).



# Figure 4: Agriculture sector share in GDP, %

Source: NSO, 2016

Despite the fact that in recent 10 years agriculture sector is in a growing state, its share in a GDP is not stable due to the mining sectors rapid increase and harsh climate changes. Some winters bring a dzud, a front of extreme cold and rough weather that comes on with little warning, killing livestock in mass. For example, during the winter of 2009-10, dzud wiped out an estimated one-quarter of Mongolia's animals.

Other challenges include the nation's transport networks, which are in relatively poor shape, hindering the transport of agriculture goods to market; a continued lack of organization in terms of long-term planning and development; and poor access to financing, among other issues (OBG, 2015).

Government of Mongolia has always been concerned about the modernization of the agriculture sector. In 2002 the government passed legislation allowing the long-term leasing of crop land and the privatizing of agricultural services. The government has consistently declined to privatize grazing land, but it does allow Mongolian citizens and foreigners to acquire long-term use rights to these lands. The Ministry of Food and Agriculture's key goals are to increase local production for export, build its capacity to mitigate veterinary disease, and reduce Mongolia's dependence on imported food products, both processed and unprocessed. To do this, the government seeks ways to better brand Mongolian food products, expand domestic production and processing of agricultural products, and improve technological capacity related to quality control. For example, in 2016 enacted a law about "Organic products" and working on projects to improve its exports.

Overall, production levels and food quality are improving across the sector, and exports are increasing apace. The cashmere segment in particular continues to provide high revenues for many Mongolian companies and individual herders, and opportunities for meat and other animal-product exports bode well for future growth. Mongolia's small logging sector produces a modest amount of timber annually that is used largely for firewood, with some lumber production. Likewise, a small quantity of freshwater fish is landed annually.

### Vegetable sector in Mongolia

Mongolia has seen steadily increasing crop production over recent years, with the total sown area standing at 505,277.5ha in 2016, up from just 315,295.3ha in 2010, according to the Mongolian Statistical Office. However, the country still faces numerous challenges in this segment. Only one percent of Mongolia's land can support the growing of crops –

primarily in a handful of river valleys in the north – and currently less than that amount of land is actively being cultivated on an annual basis (OBG, 2015).

Production is concentrated in the wetter northern parts of the country, particularly in the broad lower valleys of the Orkhon and Selenge rivers. Because of the long cold winters, only a single annual crop is possible. About three-fourths of the cropland is sown with grains—primarily spring wheat but with some barley and oats—and the rest with potatoes, fodder crops, and such vegetables as cabbage and carrots. Yields are relatively low and vary greatly from year to year. In most provinces, hay is produced for feeding livestock in winter, and emergency stockpiles are maintained. During the socialist period, production of grains and vegetables was centered on the larger state farms, which also kept some livestock.

Given the country's enormity and the relatively small size of the population – Mongolia is one of the least densely populated nations on earth – the country is nearing self-sufficiency in a number of crops. It has also seen rising productivity across a number of grain crops in recent years.

However, the state has acknowledged that meeting 100% of domestic demand for vegetables and other crops is unlikely, given the country's extremely short growing season and harsh climate. More than 50% of the domestic need is supplied by the imported staple vegetable crops from China (NSO, 2012). The local producers are not competitive with the import supply as they are small scale producers producing on the small land using little resources (World Bank, 2015). The prices of imported vegetables are relatively low compared to the domestic products and therefore wholesalers prefer the cheaper ones over expensive ones. Local smallholder farmers have chance to sell their products to the costumers mainly through local exhibitions, in the local market or sometimes directly on the street using small car stands and trolleys. After the crop farms were privatized in 1994 the farm structure is now divided between a few very large commercial farms and a large number of small, semi-commercial farms and most vegetable production is carried out manually by small holders on less than one ha of land (World Bank, 2015).

Agriculture sector in Mongolia is dominated by the livestock sector (80%) there have been numerous initiatives from the government to support the crop producers. The diet of an average Mongolia still consists and based mainly on meat, milk and flour.

The main support and subsidies are directed towards the wheat and barley production. Researchers and businessman continuously point out the importance to direct the support to the vegetable sector allowing farmers to produce the staple vegetables (World Bank, 2016). Various development agencies such as ADRA, Swiss Agency for Development and Cooperation, World Vision, Caritas and FAO started to support and direct their aid to the vegetable sector.

One of the most successful vegetable stories in Mongolia is a potato production (World Bank, 2015). Swiss development agency first started to implement the "Potato project" or MPP (Mongolia Potato Project) in 2004 until 2015. The program resulted in revitalization of the potato sector, increased production (through improved varieties and seed quality) thus increasing the domestic consumption and supply quality (Guenat and Tsegmid, 2015). Not only the project affected the potato sector, but also resulted in the indirect effects on the sustainable vegetable production and dietary change in the communities. Mongolians in the rural areas have very little experience in growing vegetables and often they do not have knowledge about how to process or cook them (Lambert, 1999).

Many international donor agencies are directing their project grants to the improvement and development of the vegetables sector in Mongolia. Specifically agencies as Asian Development Bank with their projects for small scale community group vegetable production support, SDA with their sustainable vegetable production project in Selenge, Tuv and Darkhan provinces, ADRA with the greenhouse establishment support and many more. This shows the growing interest and importance of the sector in the future.

Total potato production was 163,767 tons in 2015, up from 78,673 tons in 2003 (NSO, 2016). Production of fodder crops was 49,164 tons, compared to just 9566 tons a decade earlier. Cereals rose from 165,047 tons to 216,268 tons in the same period, while vegetable production was 72,348 tons in 2013, up from 59,610 in 2003.

## 4.2 Agricultural Cooperatives in Mongolia

#### 4.2.1 History of cooperatives

Historically, the first agricultural cooperative in Mongolia was established in 1921 with main aims to export products with animal origin to the foreign market, promote domestic production and to supply citizens with common food products (Nadmid, 2008). After several years since, during 1926-1931 with establishments of more farmer, herders and transporters unions the membership and engagement of people in the agriculture cooperatives were increased. In 1931 totally cooperatives had 367 members, 225 employees, 2 factories (Nadmid, 2008). However during the years 1930-1989 agricultural system began to be dominated by large collective farms, called "negdel" which were centrally controlled by the government started to dominate in the sector (FRD, 1989) blocking the development of voluntary cooperatives (Nadmid, 2008). Owning very less than state collective farms voluntary cooperatives were more engaged and active in the crop sector. Crop sector received much assistance from the Soviet Union and some East western countries in the machinery development as farmers lacked knowledge on it, in contrast with animal husbandry. Countries transition in the early 1990's created an institutional vacuum which has had negative and lasting effects on agriculture and rural livelihoods (Rasmussen and Frempong, 2015). Rural infrastructure and agriculture support systems collapsed during the economic transition and the productivity declined sharply as producers were left without access to markets, transportation, production inputs and financing (Rasmussen and Frempong, 2015). Dismissing the negdel, cooperatives and unions in rural areas in 1990, was one of the worst and most irrational decisions that the government has made and which has destroyed majority of small businesses leading to high unemployment and poverty in rural areas of Mongolia (Bayartsaikhan, 2012). The productivity decline both livestock and crop sector bringing huge decrease in the productivity (Rasmussen and Frempong, 2015).

When dismissing then old type of centrally planned agricultural cooperatives, the government made several major mistakes that resulted in the collapse and decreased membership in cooperatives. Mr. Batmunkh, the president of Mongolia during 1984-1990, stated in his speech at the National Policy Meeting that "the process of privatization of agricultural cooperatives went wrongly and was a very rashly made decision. The wrong

management has led to the collapse of many productive groups and factories. Because we have been centrally ruling the country for such a long time, we lost contact with the reality of our citizens and their everyday lives. The policy we made and implemented was not in line with the citizen's needs". Emerge of establishing and supporting the modern types of cooperatives took a more active turn after the National Policy Meeting.

With the main aim to tackle poverty, reduce risk and improve their livelihoods the government started to pay special interest to establish modern types of cooperatives by signing "Cooperative law" in 1995 and has also given a sign that fully encourages the cooperatives by declaring the year 2003 as a "year of cooperatives" (Bayartsaikhan, 2012). Several national programs were adopted during the recent years such as "Mongolian Livestock Program", "National Cooperative Development Movement" and "Third National Crop Rehabilitation Drive" which all encouraged development of cooperatives and provided subsidies and other financial help to cooperatives. On the other hand, government highly new support in the cooperative sector has led to establishment of many fake cooperatives history was failure of several credit cooperatives in 2005-2007 leading to mistrust from the society in cooperatives (Bayartsaikhan, 2012). Despite the attempt of the government and cooperative unions to promote modern types of cooperatives farmers are still driven by the ideas of previous negdels, and state farms.

The dominance of old style cooperatives still exist in Mongolia with word "cooperatives" and farmers are afraid of losing their private assets to state. Still, with the government support and promotions today there are approximately 3200 cooperatives with 59 thousand members are officially registered in Mongolia (NAMAC, 2013). Out of all the cooperatives registered approximately 550 are agriculture cooperatives (NAMAC, 2013) which are officially registered. Although there are many registered cooperatives, the actual number of active cooperatives is not determined.

#### **4.2.2 International and government support**

The government of Mongolia started their support to the modern types of cooperatives in 1995 when they have initiated the "Law of Cooperatives". Within these initiatives, the

government made several official changes in the taxation, accounting and labor laws of Mongolia, adding acts concerning the agricultural, labor, and consumer cooperatives.

For instance, the change in the taxation law that was in the 2000 regarding the reduction in income tax payment of newly established cooperatives by fully eliminating from paying taxes in their first two years of work, and by 50% in their next two years has highly motivated people to establish their own cooperatives (Nadmid, 2008)

One of the strongest supports of government towards the development of agricultural cooperatives, are the fact that government is directing their resource and policies towards attracting investment of international donor agencies. They specifically, support the provision of aids from donors to farmers groups, communities and cooperatives (Nadmid, 2008).

The most important program from the government was the "National Cooperative Movement" in Mongolia that started in 1998. The main objectives of the national movement were to generate employment, reduce the poverty level, and ensure the quality supply of products and services for the nationals and to build the strong market relationships that will lead to development. In order to reach these goals, government paid special attention to the specific objectives as: 1) ensuring the favorable legal environment for the creation of modern types of cooperatives; 2) to develop a market structure that promotes cooperatives; 3) to establish favorable financial environment for the cooperatives, and 4) to develop the structure of effective extension services for cooperatives. As the result of the program several positive changes were made in the sector. At the national level official licenses for cooperative extension and trainings offices were provided for 56 organizations in the rural areas and 13 in the city (Nadmid, 2008). In addition, credit provision worth 340 million MNT, farm machinery and equipment of 840 million MNT were provided to small holder groups. All the interventions and initiative that government made for the development of cooperatives could be considered to be successful. However, several authors also suggest that as these interventions were not implemented by the government alone, there was a strong negative aspect of being dependent on the external aid (Nadmid, 2008; Luvsandorj, 2006; Radnaaragchaa, 2008).

After the year 1990, many international agencies started to pay special interest in supporting the development of cooperatives and promote the sustainable growth in the agriculture sector. German Federal Enterprise for Development (GIZ) had a biggest impact in shaping the current agricultural cooperatives and its law through their projects "Promotion of organized self-help in Rural areas" implemented from 1998-2004. Within the project "Cooperative support centers" were established in 10 provinces of Mongolia, provided 778 trainings to more than 20700 farmers (Nadmid, 2008). Moreover, the project facilitated the improved access to credit to groups, provided farm equipment (2 tractors of 10 thousand dollars) and gave training on the everyday management activities to the cooperatives in the rural areas were improved and farmers felt more comfortable to be part of cooperatives. Not only they have supported the primary cooperatives, but led to the establishment of 13 secondary cooperatives.

#### **4.2.3 Development of modern types of cooperatives**

The modern types of agricultural cooperatives have its beginning in the early 90's. According to the former Minister of Agriculture (1990-1994) and former president of Mongolian Association of Producer and Service Cooperatives, Radnaaragchaa (2008) the modern cooperatives developed in four stages:

*First stage* emerged from the late 80's until the early 90's when privatization of many enterprises emerged in the economy. As the time of transition was difficult for many to understand and cope, the cooperative model of business was a familiar concept for people. Therefore they were active in establishing any kinds of cooperatives to stay employed. The cooperative law initiated in 1989 was the first one to address modern types of cooperatives. However, the law had a socialist or top-down base; therefore not many take the law as a successful act.

*Second stage* was in the beginning of the year 1993. Starting from this point the collapse and dismiss of cooperatives in many sectors took place. The promotion and change of the economic structure, made people think that collective action is not beneficial as private business. Therefore, majority started to escape the "cooperation" wanting to succeed alone.

During this stage the number of cooperatives and its' member declined three times compared to the first stage.

*Third stage* was a stage of recovery. This stage was considered as a bloom of cooperatives and successful development of modern types of cooperatives. After the government active intervention initiating "National Movement of Cooperatives" in 1998, the new "Law of cooperatives" in 1995 and declaring the year 2003 as "The Year of Cooperatives" people were more likely to have trust in cooperatives. The understanding about benefits of "collective actions" aroused again. People and farmers were informed more about the democratic approach of cooperatives.

Fourth stage was in the mid of 2000, specifically starting from the year 2006. It was the "dark years" again. The collapse and bankruptcy of several credit cooperatives has led to aroused mistrust into all kinds of cooperatives. Generally the reputation of word "cooperative" fell down. Therefore, passing these four stages, current cooperatives are still not developed as institutions.

The legal and institutional environment that shape the modern types of cooperative are still lacking in many ways. Some of the serious problems arousing in the agricultural cooperative sector are preventing and slowing down the process of cooperative development. People often do not have clear understanding about cooperative principles, values and rules.

Farmers join cooperatives either to get subsidy (Hilliova, 2016; Nadmid, 2008) or to get technical provisions from donor projects. Cooperatives have become only a government tool to implement policies effectively, not paying attention to the far better benefits that the model could have made (Nadmid, 2008; Luvsandorj, 2006). Modern types of agricultural cooperatives are mostly formed by family members (meeting the threshold stated in the law-9 members) and the dominance of informal relationship is destroying the cooperative institutions to develop as successful business model (Nadmid, 2008).

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## **5.** Aims of the Thesis

The thesis aimed to provide insights to the understanding of agricultural cooperatives through analyzing the existing cooperatives and small vegetable farmers' behavior, their motivation in joining cooperatives and impact they get from participation in cooperatives in Central region of the country.

The main idea of the research was to find out detailed insights and principles of existing cooperatives in the region and to answer questions:

- What are the characteristics of a typical vegetable farmer in the region?
- How the typical agricultural cooperatives look like?
- What are the main benefits farmers get from cooperatives?
- What is the impact of farmer groups on the individuals livelihood and wellbeing?

**The main goal** of the thesis was to analyze the impact of cooperatives on farmers' livelihood in Central Region of Mongolia.

## **Specific objectives were:**

- 1. To describe typology of agricultural vegetable cooperatives
- 2. To find out main benefits that members get from cooperative
- 3. To find out the differences between characteristics of members and non-members

## 6. Methods

#### 6.1 Study site



## Figure 5: Map of the study area

Source: D-maps, 2017

The study was conducted in Selenge and Darkhan-Uul provinces in the Central Northern Region of Mongolia (Figure 5). The region covers the area of 41200 km<sup>2</sup> and has a population of total 207,231 (NSO, 2016). Selenge province borders with Russia in the north and Darkhan province is located inside Selenge province, geographically. Both provinces are actively engaged in the agriculture production such as diary, vegetable farming and wheat production. Central Northern Region is the closest region to the market with favorable environmental conditions for agriculture. Darkhan city, the capital of Darkhan-Uul province is the second largest city in Mongolia after the capital Ulaanbaatar. Provinces are located within the same agro-ecological zone, have similar access to road infrastructure and are classified as high potential vegetable growing areas. Selenge province alone supply over 80% (NSO, 2012) of the total domestic vegetable need. According to the National Association of Mongolian Agriculture Cooperatives (NAMAC) the majority of agriculture cooperatives were registered in the Central Northern Region of Mongolia. The region was famous for collective vegetable production during the centrally planned economy times. Even today, the tradition still holds true in the region and almost every household plants and benefit from vegetable farming. For instance, the Orkhon soum is still named as "Orkhon fruit and vegetable collective brigade".

Therefore, these provinces had the highest number of vegetable farmers in Mongolia. The vegetable production is mainly concentrated in the Mandal, Bayangol, Yeruu soums<sup>1</sup> of Selenge province and Orkhon soum of Darkhan-uul province. Thus, the main study was conducted in those soums marked with red stars in the Figure 6 below.



Figure 6: Map of study area by villages visited

Source: Google Maps, 2017

We have started our research from the nearest soum Bayangol located in 150 km from the capital city Ulaanbaatar, continuing to Mandal (180 km), Orkhon (270 km) and finishing in Yeruu (320 km).

# 6.2 Study sample

Target group of the research consist of two groups of respondents: agriculture cooperative members and non-members. In order to select the members and non-members we have used stratified sampling method.

The main research group included cooperative members from the cooperatives registered in NAMAC and were interviewed regardless of their status. We also named it as a "treatment" group. First a complete list of 50 vegetable cooperatives was obtained from NAMAC; out of these 12 cooperatives in different sub-regions were selected randomly. Majority of the

<sup>&</sup>lt;sup>1</sup> Soum is the second level administrative subdivision of Mongolia, similar to "village"
cooperatives (7) were from Selenge province and several cooperatives (5) from Darkhanuul province. While selecting the members of cooperatives, we ensured that at least 4 members of each cooperative should be included in the sample for better representativeness of the research. Out of all members in all cooperatives, total of 48 members were randomly. The research sample is statistically representative with the confidence level of 90% at 10% error taken into account the total number of vegetable cooperatives in the Selenge and Darkhan-Uul provinces. However, due to the incompletion of questions of some respondents 5 questionnaires were eliminated from the analysis. Therefore the total sample of members equals to 43 respondents.

The control group consists of total 55 vegetable farmers who work individually and who are not members of any agriculture cooperative. Out of 98 respondents 14 refused to give information on income and sales in the middle of interview. Thus, total sample consists of 84 vegetable –growing households, including cooperative members, non-members in regions with active cooperatives. Table 3 shows the general socio-demographic characteristics of the research sample.

Description	Mean	SD	Min	Max
Age, years	46.26	12.9	20	70
Gender (1=male; 0=female)	0.92	0.27	0	1
Education, years	11.5	3.42	0	16
Farm experience, years	17.38	9.68	1	60
Households size	3.95	1.52	1	9
Land size, ha	3.38	4.83	0.3	20
Num. of observation	84			

 Table 3: Some demographic characteristics of the farmers

The average age of the farmer in the study sample was 46 years. The oldest farmer was 70 years old, the youngest 20 years old. The household with male household heads were dominant (77) over female headed (7). On average households had 4 registered members, and the highest had 9 family members. Average formal education received was 11 years meaning they have completed high school in Mongolian education system. The maximum

education was 16 years equal to bachelor degree. Studied farmers owned in average 3.38 ha of land and the biggest land owner had 20 ha of land.

#### **6.3 Data collection**

The study focuses on both primary and secondary data. General secondary data was collected using desk research techniques (NAMAC, existing studies, NGOs, MULS and external agency project reports,).

Primary data was collected directly through participatory methods in the field by interviewing respondents with carefully designed mixed structured questionnaire on the household level for both members and non-members. The questionnaires for both groups were similar in terms of the general information, only different in the last chapter about membership in the cooperatives. Through the questionnaire we aimed to collect detailed information about their agriculture production, specifically the vegetable plantation information and details of the cooperatives. On average from 30-35 minutes spent to complete one questionnaire. All the primary data was collected by the researcher and three other senior year students from the Applied Economics Faculty of Mongolian University of Agriculture. The students were trained twice before going to the field survey. The questionnaires were pre-tested within the researchers and with two farmers in the market in the Ulaanbaatar city. The sample of full questionnaire is included in the Appendix 1.

In order to ensure the reliability of the data we used different types of open ended qualitative questions as well as additional informal interviews with key informants from NAMAC and MULS specialists. All data were collected during July-middle of August 2016.

#### 6.4 Data analysis

For the first objective of the thesis we used data regarding the cooperative type, production and general characteristics such as the year of establishment, number of members and land holding to describe the main typology of the agricultural cooperatives in the region. The cooperatives were classified into main existing cooperative types in

accordance with the classifications defined by (Ortmann and King, 2007; Zeuli and Cropp, 2004) mentioned in the theoretical part of this thesis.

For the second objective the data collected from the qualitative questions regarding the benefits that member get from cooperatives and reasons of members that affected them to join cooperatives were used for descriptive analysis. The benefits were divided following subdivisions originally classified by Birchall and Simmons (2004) into "external" and "internal". The more tangible benefits were considered as external and the benefits which were more subjectively perceived were put into internal benefits.

To clarify the benefits, the benefits of members are compared to the reasons of members joining cooperatives. The reasons of joining were perceived as member's expectations as future benefits and therefore if they are similar to their answers on the benefit questions then the described benefits are considered to be justified.

**For the third objective** which is to estimate the impact of cooperatives on various variables of interest, the study used methodology of estimating unbiased treatment effect. Hence, we estimated the average treatment effect on the treated (ATT) using Propensity Score Matching Method. The method was widely used in the similar quasi-experimental studies (Fischer and Qaim, 2012; Mojo et al, 2017; Schreinemachers et al., 2016; Wollni and Zeller, 2007) from where we took an inspiration.

The empirical strategy for this study aims to overcome two potential biases. First, participants may differ from non-participants by some specific characteristics (such as age, education and household gender) on the household level which may have direct effect on their livelihood. As a result, differences between members and non-members may reflect, partially or totally, initial differences between them rather than the effects of cooperative membership.

Second, such selection bias may also result from unobservable community or household characteristics. At the community level, it may be that the existence of cooperative is in part driven by particularly dynamic leaders.

Farmer's social participation and active involvement in the community events and celebrations could significantly affect the results. To minimize these biases, Propensity

Score Matching (PSM) method was used to control observed characteristics. The method has been widely used in many social science causal effect research works since its' been first used by Rosenbaum and Rubin (1983).

The main idea of the method is to estimate the treatment effects by building a suitable comparison group with non-member farmers that are similar to group members. It is an approach with two-step matching estimator.

In the first stage, we generated propensity scores or covariates P(x) from a binary probit linear regression model, which indicated the probability of a farmer to be a group member. Theoretically, for the PSM any discrete choice model, both logit and probit could be used. As our case is binary treatment estimation case, there is not much difference in the two models (Caliendo and Kopeinig, 2005). Hence, we have chosen a binary probit model for the analysis. The variables chosen for matching were used as exogenous (treatment independent) and dummy variable indicating the membership used as endogenous (treatment dependent). Then a control group by matching group members to non-members according to their propensity scores was constructed.

In the second stage, the impact of group membership on outcome variable Y using matched observations of members and non-members was estimated. We estimated the average treatment effect on the treated to see the impact of cooperative membership on the members. The PSM estimator of the Average treatment effect on the treated (ATT) is the difference in outcomes between treatment and control group appropriately matched by the propensity score. The empirical representation of the ATT is following:

$$\tau_{ATT}^{PSM} = E_{(P(X)|C=1)} \{ E[Y(1)|C = 1, P(X)] | -E[Y(0)|C = 0, P(X)] \},\$$

where Y(1) and Y(0) are the outcomes for the treated with treatment (group membership); and control group farmers without treatment, respectively while C=1 indicates treated farmers and C=0 control farmers. The difference between the two outcomes is the treatment effect on the treated (ATT). ATT is contributed by the simple descriptive statistics of the rest of variables together with summary of qualitative data.

#### **Testing of assumptions**

The use of PSM requires that the distribution of covariates in the main group and control group should be balanced (Schreinemachers et al., 2016). There are several ways of testing the balance of covariates and we have chosen the most commonly used (Caliendo and Kopeinig, 2005) testing method which is to check the overlap and the common support region in the ATT estimation. This method is the visualization of the density distribution of propensity scores of treated and non-treated groups on the plot. In addition, to test the statistical significance of the ATT, a z-test was used.

#### Variable description

Caliendo and Kopeinig (2005) note in the analysis that choosing a variable both for matching and outcome is a challenging step in constructing the model. They have noted several instructions amongst which they specifically indicate choosing right number of variables (not too few and not too many) and economically verifiable covariates (that are backed up with economic and institutional background) are crucial. Therefore, for our model we have chosen following variables, based on the existing theoretical background.

#### Variables used for matching

Based on the existing literature, we draw the explanatory variables used for matching and outcome variables used to estimate the average treatment effect on the treated. Several studies noted that personal and family characteristics influence the individuals motivation to be a member (Xiang and Sumelius, 2010; Fischer and Qaim, 2012; Zheng et al, 2011). Gender of the household head seems to have a certain influence on the membership as women tend to have different motivation and behavior compared to men (Fischer and Qaim, 2012) and thus their decision could be influenced by their various roles in the family (Pandolfelli, Meinzen-Dick and Dohrn, 2007). Hence our model included explanatory variables such as (a) *age*, (b) *gender*, (c) *education and farm experience* as a proxy of know-how and (d) *household size*. The land owned seems to also have a significant effect on the motivation of farmers in joining cooperatives (Zheng et al, 2011), so we have used (e) *land size* in hectares as a matching variable to make sure that the samples did not differ in land holding. In addition to the personal characteristics, farmers' (f) *social participation* 

(Mojo et al, 2017; Nigussie, 2009) also affected their motivation positively. For instance, similarly to the model in Nigussie's (2009) research social participation in our model is defined as an average frequency of meeting and celebrations attended in the soum center. Parameters were estimated using a probit model and predicted values from the model represents the probability of a farmer being a member of a cooperative.

#### **Outcome indicators**

We have chosen the outcome variables based on the theory available and specific variables that we wanted to check. The significant and positive impact of cooperatives on farm income, technical efficiency, total assets, yields and average price of crops have been noted (Fischer and Qaim, 2012; Mojo et al, 2017; Wollni and Zeller, 2007, Bernard and Spielman, 2010; Wanglin and Awadu, 2016). Similarly to these studies, we have selected (a) *average cash revenue* from the vegetables that farmers sold to market, (b) *average output price* of vegetables, (c) *average cost* of seed and fertilizers and as outcome variables. Because farmers in our study sell different types of vegetables the average estimation of indicators were used for the analysis.

Furthermore, cooperatives noted to be more influencing on the farmers livelihood when they produce one type of crop rather than diverse (Bijman et al., 2016). As similar studies were based on one type of crop production as banana (Fischer and Qaim, 2012), coffee (Wollni and Zeller, 2007), apple (Wanglin and Awudu, 2007) and tomato (Schreinemachers et al., 2016) we also wanted to see the impact of cooperatives on a specific crop example. Therefore, we have chosen potato and carrots for the further analysis as they were the vegetables that farmers planted most, valued most and most commercially used for income generation out of all vegetables they produced in the study region. For these impact outcomes we have chose economic indicators (a) *land productivity*, (b) *crop yield*, and (c) *output price* that were also used in a tomato farmer's case in Schreinemachers et al. (2016). All outcome indicators refer to period of one year, which is the year 2015. The operationalization of variables is shown in the Table 4 below.

Variable	Description	Unit of			
v al lable	Description	measurement			
Matching vari	ables:				
Age	Age of household head	Years			
Education	Education level of household head	Years			
Gender		Dummy variable			
	Gender of the household head	(1=male; 0=female)			
HHSize	Number of household members	Number			
Land	Size of land owned	На			
Experience	Farm experience	Years			
Social	Average of events and celebrations attended in one	Number			
participation	year				
Outcome varia	ables				
Average	Average of cash revenue from vegetables sold	FUD			
income	Average of easin revenue from vegetables solu	LOK			
Average	Average of vegetable prices	FUD/kα			
Output price	Average of vegetable prices	LOK/Kg			
Average cost	Average cost of seeds and fertilizers	EUR			
NumVeg	Number of vegetable types sold to the market	Number			
Additional outcome variables for potato and carrot producers					
Land	Potato total cash revenue divided by the potato plot	EUD/ba			
productivity	area	EUN/IIa			
Output price	Price of potato per kg	EUR/kg			
Yield	Total potato harvest divided by the potato plot area	Kg/ha			

# Table 4: The description of variables used for PSM

## 6.5 Limitations of the study

We acknowledge several limitations of our research design. Firstly the data concerning the reliability of financial evidence of respondents could not be perfectly accurate. Most farmers did not have detailed written records about their income, cost and production giving only approximate numbers. Therefore, variables of production and income could be exaggerated or lowered based on the individual respondents.

Second, the selection of respondents was partially non-random as information of cooperatives and first cooperative member contact was obtained from the NAMAC official data base.

Lastly, the farmer's general mistrusting attitude towards researchers and surveys challenged us in obtaining information and persuading people to give interview. They were not willing to give interviews due to the negative past experience with researcher and giving surveys without getting any feedback.

# 7. Results

# 7.1 Production characteristics in the region

To see the typical vegetable production characteristics and market features in the study area results regarding the plantation, main vegetables distribution channels, main sources of market information of farmers are shown.



#### Main vegetables produced

### Figure 7: Vegetables produced and sold

The result in the Figure 7 shows that farmers plant all types of commonly used vegetables. The most planted vegetable is potato, planted by 98.9 percent of respondents, followed by carrot (90.4%) and onion (83%). Turnip, cucumber, beetroot and cabbage were planted by similar number of respondents. Other types of vegetables are planted (10.6%) and sold by minority and they were mentioned as sweet pepper, broccoli and green salad during the interview. Potato, carrot and onions are the most sold vegetables to the market. Interestingly, 44.4% of farmers planted garlic, but only 9.6% sold to the market. Garlic, berries, tomato and beetroot are seen to be planted for own consumption as they are sold by 9.6%, 28.7% and 22.3% of farmers respectively.

#### Main product distribution channels



#### Figure 8: Main product distribution channels

The result on the Figure8 shows that 61% of member and 60% non-members of cooperatives sell their vegetable directly to consumers. 22% of members and 19% of non-members sell to middlemen. Non-members (12%) sell their products to private companies more than members (4%). There is no non-member who sells their product to cooperatives and only 9% of members sell their products to cooperative. The main distribution channel of vegetables is selling directly to consumers in the market.

#### Main market information sources



Figure 9: Main market information sources

The main market source of obtaining information about price, technology and innovation (Figure9) for farmers is media (TV, newspapers, radio). 42 farmers said they obtain information from friends, relatives and neighbors which make it as a second biggest source. Third source is agriculture local offices located in the soum center. Other (9 farmers) market information sources are middlemen and wholesalers.



#### The price of vegetables

#### Figure 10: The average price of vegetables

Garlic is the most expensive crop that farmers planted (Figure 10) within the respondents. The average price per kg of garlic is 10700 MNT/kg (~4 EUR) for members and 9431 MNT/kg (~ 3.5 EUR) for non-members. Second most expensive vegetable is tomato costing 5475 MNT/kg (~2 EUR). The prices for other types of vegetables were relatively same for member and non-member farmers.

#### 7.2 Typology of studied cooperatives

Based on the theory and methodology we have classified visited cooperatives into three main categories: the marketing cooperatives, the service cooperatives and the producer cooperatives. The result of the typology of visited cooperatives is shown below in the Table 5.

	Cooperative		Vear of	No. of	Cooperative
No.	type	Main products	octablichmont	mombors	land
	type		establishment	members	holding, ha
1	M, S	Vegetable, honey	2011	10	•
2	S	Vegetable	2011	9	•
3	S, Pd	Vegetable	2008	20	10
4	S, Pd	Vegetable	2003	16	5
5	S, Pd	Vegetable, Felt	2007	14	
		production			
6	S	Potato, vegetable	2010	30	
7	S	Potato, vegetable	2005	12	
8	M,S, Pd	Vegetable, honey	2012	9	20
9	S, Pd	Potato <sup>2</sup> , vegetable	2004	25	30
10	S	Potato, vegetable	2003	13	
11	S	Vegetable, livestock	2001	120	•
12	S	Potato, vegetable	2011	11	•

#### **Table 5: The characteristics of studied cooperatives**

Code: M=marketing cooperatives, Pd=production cooperatives, S=service cooperatives

#### The Marketing cooperatives

Out of 12 cooperatives three are marketing cooperatives. These cooperatives are involved in one additional side activity apart from vegetable production. Members of Cooperative number 1 and 8 produce honey and sell it on the market under cooperative name. Members of the cooperatives expanded production into honey because it was more profitable and international donor projects provided bees to the group. According to the cooperative number 1 manager, cooperative takes 10 percent from the honey collected and the income from its sales goes to the cooperative budget. Cooperatives provide unite label and support in getting selling place at the fairs to its members. However, the cooperative does not buy

 $<sup>^2</sup>$  In the official cooperative registration list of cooperatives of NAMAC, potato was registered as a separate crop. Therefore, in the Table4 the potato is mentioned alongside vegetables. In our research, we consider potato as a vegetable. Thus, the term "vegetable" includes potato as well.

vegetables from its members. Members sell vegetables individually to the market using the place on the fairs.

Cooperative number 11 has herder members registered apart from vegetable producers. The cooperative support their herder members in selling the wool to the market under it's name. During this research we did not focus on the herder members, therefore the information regarding the wool collection is not collected.

#### The Producer cooperatives

Five cooperatives are producer cooperatives. The cooperative five produces felt products in a small factory. The wool is collected from the non-member herders, living in the region and final products are sold in the small shop in the center of the soum and in the capital city-Ulaanbaatar.

Other four cooperatives (cooperative 3, 4, 5, 8 and 9) are classified as producer cooperatives because they own a common land under cooperative name. The shared land is used by members for vegetable production. However, farmers cooperate just in terms of land. According to the respondents place in the common land is offered for free as cooperatives have been provided the land from the government for free for the cooperative use. Cooperative land is used mainly for potato, cabbage and onions. The vegetables harvested from the common land are not sold to the cooperative. For the cooperative 8, the common land is used for the berry tree used for the pollination of bees.

#### The Service cooperatives

All cooperatives are classified as service cooperatives as their main activity is to provide services to its members. Specifically, they provide extension services, technical assistance and labor support during the harvesting period. The extension services include trainings and workshops, distribution of new information, materials and leaflets. Most of the trainings concern farming and several include business accounting. According to the NAMAC officer, the international donor agencies, public agents and private entities mostly favor using the cooperative channel when giving special trainings and support.

#### Organization and management of cooperative daily activities

Directors of cooperatives were in charge of the everyday activities and its organization. All visited cooperatives do not own an office, so the meeting and trainings take place in the manager's or sometimes in the member's house. According to the respondents, as cooperatives are small in size they did not need managers and accountants, and most often managers were responsible for financial recording and reporting.

There were no cooperatives registered in NAMAC in the study area that were established before the centrally planned economy, before the 90's. Cooperatives were relatively new, beginning their activities after the year 2003. This could be the result of renewed government involvement in cooperatives establishment after the year 2003. The cooperative 1 has highest number of member registered (120) and cooperative 2 has the lowest (9).

Generally, cooperatives, except from cooperative 1, did not buy products from its members. Members sell their products individually to costumers. According to the respondents and NAMAC officer, the selling points in the fair in the city are only provided for cooperatives. Therefore, farmers join cooperatives, and then use its name for selling their products to the city consumers. In this sense, cooperatives provide farmers with a "selling point", a service which could be considered as marketing. The profit from sales goes 100 percent to the farmers as they do not sell their products through the cooperatives but only under its name. From the personal interviews with directors and managers that we could contact it was visible that they were not motivated to encourage members to sell their products through the cooperatives as they did not seem to know how to efficiently conduct the process.

#### 7.3 The benefits of cooperatives

#### 7.3.1 The farmers expectations from cooperatives

The expectations of members before joining cooperatives are described as their reason of joining cooperatives. The result (Figure 11) show that farmers expected from cooperatives 1) social networking, 2) access to market, 3) improving of livelihood and 4) support in starting new businesses. Some farmers joined cooperatives following others (friends, family, neighbors, etc.).



#### Figure 11: Farmers expectation from cooperatives (n=43)

The result shows that 36% of members have joined the cooperatives to expand their network, connection and share knowledge. According to these respondents the social network with the other farmers in the community is more important for them than the financial benefits that they could get from the cooperatives. They considered cooperatives as a "good" place to get to know their neighbors and make new connections. The idea of "cooperation" and "sharing" were the main triggers that made them join cooperatives in the region.

The second biggest reason (29%) in their decision to become a member was to get a market access in order to sell the vegetables. Moreover, 20% of respondents perceived cooperatives as a way to improve their overall livelihood. Few (7%) members joined cooperatives following other neighbors to not feel left out in the community. They have also stated that they joined cooperatives only based on their friend's suggestions without initial understanding about cooperatives. Also, 8% of respondents joined cooperatives in search for support in starting new business.

While looking at the result, it is seen that two triggers could be classified as collective incentive: "following others" as sense of community showing that farmer likes or follows other farmers and "expanding network, cooperate" as shared value.

#### 7.3.2 The benefits of cooperatives

The benefits of cooperatives are divided into: external and internal benefits. The results from qualitative questions show that external benefits (Figure 13) surpass the internal benefits (Figure 12) for farmers.



#### Figure 12: Internal benefits of cooperatives

In total 14% of members answered they benefited from cooperatives in *networking and connections*. This is surprising as 26% of members expected the cooperatives to be a place to improve their network expansion and cooperation in the first place. This finding could be backed up with the respondent's answers during the interview that cooperatives were poor in "cooperating" and it was challenging to work and communicate with other members. Another internal benefit is *a working environment*, where respondents (19%) stated that cooperatives provided them a good working place where they felt like working a more "formal" environment than just farming alone. It is seen that they see themselves and their work more valued.

External benefits (Figure 13) that members get from cooperative are access to market, trainings, improved access to production resources, access to information and saving time spent on farming.



#### Figure 13: External benefits of cooperatives for members

The result show that member's expectation from cooperatives for getting improved access to market is met because majority of members (63%) stated is as benefit received from cooperatives. The second benefit is the trainings (22%) that member's receive from cooperatives. From the results of qualitative questions, trainings that cooperatives provide for members are mostly related to new agriculture practices (vegetable processing and pickling techniques, storing, planting techniques, introduction of new vegetable varieties and honey harvesting) and business management (accounting and organization of cooperatives). Trainings are provided from the international organizations, government agencies and NAMAC.

Members also benefit from improved access to production inputs (6%). Cooperative members, engaged in the vegetable production, get seed of new varieties from the projects and those members who are engaged in honey production received bees from projects through cooperatives. Unfortunately, respondents were not able to tell us the quantity or monetary value of the received inputs as it was few years ago and they did not recall the exact amount of the provision. 4% of members said that they benefited from the help in saving farming time. The informal help they receive from the other members during vegetable plantation and harvesting times saves their overall farming time.

Lastly, the members benefited from cooperatives in access to information. According to the 5% of members, cooperative managers distribute to their members new information

regarding the new projects in the soum and any kind of change in the field by phone or personally. During the informal interview with the soum public agriculture officer backed up this finding saying that usually cooperative managers are the first ones that they call when implementing any kind of new project in the agriculture sector. According to the officer, reaching farmers through cooperative managers is the fastest way to gather people for trainings, announcement and activities.

#### 7.4 The impact of cooperatives on farmers livelihood

#### 7.4.1 Propensity score matching estimation

#### Average treatment effect on the first chosen outcomes

Firstly, the ATT is estimated on the sample of all 84 farmers (38 members and 41 nonmembers) planting all types of vegetables.



#### Figure 14: Kernel density distribution between member and non-members

The balancing requirement that we have used shows overlap between treatment and comparison group (Figure 14). However, extreme values on the right upper side suggest that there might be a lack of overlap of some propensity scores. It should be checked with z-testing further.

The results of the ATT on the first chosen outcome variables are shown in the Table6 below.

Outcome	Treated	Control	ATT	SE
	Mean	Mean		
	(n=38)	(n=41)		
Average price (EUR/kg) <sup>3</sup>	0.54	0.48	0.21***	0.07
Average income (EUR)	2451.55	2820.96	-488.16	1269.20
Average cost (EUR)	893.49	489.34	455.32*	267.67
Number of vegetables	5.47	4.95	1.73***	0.51
Num. of observation		84		

Table 6: The average treatment effect o the treated, total sample

Notes: \* and \*\*\* denote significance at the 10% and 1% respectively. ATT estimates were done in Small STATA13 using the command "teffects psmatch". Significance tested using z-test.

PSM estimations tell us the positive and significant influence of cooperatives on the average price of vegetables and number of vegetables produced by the farmers. On average members of cooperatives sell their products at 0.207 EUR higher prices than the non-members. The model indicates that there is no significant effect of group membership on average vegetable income. Moreover, cooperative membership negatively affects the members' annual average cost of seed and fertilizers showing that members spend on average 455.32 EURs more than the non-members farmers.

Group membership has a significant and positive effect on the diversity of vegetable varieties produced by the farmers. Members produced approximately two more varieties of vegetables compared to non-members.

#### ATT estimation on the potato and carrot farmers

Secondly, we estimate the ATT on the outcomes concerning potato and carrot farmers. Potato and carrot farmer sample consist of total 72 and 66 farmers respectively.

We test the covariate balance for the both ATT on potato farmers sample (Figure 15) and carrot farmers (Figure 16) below.

<sup>&</sup>lt;sup>3</sup> Exchange rate was taken from Central Bank of Mongolia on 2017-03-22, 1EUR=2650 MNT



Figure 15: Kernel density distribution between non-member and member (Potato farmers)



# Figure 16: Kernel density distribution between non-member and member (Carrot farmers)

In both cases, the density distribution shows good overlap of propensity scores between non-members and members. Therefore, the balancing test if fulfilled.

Furthermore, we estimate the membership effect on the economic indicators of potato and carrot farmers (Table 7).

0.4	Potato fa	armers	<b>Carrot farmers</b>	
Outcome	ATT	SE	ATT	SE
Land productivity (EUR/ha)	198.57	857.13	1662.76	3148.50
Yield (kg/ha)	426.87	1825.55	3987.06	10486.30
Output price (EUR/kg)	0.0003	0.03	0.03	0.03
Num. of observation	72		66	

Table 7: The average treatment effect on the treated, potato and carrot farmers

Notes: ATT estimates were done in Small STATA13 using the command "teffects psmatch". Significance tested using z-test

The results from the ATT analysis show that cooperatives do not have statistically significant effect on both potato and carrot producers' land productivity, yield and output price. However, as the density distribution shows overlap

Overall, cooperative membership has a positive and a significant impact on the average price of vegetables, average cost of seeds and fertilizers and variety of vegetables produced.

#### 8. Discussion

In this study we investigated the typology, benefits and impact of agricultural cooperatives to the smallholder vegetable farmers in rural areas of Mongolia. Our results show that overall cooperative membership has a positive impact on farmers' output price, variety of vegetables produced and negative impact on production costs. In their theory, agricultural cooperatives should reduce transaction costs, promote economies of scale, improve the collective actions and social capital, reduce the cost of production and increase productivity of poor farmers.

When looking at the typology of existing cooperatives, there were no clear distinction between cooperative types such as marketing cooperatives and production cooperatives. Gardner and Lerman (2006) back up this result, stating that there is no visible distinction between western types of cooperatives from older collective types of cooperatives in transitional economy countries. The understanding and classification of cooperatives according to the main types is still needed.

Interesting finding was that both members (61%) and non-members (60%) sold their products individually to consumers rather than through cooperatives. This was previously noted in a research done by Hilliova (2016) in analyzing the role of Mongolian herders' cooperatives. They mentioned that both members and non-members did not sell products through cooperatives but rather individually. Because most farmers sell their products directly through costumers the benefits and development of cooperatives could be rather slow and low.

While analyzing the benefits of cooperatives, farmers in Mongolia identified more external benefits than internal compared to the findings of Birchall and Simmons, 2014. Cooperatives seem to provide more tangible benefits than subjective ones. In lining with their study, our study also shows that the collective incentives as sense of community served as one of the main reasons in joining cooperatives. However, in our case, when talking about the benefits received, they are more tangible and individualistic.

We also have found out that one of the main reasons of farmers joining cooperatives is to get a "place" in the local market and at the annual vegetable exhibition in the cities. During

our research it was seen that farmers were somehow "pushed" to join cooperatives in order to improve their market access. This finding was similar to other studies done in China (Liang and Hendrikse, 2013) that government institutions shape the behavior of farmers by providing support only to cooperatives or collective groups. The strong initiatives from the government to promote cooperatives without creating suitable institutional background have led to creations of several "on paper" cooperatives. Strengthening up this finding, Hilliova (2016) found out those herders joined cooperatives only based on the government policy to provide subsidy to group members. There is poor understanding and participation in cooperatives mainly due to the fact that farmers join cooperatives to obtain either "selling point right" or "wool subsidy" these points are very similar with findings in other transitional economies (Golovina and Nilsson, 2009). This findings in lining with our results show that there is a need of improving and looking back at the development of stronger institutional base in the agriculture cooperative sector in Mongolia.

Contradicting to the results of several scholars when identifying the positive impact of cooperative membership on the income of smallholder farmers (Zheng et al., 2011; Fisher and Qaim, 2012; Ma and Abduali, 2016) we found out that cooperatives did not have significant influence on average income from vegetables in farmers livelihood. Similarly to our finding, in the study done on case of Ethiopian coffee cooperatives (Mojo et al., 2017) including 300 respondents they have concluded that cooperative membership does not have significant impacts on the cash revenue of the farmers. Therefore the impact of cooperatives on revenue should be studied more.

Our findings that cooperative membership helps farmers to obtain better output prices are similar to the finding of Bernard et al. (2010), and Fisher and Qaim (2012) that were done in Ethiopia and Kenya respectively. Both works conclude that although members of cooperative get better prices it does not affect the impacts on their overall income, as this does not necessarily guarantee the increase in the harvest amount. In our case, the possible explanation could be similar to the Kenya case that majority of members' still sell individually, therefore the impact of better outcome price is still very little.

On one hand, the finding that cooperatives have a positive significant influence on the crop diversity does not seem to be in lining with the theoretical findings of Bijman et al., (2016), stating that cooperatives does not have effect on farmers producing diverse crops. On the other hand, it supports the theory that cooperatives benefit farmers' with extension services giving trainings and advisory services, thus increasing the farmer's capacity to implement innovation and learn new skills.

When looking at the cooperative effects on the farmers land productivity, yield and output price of potato and carrot farmers separately, we did not find any significant effect. In terms of productivity our findings were in line with Fisher and Qaim's (2012) banana plantation case study. They did not find significant impact of group membership on the yields of banana. These findings might have been influenced by the unfavorable weather conditions, specifically signs of drought.

Agricultural cooperatives still need improvement in reaching farmers in the Central region. There is a need for better management mechanism to improve the understanding of modern types of cooperatives within the farmers, consumers and officials. Since our research includes only few cooperatives established after the year 2000, the results and findings are limited. Based on the current findings, it would be interesting to increase and diversify the sample size to different regions. Analyzing more into the institutional background and defining the "rule of the game" of agriculture cooperatives will be also interesting.

The results might serve as a contribution to further researches focused on the development of cooperatives. Also, it can be useful material for professionals in establishment of new cooperatives. It can provide valuable information to the national government regarding their decision on legislation, public services, activities and support in the future. For the cooperative associations it can also be useful in improving their services by giving information about farmers' behaviors and needs.

# 9. Conclusion

The main aims of our research were to identify the typology of agriculture vegetable cooperatives and to understand the impact it has on the livelihood of smallholder vegetable producers.

The result suggests that cooperatives in the Central Northern Region of Mongolia are mainly Service cooperatives. Producer cooperatives and Marketing cooperatives also exist in the region.

Main benefits members get from cooperatives are access to market, provision of farm inputs, trainings and social networking. The access to market and willingness to cooperate are the most common reason that pushed initially to join agricultural cooperatives. Initially, farmers had been motivated by collective incentives when joining cooperatives. After participation in cooperatives farmers receive more external (tangible) benefits than internal ones.

The PSM shows that membership in cooperative members are able to obtain better product prices, produce more varieties of vegetables than non-member farmers. Cooperative membership has a negative impact on the input cost of members. Agriculture cooperatives in the Central Region do not have significant effect on average cash income of farmers. But it does provide better market opportunities by giving access to better output prices and diversify planted vegetables.

Moreover, there is no significant effect of cooperatives on land productivity, yield and crop output price of potato and carrot farmers.

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#### THE APPENDIX 1: THE FULL SURVEY QUESTIONNAIRE

# **"SURVEY ON TOPIC "IMPACT OF AGRICULTURE COOPERATIVES ON LIVELIHOOD OF SMALL SCALE VEGETABLE FARMERS"**

Dear Sir/Madam

Thank you very much for finding time in answering the questions in the survey. Researchers at all levels will keep your family's private data strictly confidential. The information that you have provided will only be used for academic purposes.

# **SECTION 1: GENERAL QUESTIONS**

SURVEY NUMBER	
DATE	
PROVINCE	
SOUM	
Name of the household head	
Number of household members	
Age	
Gender (male=1;female =0)	
What is your highest level of obtained education?	
None =1	
Elementary =2	
Secondary=3	
High School=4	
Vocational =5	
High =6	
Other=7	

Location	From UB	From Province Center	From Soum Center
Distance of the			
household, km			

## **SECTION 2: CROP PRODUCTION**

2.1 Does your household own any land for agricultural purposes? 1. Yes 2. No

2.2 What is the total land amount you own in hectares? \_\_\_\_\_

2.3 How much of your total land do you use for vegetable production, in hectar?

2.4 Do you own any land together with other farmers? 1.Yes 2.No

2.5 How much of the land do you own from the common shared land, in hectares?

	Production details								
Ν	(2.6)	$(2.7)$ $(2.8)^{-7}$		Total	(2.9)	(2.1	0) Sold	(2.11) sold as	
	Name of	Did you	harvest of		Quantity used	as raw		processed	
	the crop	harvest	the		for own	vege	etable?	and	stored
		any of	vegeta	ble	consumption?			proc	luct?
		the	in?						
		following							
		crops in							
		the last							
		one year?		Г <u> </u>					
		Yes=1	From	From	Kg	Kg	Price/kg	Kg	Price/kg
		No=2	1 ha	total					
0.1	-			land					
01	Potatoes								
02	Carrots								
03	Turnip								
04	Cabbage								
05	Beetroot								
06	Onion								
07	Garlic								
08	Tomatoes								
09	Cucumber								
10	Fruits								
11	Other								
	Total								

			Sale details	
Ν	(2.11)	(2.12) Where did	(2.13) Main type of	(2.14) How far
	name of the	you sell the crop?	distribution	do you have to
	crop			go to sell the
		Soum center =1	To consumers directly,	crop?
		Aimag center=2	individually =1	
		Ulaanbaatar=3	To cooperative $=2$	
		Other=4	Private company=3	In km
			Shops=4	

		To other institutions by
		Other=6
01	Potatoes	
02	Carrots	
03	Turnip	
04	Cabbage	
05	Beetroot	
06	Onion	
07	Garlic	
08	Tomatoes	
09	Cucumber	
10	Fruits	
11	Other	
	Total	

2.15 Have you enlarged your production in last two years? (1=yes; 2=no)

2.16 In the last two years my production has increased/decreased by:

1.10% 2.20% 3.30% 4.40% 5.50% 6. More than 50%

2.17 How satisfied are you with your vegetable selling price?

- 1. Very unsatisfied
- 2. Unsatisfied

- 3. Satisfied 4. Very satisfied

	EXPENDITURE							
	Expenditure	(02.18)Wł	nat was		Expenditure	(02.18)Wh	at was the	
	item	the expend	liture		item	expenditure on		
		on[ITEN	/I] in			[ITEM]	in the past	
		the past 12	2			12 months	?	
		months?						
		Quantity	Value			Quantity	Төгрөгөөр	
			in					
			MNT					
01	Seeds			08	Electricity			
02	Fertilizers			09	Water			
03	Hired labour			10	Transportation			
04	Equipment			11	Communication			
	tools							
05	Constructions			12	Taxes, Fees			
06	Raw materials			13	Rent			
07	Gasoline, fuel			14	Other			

		(insurance,)	
Total			

#### **SECTION 3: OTHER INCOME (wage, pension, aid)**

3.1 Do you have any job other than agriculture? (1. Yes 2.No)

3.2 What kind of job do you do? (.....)

3.3 What was the type of the work ? 1. Unpaid 2. Paid 3. Non-monetary payment

3.4 What was the type of your work employer?

1. Cooperative 4. Sate owned company 7. Other

- 2. Corporation 5. Government organization
- 3. LLC 6. NGO3

3.5 Could you please provide your monthly wage? .....

3.6 In the past one year has any member of the household received money or goods from individual, relatives, friends, government, or an organization? (1.Yes 2.No)

3.7 Who gave the gift, remittance or aid?

- 1. Government
- 2. Private company
- 3. NGO
- 4. Relatives
- 5. Other individual (friends, neighbors,..)
- 6. International organization
- 7. Other

3.8 How much of aid did your household receive in total during last one year, in MNT ?

3.9 How many members of your household receive pension?

3.10 What is the total pension amount, in MNT?

#### **SECTION 4: SAVINGS AND LOAN**

4.1 Do you have a saving?	1.Yes	2.No
4.2 Do you have a loan that has not been yet repaid?	1.Yes	2.No
4.3 Did you take any loan in the last one year?	1.Yes	2.No
4.4 Where did you get a loan? Choose from following sources		
1. Commercial Bank		

- 2. Non-Bank Financial Institutions
- 3. Savings and Credit Cooperative
- 4. State loan institutions (Soum foundations, local government projects,etc)
- 5. Individual

# 6. Other SECTION 5: SOCIAL CAPITAL

5.1 Are you a member of any social group? 1. Yes 2. No

5.2 What type of group is that?

1. Farmers union 2. Religious group 3. Cooperative 4. Other,

5.3 In how many meetings in the village did you attend in the past one year?

5.4 In how many celebrations in the village did you attend in the past one year?

5.5 How many farmers outside your community do you communicate with?

5.6 What kind of relationship do you have with other farmers outside your community?

1. Only for farming activities 2. Close friendship 3. Both above

5.7 Do you agree with the statement "I would be willing to share my property with other farmers in the village" ? 1.Agree 2. Do not agree

5.8 Will you be willing to share land and other utilities with other farmers in the future?

1. Yes 2. No

5.9 If no, what is the main reason of you not wanting to share?

- 1. No profitable
- 2. Other farmers use everything without care
- 3. Other farmers does not want to share things with me
- 4. I do not trust others

5. Other (.....)

5.10 Do you agree with statement " I trust other farmers in the village" ? ( 1. Agree 2. Do not agree )

SECTION 6: QUESTIONS FOR COOPERATIVE MEMBERS

6.1 How many years have you been a cooperative member?

6.2 What is your position in the cooperative?

1. Member 2. Member of Board of Directors 3. Director 4. Other

### Meeting organized from the cooperative

Year	(6.3) How	(6.4) How	(6.5) In how	(6.6) In how
	many meetings	many trainings	many meeting	many
	does your	does your	did you attend?	trainings did
	cooperative	cooperative		you attend?
	organize?	organize?		
	Number	Number	Number	
				Number
2014-2015				
-----------	--	--		
2016				

6.7 How actively are you involved in the cooperative activities?

1. Very inactive2.Inactive3. Average4. Active5. Very active

6.8 How many members are actively involved in business transactions with cooperative, in %?

6.9 How would you rate the cooperative capacity to provide services on a scale from 1 to 5?

1. Very bad 2.Bad 3. Average 4. Good 5. Very good

6.10 What is the amount of land which is under cooperative management?

6.11 What are the main services provided from the cooperative to the members?

6.12 What are the main benefits you receive from the cooperative?

6.13 What are the main problems associated with the cooperative?

- 6.14 What are the main products sold by the cooperative?
- 6.15 Why have you decided to join cooperatives?
- 6.16 Do you know main principles of cooperative? 1. Yes 2.No
- 6.17 Are you familiar with "Law on Agriculture Cooperative"?
- 1. Not familiar at all
- 2. I have heard about it
- 3. I know a little bit
- 4. I know it very well
- 6.18 Does you cooperative support you in selling vegetables?
- 1. Very unsupportive
- 2. Unsupportive
- 3. Supportive
- 4. Very supportive
- 6.19 What kind of support does your cooperative provide?
- 1. To obtain better prices in the market
- 2. To get better information about the market

- 3. To reduce the transportation cost to the market
- 4. To obtain credits from financial institutions
- 5. To save the time spent on vegetable plantation
- 6. Other (.....)

6.20 Where do you get information about market, production and technology?

- 1. Media (TV, radio, newspaper)
- 2. Local administrative office
- 3. State offices
- 4. Cooperative
- 5. Friends, relatives, neighbors
- 6. NGO
- 7. International organization
- 8.Other (to specify)

## **SECTION 7: QUESTIONS FOR NON-MEMBERS**

Ν	Questions	Answers
(7.1)	Have you ever tried to join an agriculture cooperative? (YES=1, NO=0)	
(7.2)	What are the reasons that you are not a member of a cooperative?	
(7.3)	What are the problems associated with a membership of a cooperative?	
(7.4)	Do you have a basic understanding about cooperative principles? (YES=1, NO=0)	
(7.5)	Where do you get information about market, production and technology?	<ol> <li>Media (TV, radio, newspaper)</li> <li>Local administrative office</li> <li>State offices</li> <li>Cooperative</li> <li>Friends, relatives, neighbors</li> <li>NGO</li> <li>International organization</li> <li>Other (to specify)</li> </ol>

## THANK YOU VERY MUCH

## THE APPENDIX 2: PHOTOS OF DATA COLLECTION



Picture 1 Data collection in Orkhon soum, onion field



Picture 2 Data collection in Selenge Province with cooperative member