

Results of Economic Activity of Personal Subsidiary Plots Engaged in Distant-Pasture Animal Husbandry in the Republic of Tuva

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ABSTRACT

Animal husbandry is a means of subsistence and a major source of income for families in rural areas in the Central Asia. The article discusses the results of economic activity of personal subsidiary plots engaged in livestock in the Republic of Tuva. The Republic of Tuva lies at the Asian part of Russia and is allocated in southern Siberia. In the article, the calculation of basic annual expenses and incomes of personal subsidiary plots engaged in livestock is made. The calculation is based upon the information on the results of the activities of personal subsidiary plots gained in the field expedition conducted in summer 2019. 59 plots in all 17 regions of the republic are surveyed. Depending on the quantity and species composition of livestock in households in the districts of Tuva, small, average and large personal subsidiary plots are allocated. The study showed that the income of a person working in a small personal subsidiary plot does not reach the average subsistence level of the population established in the region in 2019; and the income in the average one is above the subsistence level but below the minimum wage established in 2019. The income of a person in a large personal subsidiary plot is at the level of the minimum wage. The main factors of low income of livestock breeders are the distance from the capital of the Republic where the main market is located, and the transport inaccessibility due to the terrain and natural conditions.

Keywords: *personal subsidiary plots, animal husbandry, pastoralism, sheep breeding, expenses, income, rural economy*

1. INTRODUCTION

Pastoralism is a means of existence of the great part of the population in different parts of the world. The Republic of Tuva is one of the regions of Russia that has maintained this type of animal breeding.

Tuva is allocated in the southern part of Siberia (fig.1). The territory is 168,6 thousand sq. km. 80% of the territory is covered by mountains and the rest part is covered by valley and steppes. 1112,7 thousand hectares, or 23%, of

the territory is occupied by agricultural lands including 1028,1 thousand hectares (92%) of pastures (fig.2) [1].

Specialization of animal husbandry in personal subsidiary plots (PSP) in the districts of Tuva is as follows: in the central subtaiga-steppe zone there are meat and dairy livestock breeding, meat and wool sheep breeding; in the west steppe zone there are meat livestock breeding, meat and wool sheep breeding, goat breeding, and yak breeding; in the south zone of dry steppe there are wool sheep breeding, meat livestock breeding, goat breeding and herd horse breeding; in the east forest-steppe zone there are meat and dairy livestock breeding, reindeer husbandry [2].



Figure 1 The Republic of Tuva on the map of the Russian Federation

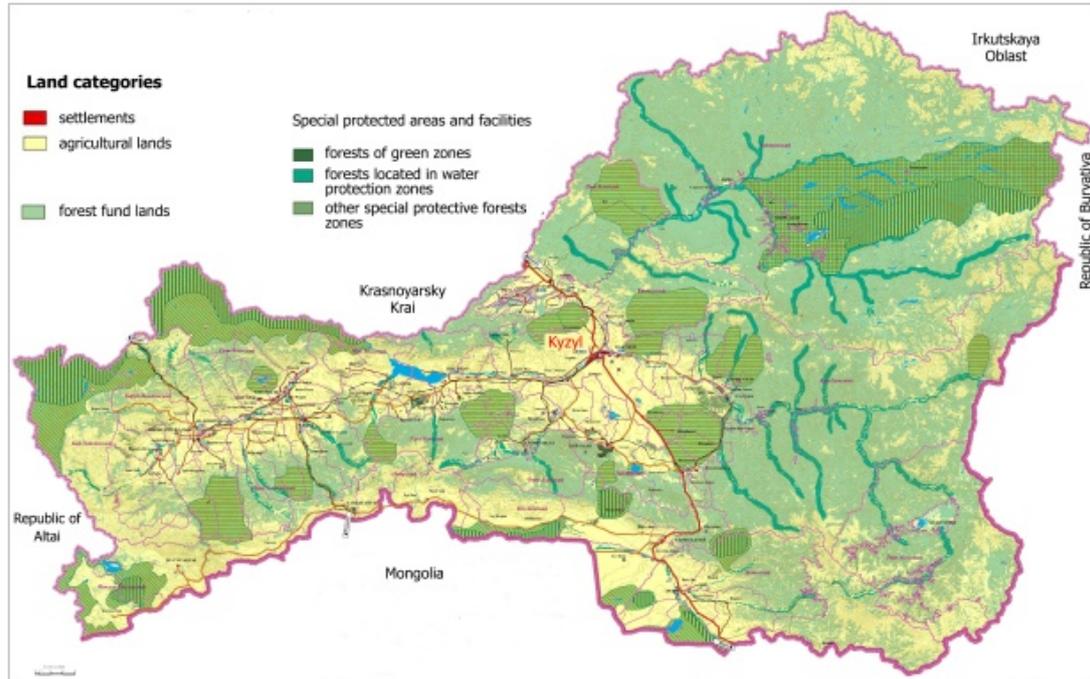


Figure 2 Map of land categories of the Republic of Tuva

Today, more than 70% of all agricultural products in the Republic of Tuva are produced by personal subsidiary plots while in Russia they produce more than 30% [3] ensuring food security in the region and the country. The share of livestock production in agricultural products in Tuva is about 80% [4]. Animal husbandry, mainly sheep breeding, is the livelihood of a significant part of the rural population. According to the Ministry of agriculture and food of the Republic of Tuva in 2018, the number of nomad camps was 3,018, including 1,791 personal subsidiary plots and 784 peasant (farm) holdings [5]. The Republic of Tuva is one of the depressed regions with high unemployment, low abundance of factors of production and infrastructure constraints, where 42% of the population has incomes below the subsistence level [6]. Taking into account the above, the study of personal subsidiary plots as subjects of economic relations, along with the study of working conditions and everyday life of livestock breeders and their family members, remains relevant.

1.1. Related Work

Various works of scientists and economists are devoted to the research of rural households. Regarding foreign studies, the activities of households (family farms) engaged in animal husbandry have been studied and reflected in the works of J. Forero-Álvarez [7], C. H. González and M. P. Fernández [8], N. Popović [9] and others. Undoubtedly, the classic theory of peasant farming is the works of A.V. Chayanov [10], N. D. Kondratiev [11]; the theme of the informal economy of modern Russia

is reflected in the works of M. A. Nikulin [12]; the issues associated with determining the place and role of personal subsidiary farming in the Russian economy, reflected in the studies of V. I. Savkin [13] and etc. The problems of agriculture of the Republic of Tuva are considered in works of such researchers as V. K. Sevek [14], B. A. Dongak [15].

1.2. Our Contribution

The novelty of this work is to determine the economic results of the economic activities of personal subsidiary plots engaged in pastoral animal husbandry. The purpose of the research was to determine their expenses and income. The purpose predetermined the following research tasks:

- study the socio-economic and agro-climatic conditions of pasture in rural areas,
- analyze the composition and structure of annual basic expenses for livestock,
- analyze the composition and structure of the annual basic incomes of personal subsidiary plots.

The object of the study is personal subsidiary plots engaged in pastoral animal husbandry in rural areas. In accordance with the Federal law on personal subsidiary farming, a personal subsidiary plot is an activity to meet personal needs, while the sale of surplus products produced on the provided land is not an entrepreneurial activity [16].

Animal breeders live and keep their livestock at nomad camps. Currently, a nomad camp is a complex of buildings located outside localities: sheds, yurts, a small house, etc.

Yurts are usually used in the warm period. During winter (the air temperature reaches minus 45 Celsius), animal breeders live in houses built on pasture lands [17]. Earlier traditional pasture was based on seasonal migrations four times a year. However, in our days, the temporal and spatial organization of nomads has undergone changes: most livestock breeders have shifted from four-season move to a two-season move [18]. This is optimal for them both in terms of expenses and for saving land.

The empirical base of the research was the information collected during the expedition in July-August 2019 within the framework of the Russian Foundation of Basic Research grant no. 19-010-00831 "Determining the results of livestock production (personal subsidiary plots) for possible further taxation." During the expedition, 56 personal subsidiary plots of various sizes were surveyed.

1.3. Paper Structure

The structure of the main part of the paper is organized as follows. The first section presents the conditional division of republic districts into zones by the size and species composition of livestock in personal subsidiary plots. The second section analyzes annual expenses of households and describes their annual turnover of livestock; also, the approximate cost of raising different types of livestock is determined. In the last one, the third section, annual income of livestock breeding plots of the population is considered. In conclusion, further directions of the research are outlined.

2. BACKGROUND

2.1. Conditional division of republic districts into zones

Conditional division (fig.3) of districts is made by differences in the quantity and species composition of livestock in personal subsidiary plots and similarity in the amount of expenses for keeping livestock. So, the calculations are made for 4 zones (table 1). Most of the regions in the central, western and southern parts of the Republic are characterized by relatively favorable natural conditions and geographical location: low snowfall in winter, developed transport infrastructure, and the accessibility of wide pastures. The districts of zones 2, 3 and 4 are characterized by remoteness from the republic capital and transport inaccessibility, personal subsidiary plots are located far from human settlements.

Depending on the size and species composition of livestock, small, average and large personal subsidiary plots are allocated (table 1).

Let's consider specifics of Tuva districts. Mongun-Taiginsky district is located in the south-west of Tuva. This is a mountainous area that separated from the rest of the territory of republic by high ridges. The population of the district has always bred sarlyks (yaks). The residents of Mongun-Taiginsky district keep sarlyks in a semi-free state, they note that the animals do not need much attention, they are not afraid of wolves (wolf fangs do not reach yak's skin due to thick hair). Thus, households do not bear the cost of feeding yaks.

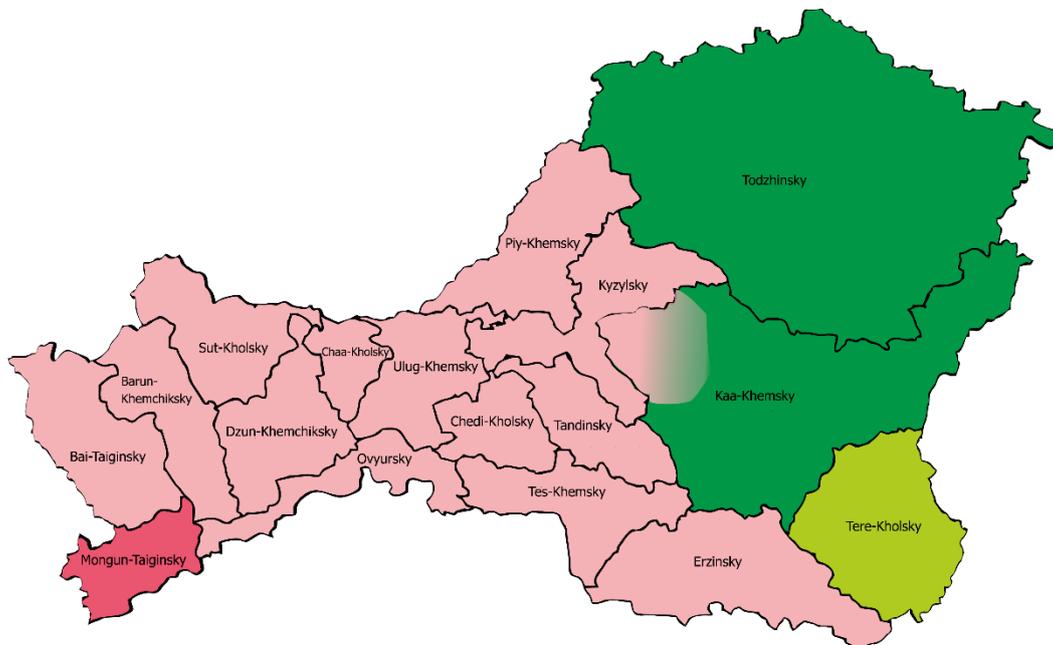


Figure 3. Conditional division of districts into zones by size and species composition of livestock in personal subsidiary plots

Table 1 The size and species composition of livestock in personal subsidiary plots in the districts of the Republic of Tuva

Zones	Districts	Units	Small PSP			Average PSP			Large PSP		
			Small ruminants	Cattle	Horses	Small ruminants	Cattle	Horses	Small ruminants	Cattle	Horses
1	Kyzylsky, Tandinsky, Kaa-Khemsy (Western part), Piy-Khemsy, Ulug-Khemsy, Chedi-Kholsky, Dzun-Khemchiksky, Chaa-Kholsky, Sut-Kholsky, Bai-Taiginsky, Barun-Khemchiksky, Ovyursky, Tes-Khemsy, Erzinsky	heads	220	10	1	350	50	2	750	80	100
2	Mongun-Taiginsky	heads	220	10	1	350	50	2	750	80	25
3	Todzhinsky, Kaa-Khemsy (Eastern part)	heads	x	15	1	x	35	2	x	45	15
4	Tere-Kholsky	heads	70	10	1	150	30	2	280	70	30

Due to the distance from the republic capital, the cost of fuel and feed mixture in Mongun-Taiginsky district is high therefore many livestock breeders do not use feed mixture. For high-altitude pastures, grass is low-growing which makes it difficult to harvest hay in large quantities; in addition, the best pastures and haymaking areas are occupied by state and municipal unitary enterprises, so households harvest hay in other areas or buy it. Compared to the zone 1, Mongun-Taiga animal breeders stock up on feed in smaller quantities.

Todzha is also a mountainous area in the North-East of the Republic. The territory is covered mainly by taiga and tundra. Due to natural and climatic conditions, the population keeps cattle and horses. In Todzhinsky district, there are significantly fewer livestock in personal subsidiary plots. This is because of small areas for hay and pastures; high snowdrifts block access to grass. In connection with the above, the number of livestock in a personal subsidiary plot does not exceed 45-50 heads of cattle. Todzha is known for reindeer. At the end of 2018, there were 1285 heads of reindeer, of which 1132 belong to agricultural organizations, 153-to peasant (farm) holdings. Personal subsidiary plots do not breed reindeer. Due to the distance between the district and the capital and inaccessibility, personal subsidiary plots sale their agricultural products mainly within the district.

Tere-Kholsky district is the most remote, inaccessible region of the Republic of Tuva, located in the South-East of the Republic, bordering with Mongolia. Travelling from the city of Kyzyl to the village of Kungurtug (the administrative center of the district) takes about 18 hours. The dirt road runs through mountains and rivers; the traffic is stopped in spring and autumn during snowmelt and snowfall. This causes high prices for fuel and feed mixtures in the district. In such circumstances, breeders usually buy a small amount of feed for dairy cows, and the rest of the cattle are fed only with hay and salt. In addition, livestock breeders mainly use horses to move between nomad camps and human settlements, less often motor vehicles. In Tere-Kholsky district, the nomad camps are located at a great distance from the district center: pastures suitable for grazing are located in a remote and inaccessible area. The inaccessibility and the distance from the market caused the small size of livestock in personal subsidiary plots: animals are mostly raised for personal

consumption. In contrast to the livestock breeders in other districts who sell live animals, the livestock breeders of Tere-Kholsky district can sell carcasses delivering them to the market only during the cold period. First, live cattle do not stand up to transportation over long distances. Secondly, due to the lack of refrigerated trucks, animal breeders are forced to deliver carcasses to Kyzyl when it gets cold.

Due to certain factors, it was very difficult to find out from livestock breeders the exact amount of expenses incurred by them for keeping their personal subsidiary plots. They do not record their incomes and expenses, not to mention that there is no division between the family budget and the "family business". Moreover, animal breeders do not specify the exact number of animals. Tuvan livestock breeders have a belief that frequent counting of the number of small cattle in their herd will lead to a decrease in the number of livestock. Nevertheless, an attempt is made to generalize information about the annual expenses carried out by livestock personal subsidiary plots, and their incomes.

2.2. *Expenses of personal subsidiary plots engaged in livestock breeding*

To identify the expenses of small, average and large personal subsidiary plots, calculations were made separately for small ruminants, cattle and horses in 4 zones. The basic expenses for animal husbandry include: feed, fuel and lubricants for hay harvesting and delivery hay to nomad camps, veterinary services and medicines, veterinary certificate, temporary hired labor, fuel for travelling to settlements, maintenance of property, rent for land use, and other. In addition to pasture grasses, in Tuva, livestock feed usually consists of hay, feed mixture and salt. The need to buy additional hay occurs in an unfavorable year with a cold and snowy winter, usually at the end of the winter season. Additional feeding is also required for ewes during lambing and weakened animals [19]. In small and average-sized personal subsidiary plots, the expenses include the maintenance of working horses: 1 horse in a small personal subsidiary plot, 2 horses in an average personal subsidiary plot. These include feed and veterinary services.

Calculations are made in 2019 prices in rubles.

As a rule, small households prepare enough hay to feed the animals on their own. Average and large personal subsidiary plots also harvest hay but it is difficult to prepare it for the entire herd in large quantities so households buy a certain amount of hay. Hay harvesting is carried out by households on their own and by hiring additional labor (in average and large personal subsidiary plots).

Older children and relatives and sometimes other people looking for a temporary part-time job are usually involved in seasonal works (haymaking, lambing and calving, shearing). As a reward for their work, seasonal workers receive a certain number of heads of live sheep and goats. These expenses, which are made in kind, are determined in value terms by multiplying the number of heads of live small ruminants given as remuneration for labor by the average regional wholesale price of a head of live small ruminants (4000 rubles).

Analysis of expenses of livestock personal subsidiary plots has revealed that the largest points in the structure of expenses are feed, seasonal work, and fuel and lubricants.

Further, the authors determined the number of heads of livestock that must be sold to cover the main annual expenses by dividing all expenses for keeping livestock by the wholesale price of a head of live animal. Since live small ruminants are the main commodity for personal subsidiary plots to sell, the analysis of the turnover of small ruminants is of the greatest interest. The annual turnover of livestock shows the change in the number of animals at the beginning and the end of the year, which is as follows:

$$\text{Livestock at the end of the year} = \text{Livestock at the beginning of the year} + \text{Offspring of the current year} - \text{Number of livestock for sale to cover expenses} - \text{Number of livestock for consumption and sale-Losses.}$$

The analysis showed that small personal subsidiary plots need to sell from 15 to 20% of their livestock to cover their expenses, while large ones need to sell less: from 10% to 14%.

There is a tendency to reduce the number of small ruminants in small personal subsidiary plots, and the number of livestock in average personal subsidiary plots remains the same. We can assume that the number of small ruminants in all households of the Republic is growing due to an increase in the number of small ruminants in large personal subsidiary plots. Additionally, the number of small ruminants can increase with a maximum annual slaughter of 30% of the flock. Therefore, if breeders intend to expand the livestock, they should sell or consume not more than 30% of young and adult livestock, that is, the share of young and adult livestock should be at least 70% of the population for natural reproduction. With a higher value of slaughter, the number of livestock either remains at the same level or decreases. Large personal subsidiary plots have the opportunity to increase the number of livestock without changing the volume of consumption and sales. Thus, the larger personal subsidiary plot, the more possibilities of expanding it has.

Annual expenses per head of livestock are defined as the ratio of the total annual expenses for keeping of each of the species and the number of animals of each species. The cost per head is calculated by multiplying the annual cost of raising a head of livestock by the number of years the animal has reached by the time of sale.

Table 2. Expenses of personal subsidiary plots engaged in livestock breeding

Indicators	Unit	Small PSP				Average PSP				Large PSP			
		Zones											
		1	2	3	4	1	2	3	4	1	2	3	4
Annual expenses for keeping of small ruminants	ths rubles	15,6	96,9	x	55,7	200	167,9	x	93,9	333,6	288,4	x	151,6
Annual expenses for keeping of cattle	ths rubles	40	15,5	67,2	36,7	143,5	41,1	106,9	79,5	231	68,2	136,2	148,4
Annual expenses for keeping of horses	ths rubles	1,3	1,1	1,3	1,3	2,5	2	2,1	2,5	106,7	46,2	31,3	44,3
Annual cost for a head of small ruminants	ths rubles	0,7	0,4	x	0,8	0,6	0,5	x	0,6	0,4	0,4	x	0,5
Annual expenses for a head of cattle	ths rubles	4	1,5	4,5	3,7	2,9	0,8	3,1	2,7	2,9	0,9	3	2,1
Annual expenses for a horse head	ths rubles	1,3	1,1	1,3	1,3	1,2	1	1	1,2	1,1	1,8	2,1	1,5
Cost of a head of small ruminant (age of small ruminant 2,5 years in small and average PSP, 3 years in large PSP)	ths rubles	1,8	1	x	2	1,5	1,3	x	1,5	1,2	1,2	x	1,5
Cost of a head of cattle (4 years old)	ths rubles	16	6	17,9	14,8	11,6	3,2	12,4	10,8	11,6	3,6	12	8,4
Cost of a head of horse (4 years old)	ths rubles	x	x	x	x	x	x	x	x	4,4	7,2	8,4	6

Note:

1 – Kyzylsky, Tandinsky, Kaa-Khemsy (Western part), Piy-Khemsy, Ulug-Khemsy, Chedi-Kholsky, Dzun-Khemchiksky, Chaa-Kholsky, Sut-Kholsky, Bai-Taiginsky, Barun-Khemchiksky, Ovyursky, Tes-Khemsy, Erzinsky districts

2 – Mongun-Taiginsky district

3 – Todzhinsky district

4 – Tere-Kholsky district

Calculations have shown that with an increase in the number of livestock, the cost of breeding a head of livestock decreases. Since a large personal subsidiary plot has a large number of livestock, there is less feed per head of livestock than in small and average personal subsidiary plots, so the duration of raising livestock increases. Small ruminants in a large personal subsidiary plot reach merchantability in 3 years while in a small or average personal subsidiary plot in 2.5 years.

The largest annual expenses for a head of small ruminants (0.8 thousand rubles) are in small personal subsidiary plots of Tere-Kholsky district; consequently, there is the highest cost for a head of small ruminants (2 thousand rubles) in this area. The lowest annual expenses (0.38 thousand rubles) and the lowest cost for a head of small ruminants (1.1 thousand rubles) are in large personal subsidiary plots of Mongun-Taiginsky district.

The highest cost of a head of cattle (17.9 thousand rubles) is in a small personal subsidiary plot in Todzhinsky district. The lowest cost of a head of cattle (3.2 thousand rubles) is in an average personal subsidiary plot in Mongun-Taiginsky district since Yak-breeding does not require expenses for feed.

2.3. Annual income of households engaged in pastoral animal breeding

The determination of personal subsidiary plots' income has been made on the basis of regional average wholesale prices: 4000 rubles per head of small ruminants, 35,000 rubles per head of cattle, and 30,000 rubles per horse.

The consumption of lamb and beef is traditionally widespread in the Republic, and in this regard, there is a low demand for horse meat. The main income of personal subsidiary plots is derived from the sale of small ruminants and cattle. The major channel for selling livestock products is wholesale buyers. The low wholesale price is due to that livestock breeders are forced to sell their livestock quickly because they cannot leave their work for a long time.

Since personal subsidiary plots receive their income in kind, in the calculations, the income is reflected as the cost of livestock consumed by the livestock breeders themselves, given to children and relatives, the cost of sold livestock, the cost of collected small ruminant's wool, and cow's milk. Due to the lack of refrigeration equipment, households receive milk only in the amount that they can consume in a short time. Most of the milk is left to the calves.

Large personal subsidiary plots also collect the wool of purebred goats. In calculating the income of large personal subsidiary plots, income from the sale of goat wool is taken into account. Some average personal subsidiary plots also keep purebred goats to get wool but in smaller quantities, so the income from the sale of goat wool is not included in the calculation of their income.

Table 3. Results of economic activity of personal subsidiary plots engaged in livestock breeding

Indicators	Unit	Small PSP				Average PSP				Large PSP			
		Zones											
		1	2	3	4	1	2	3	4	1	2	3	4
Total annual expenses	ths rubles	198	113,4	69	93,7	346	211	109	175,9	671,3	402,7	167,5	344,2
Total income less expenses	ths rubles	252	252	135	140	427	387	250	256	911,6	889,6	350	532
Number of people working in a PSP	person	2	2	2	2	2	2	2	2	3	3	2	3
Income per 1 person per month	ths rubles	10,5	10,5	5,6	5,8	17,8	16,1	10,4	10,7	25,3	24,7	14,6	14,8

The lowest incomes are in Todzhinsky and Tere-Kholsky districts. According to the livestock breeders, their incomes are barely sufficient for food, but there is no other work and raising livestock is all what they do from generation to generation. The situation is slightly better in the large personal subsidiary plots of zone 1 and Mongun-Taiginsky district. Their incomes are at the level of the minimum wage (in 2019, the minimum wage in the Republic of Tuva was 21432 rubles) [20].

3. CONCLUSION

The study of the conditions, problems, and specifics of personal subsidiary plots in various districts of Tuva allowed identifying the results of economic activity of

personal subsidiary plots raising livestock, as well as the main factors that affect the amount of their expenses and incomes. The analysis showed that feed, seasonal labor and fuel make up the largest proportion of expenses; the main source of income (consumption and sales) is small ruminants breeding. In the current conditions, livestock breeders receive low income for their hard work, especially in small and average personal subsidiary plots. The main factors of the current situation are the distance from the capital of the Republic where the main market is located and the transport inaccessibility of personal subsidiary plots due to the terrain and natural conditions. Animal breeders themselves, in particular, who evolved from a small personal subsidiary plot to a large one, note that it is very difficult to keep livestock in small and

average personal subsidiary plots without other sources of income, not to mention increasing the number of livestock. Personal subsidiary plots occupy an important place in the agricultural economy of Tuva. In this regard, supporting personal subsidiary plots, including the provision of infrastructure that serves supply and demand (collection points, processing, and sales), is one of the priorities of state policy. One of the directions is to develop a mechanism for interaction between personal households and business entities to support the personal-plot livestock production.

ACKNOWLEDGMENT

The study was carried out with the financial support of the Russian Foundation for Basic Research grant no. 19-010-00831A

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