

Organizational-Economic Directions of the Effective Use of Supply Chain Strategy in Rural Territories of Kazakhstan

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Abstract-The article discusses the issues of creating a solid fodder basis for keeping livestock in the personal subsidiary farm of the rural population based on supply chain strategy. The analysis of the use of pastures on fixed lands of settlements has been conducted based on the example of five regions of Kazakhstan and a number of rural districts. A huge shortage of pastures in the territories of rural settlements and a discrepancy between the livestock population of the households and the level of their feed supply have been revealed. The assessment of the current regulatory and legislative framework and prospects for the organizational and economic use of these territories is presented. The necessity of regulating the use of pastures through the application of standards for limiting the livestock management per one household, the system of pasture rotation and radical improvement of pastures, allocation of additional areas at the expense of reserve lands, development of cooperation have been justified.

Keywords-supply chain strategy, pastures of rural settlements, personal subsidiary farms, household, livestock population, livestock species, economy.

1. Introduction

In introductions on supply chain management, increased global competition is frequently mentioned as one major driver of changes taking place in the business environment of many companies. This leads to a shift in the entity that is able to compete in the marketplace from the single company to the whole supply chain. In the world there are 3.4 bln ha of pasture lands. 12% of these areas are located in China, 11% in Australia, 7% in the US, 6% in Brazil and in Turkey 0.4% [1, 2]. Among them, Kazakhstan occupies 5.3%. Supply chain management operates at three levels: strategic, tactical, and operational. At the strategic level, company management makes high-level strategic supply chain decisions that are relevant to whole organizations. Natural pastures of

Kazakhstan occupy 180.0 mln ha, or 66.2% of the country's lands. Out of 180 mln ha of pastures of the republic, only about 30% are currently used, where sheep breeding, camel breeding, and horse breeding are developing, in conditions of a large shortage of land surface water resources [3, 4]. 70 mln ha of agricultural land and 19.6 mln ha of pastures are in agricultural use, which are attributed to the lands of the settlements. As a result of privatization, 75% of the livestock population moved from public sector to the farms of the population, whose livestock grazes near the settlements within 5-10 km zone. Therefore, the pastures, which are in common use for grazing livestock of personal subsidiary farms, are most overgrazed. [5]. On a designated territory around the settlements there is a permanent unregulated grazing. This leads to the development of pasture degradation processes, which cause great economic damage and result in the deterioration of the economic and social conditions of rural residents [6, 7]. The solution of the problem is associated with the decreasing of farms' livestock grazing on pastures by limiting the grazing livestock number within the lands of the settlements, establishing rates of keeping livestock per household, additional attraction of the reserve land territories of rural settlements and reserve lands, and developing effective mechanisms for organizing livestock grazing.

2. Methodology

Recommendations on improvement of management of pasture lands in rural areas by regulating livestock grazing, evaluation of the existing load of livestock by regions, identification of the existing shortage of pastures, development of the optimal standards for keeping animals per one household in the spring-summer-autumn period, identification of the priority management of

livestock types of the personal subsidiary farms, radical improvement of haymaking and rangelands, observance of pasture rotation, organization of the grazing system of young animals in remote areas, finding reserve areas in other categories of land for pasture grazing, taking into account the specifics of their location according to the natural-economic zones.

3. Results

According to the Land Code of the Republic of Kazakhstan, pasture lands of rural areas are included into the category of lands which refer to the settlements. Territorially they refer to a certain (different) functional zone out of four allocated zones (housing, social, commercial and other), which are formed within the boundaries of the city, village and rural settlements. According to the land balance of the republic for 2017, from total area of the rural settlements which is 21,6 mln ha, 19.9 mln ha or 92% are used for agricultural purposes. 1,75 mln ha (8,0%) - other lands, of which 0,71 mln ha (43,0%) are occupied by residential area: buildings, parks, squares, plantations, canals [8]. In total 246.7 thous. ha are in private ownership of citizens for management of a personal subsidiary farm, of which 152.5 thous. ha of farmland. Farmland is mainly used as homestead land (102.5 thous. ha of arable land, 22.0 thous. ha perennial plantations, 3.7 thous. ha fallow lands, 1.1 thous. ha hayfields, 4,7 thous. ha - vegetable gardens and 29,3 thous. ha pastures). In addition, 6405 agricultural enterprises use agricultural lands on the territories of rural settlements on the area of 749.0 thous. ha, of which 78.5 thous. ha is arable land and 607.5 thous. ha pastures. The remaining pasture area in the amount (19.3-0.61 mln ha) 18.7 mln ha are not distributed and is a State property. These lands are allocated for grazing of private livestock of citizens and are in common joint use. Not all rural settlements are equally provided with pastures and other agricultural lands. The largest areas of pastures are in the regions, rural districts in the western, central and eastern regions, where desert and semi-desert territories predominate. In the northern region with a high level of plowed lands (55-80% of the territory), the areas of pastures in rural administrative districts and rural districts are much smaller, which also affected the category of land in rural settlements that was formed during the

privatization period by allocating lands from the land areas of State and Collective farms. In the southern region where there is a high concentration of irrigated arable land (up to 85% of all irrigated lands of the republic), the category of lands of rural settlements was formed in terms of a large shortage of the territory, including pastures. In modern conditions, the nature of the pasture use in rural areas has largely changed. New socio-economic conditions contributed to the reduction of livestock population in public sector and transfer of its main part to private farms, which increased overgrazing on these territories and caused degradation. The liquidation of inter-farm livestock routes also affected negatively, which led to the restriction of the development of pasture grazing of the livestock, practically excluded the system of livestock migration, grazing rotation and seasonal change of pastures. The presence of non-irrigated areas remains a significant problem, especially in western and central regions. Based on the inventory of GISHAGI for 2012-2014, out of 19.3 mln ha of pastureland in rural areas, only 13.3 mln ha (69.3%) are irrigated, the rest of the territory is practically not used. In the southern region the level of irrigated pastures is 90.0%, in eastern - 89.4%, in the northern region only - 68.5%, in the western - 64.6%, in the central - 46%. In the context of the regions, the irrigation of pastures is different, it has great fluctuations. Thus, in the northern region, from 50.0% in Akmola region to 75.9% in Kostanai region, in other regions it is at the level of 72%. In the western region, pastures of the West Kazakhstan region are most irrigated, their level is 90.3%, in Atyrau, Mangystau and Aktobe regions - 50%. In the southern region, almost all areas have a high level of irrigation - 95% or higher. Therefore, when determining the crop capacity of pastures, it is necessary to make a correction for the degree of water availability. For 2013-2017 in the farms of the population in republic, sheep and goat population remains practically at the same level - 10.7 mln heads with small fluctuations by years, the number of cattle tends to decrease from 4034.5 to 3857.5 thous. heads, the number of horses increased by 201.7 thous. heads or by 20%, the number of camels increased by 6,3 thous. heads [9]. At the same time, the total increase in the area of pastures in rural settlements is insignificant (Table 1).

Table 1. Number of livestock of households in pasture grazing and the area of pastures of rural settlements in the Republic of Kazakhstan for 2013-2017.

Indices	Measurement unit	2013	2014	2015	2016	2017	2017 in % to 2013
CATTLE	Thous. heads	4034,5	3916,5	3886,1	3796,2	3857,5	95,6
Sheep and goats	Thous. heads	10996,1	10883,5	10859	10739	10700,5	97,3
Horses	Thous. heads	995,0	1040,0	1066,5	1141,7	1196,7	120,3
Camels	Thous. heads	91,7	91,0	91,5	96,1	98,0	106,9
Pasture areas	Thous. ha	19 224,6	19267,1	19 205,3	19 190,3	19853,2	103,2

In the structure of the livestock population in personal subsidiary farms, in the northern, eastern and central regions, cattle predominate, mainly dairy cows, which products are used for personal consumption of the rural population. The proportion of sheep population in them is at the level of 20%. In the structure of the livestock population of the western and southern regions, the share of beef and dairy cattle is lower (less than 50%). In these regions the proportion of sheep population is higher: in the western part - 29.4%, in the southern - 34.6%, where significant areas of grazing lands predominate. The share of horses and camels in the herd structure in all regions except the southern, is in the range of 20-23%, in the southern - 17.2%. The existing way of using rangelands in rural areas is characterized by overgrazing of livestock of the population's farms. The calculations show a significant excess of the permissible rates of the load on the pastures. This leads to the loss of grass, a decrease in productivity, the development of degradation processes, desertification of the territory near rural areas, which results in deterioration of the ecological and social

conditions of rural residents. In most regions, organizational structures of grazing regulation management have not been established. The actual load on the pastures of rural settlements in 2017 in a number of regions of the country remained critically high. Calculations show that for the whole of the country the grazing livestock population (7548 thous. conv. cattle heads) in these allocated pastures is 2,0 times higher than the normative level, and in view of the presence of irrigated pastures this shortage is increased 2.8 times [10]. Households that own a large number of livestock also take their livestock to graze in the remote pastures in spring and autumn, and in some cases even in winter, and thus the animals graze away from settlements for a long time during the year. Often private farms have only a small number of livestock and therefore most farmers' livestock is grazing in pastures by using a common grazing system [11, 12]. The level of provision of livestock of households with pasture fodder in the regions remains low and does not correspond to the permissible rate (Table 2).

Table 2. Provision of livestock of population farms with pasture fodder by regions of Kazakhstan, 2017

Region	Availability if pastures, thous. ha	Average productivity of 1 ha, c/f.u.	Potential fodder stock of pastures, thous. c f.u.		Grazing livestock population of conditioned cattle heads, thous. heads.	Required number of pasture fodder thous. c f.u.	Optimal number of conditioned heads of cattle, тыс. гол	
			total	irrigated			total	irrigated
Northern	4482,1	2,1	9517,5	6519,5	1520	14212,0	1060,2	703,6
Western	7591,3	1,42	10789,8	6970,2	1079,7	10279,6	1133,4	714,6
Eastern	2536,9	3,0	7610,7	6804,0	748,3	7034,0	809,6	723,8
Central	2609,2	1,50	3913,8	1800,4	432,5	4104	416,4	190,7
Southern	2049,9	1,80	3689,4	3320,5	3767,5	35688,3	391	375,8
Total in the RK	19269,4	1,84	35521,2	24616,2	7548,0	71317,9	3810,6	2708,5

Calculations showed that the annually renewed feed stock of allocated pastures is 35.5 mln c f.u., which makes it possible to keep cattle, in view of productivity of cattle, different types and rates of the need for pasture fodder, 3.8 mln conventional heads of cattle, but in fact there are 7, 5 mln heads or 2 times higher. The problem is worsened due to the

lack of irrigated pastures. Thus, only 24.6 mln ha from the total area of pastures are irrigated, and feed loss is 10.9 mln c of f.u. Over-rate overgrazing of livestock in pastures takes place in the northern region, where the grazing livestock number is 1.4 times higher compared to fixed lands, including irrigated areas- 2,2 times higher. In the western

region, in the fixed pastures of rural settlements the estimated livestock load is lower than the standard due to the large area of deserted, non-irrigated pastures, but the number of livestock on the irrigated lands is 1.5 times higher than the standard. In the eastern region for the livestock population - 748.3 thous. cond. heads of cattle feed stock of the pastures is 8.2% higher than the required rate, and in the irrigated areas, the forage shortage is 3.4%, i.e. the actual livestock grazing load corresponds to the required level [13,16]. In the central region, for the available livestock population the shortage of feed stock was determined as 190.2 thous. c f.u. or less by 4.9% of the rate. In the irrigated areas, the livestock grazing load on pastures exceeds 2.2 times. A significant shortage of pasture forage is observed in the southern region on the one hand, due to the lack of sufficient pasture areas in rural settlements, high concentration of rural population and a large number of households, and on the other, excessive animal management. Calculations showed that the required volume of green (pasture) feeds in comparison with the fixed pasture areas exceeds 9.7 times. Therefore, the livestock grazing on irrigated pastures is 10 times higher than the rate of grazing per one head of cattle. Especially large gap in the area of fixed pastures at an average rate of pasture fodder per 1 head of cattle - 9.4 c f.u. and livestock grazing load on them is observed in the South-Kazakhstan region, which exceeds 17 times. In Almaty region, the livestock grazing in pastures exceeds 8 times, in Zhambyl - 7.5 times, in Kyzylorda region - 5.7 times. The typical rural districts of the steppe natural and agricultural zone of the Ereymentau district and the dry steppe zone of the Arshaly region of the Akmola region were explored using the monographic method. The materials of the monographic survey indicate a large shortage of grazing lands for households' livestock grazing, and uncontrolled keeping of animals in rural districts of different natural and agricultural zones in the northern region. Moreover, this region faces an acute shortage of fodder in winter. The potential of winter pastures is often very low and additional feeds are required for feeding the herd during this season [17]. For the maintenance of livestock in the stall period, concentrated and coarse fodder is purchased. Part of the rough forage is obtained by sowing fodder crops on household plots. In the survey edrural districts, regardless of the natural and agricultural zone, certain households keep uncontrolled livestock population that exceeds the food provision requirements of their families, i.e. personal subsidiary farms of commodity type are developing. However,

the process of their registration as individual entrepreneurs is limited and amounts to a small percentage. The issues of management of rural areas in which the largest share of land is occupied by agricultural lands are regulated by a number of laws, regulatory legal documents of the Government, central and local executive bodies. The main laws governing land use issues are the Civil and Land Codes, the Law on Pastures and Agricultural Consumers' Cooperatives Act. When assessing the legislative framework, it was revealed that all Laws regulate the mechanisms of creating a process of cooperation of households, joint efforts in organizing livestock grazing and watering, selling and processing surplus products.

The results of the monographic research allow us to propose a number of measures aimed at rational and effective use of pasture lands of rural settlements:

- Reduce the grazing load of livestock on pastures by setting limits on the livestock management that take into account the structure of livestock of a personal farms in the regions of the country and the rates of keeping livestock per household. At the same time, priority is given to the use of pastures for grazing a dairy cows herd;
- allocate additional pasture lands at the expense of reserve lands and unclaimed lands of active agricultural enterprises for grazing livestock of rural population of the nearby settlements;
- Introduce pasture rotation and pen system of grazing livestock of households on pastures by cooperating in dairy cows and horses herds;
- form flocks for young sheep, cattle, horses and camels (depending on the natural and agricultural zone) and organize their grazing and watering in the ranches by restoring irrigation devices on the provided land reserves, using government support measures such as subsidies to reimburse 80% of costs;
- for the full provision of dairy cows herd with green feed it is proposed to create cultivated irrigated pastures, and radically improve pastures in these areas through contributions from shareholders of organized agricultural consumer cooperatives or simple partnerships or obtain preferential loans through the JSC "NGH "KazAgro";
- households that exceed the established standards of livestock keeping for one family and food supply

standards for the needs of the family must be registered in the justice authorities as individual entrepreneurs;

- the existing use of pastures in rural areas requires the adoption of comprehensive measures by the executive bodies that are obliged to ensure the normative livestock management per 1 household in order to avoid degradation of pastures around the villages and create favorable environmentally friendly conditions for rural residents.

4. Conclusions

The primary and overriding goal of any supply chain is to make sure a company is delivering the orders its customers want when its customers want those orders—and accomplish this by spending as little money as possible. Only by lowering costs and improving performance can a supply chain be truly optimized.

1. The existing way of using pastures in rural areas is characterized by overgrazing of livestock herds. In 2017, as a whole, in the country, grazing livestock on fixed pastures in the amount of 7.5 mln conv. heads of cattle twice exceeds the standard level, and taking into account the presence of irrigated pastures, this shortage increases 2.8 times.

2. A significant shortage of grazing forage is observed in the southern region, where the required amount of green (pasture) feed is 9.7 times higher compared to the fixed pasture area.

3. Monographic study of the nature of pasture land use in rural districts and settlements in the northern and southern regions showed that individual households have uncontrolled livestock numbers which exceed food provision requirements of their families, i.e. personal subsidiary farms of commodity type are developing. However, the process of their registration as individual entrepreneurs is limited and amounts to a small percentage.

4. The conducted analysis of current legislation on the use of pastures by households of the population has revealed the conditions of regulation of the rights of land users who are using lands that are in common ownership of the citizens, as well as mechanisms of organizing management system, which include the unification mechanism: simple partnerships, associations, unions, agricultural consumer cooperatives. However, the coverage of households and implementation of these mechanisms in practice

are minimal and make about 10% of their total number [18, 19]. In the explored rural districts and settlements, the system of co-operation of herds, flocks to provide livestock grazing and veterinary services in the form of simple partnerships, agricultural consumer cooperatives is not developed, which does not allow to effectively and rationally use pasture lands, and avoid the development of land degradation processes. There is no scientifically-based organization of pasture areas, taking into account the optimal load on them, the timing of grazing, grass condition, as well as there is no comprehensive program for the revival of rangeland animal husbandry. The State does not provide assistance in creating a certain pasture infrastructure [20].

References

- [1] CaferOlcaytoSabancı and Tamer Yavuz. *Protecting Our Grass and Pasture, and Changes in their Use and Recent Developments Technical Congress organized as part of the Agriculture Week 2015/Agricultural Engineers Chamber.* [Electronic resource].-2015.-URL:<https://www.semanticscholar.org/> (date: 09.08.2018).
- [2] Ali EkberYıldırım. *Pasture areas zoned for construction increases dependence on foreign resources.* [Electronic resource].-2016. -URL: <http://tr.boell.org/de/node/2943/>(date: 09.08.2018).
- [3] Medvedeva A. *Scientists are working on the concept of livestock development on pastures in the EAEU countries* [Electronic resource]. -2018.-URL: <http://meatinfo.ru/news/> (reference date: July 12, 2013).
- [4] R. Neudert, M. Ruehs,V. Beckmann. *Implementation of pasture leasing rights for mobile pastoralists – a case study on institutional change during post-socialist reforms in Azerbaijan* [Electronic resource]. -2015. -URL: <https://www.thecommonsjournal.org/articles/>(reference date: 04.08.2018).
- [5] *Land Code of the Republic of Kazakhstan* [Electronic resource]. -2018. -URL: <http://adilet.zan.kz/rus/> (reference date: 12.07.2018).
- [6] Voloshenko K. Yu., Mikhailova A. A. *Innovative factors and conditions of sustainable development of rural territories* [Electronic resource].-2012. -URL:<https://journals.kantiana.ru/upload/iblock/def/> (reference date: 03.08.2018).
- [7] ZoricaSredojevic. *Sheep farming-pastures-sustainability: an economic model of sheep farm for rural areas in serbia*[Electronic resource].-2017. -URL:

- <http://www.academia.edu/20007605/>(reference date: 05.08.2018).
- [8] *Land balance of the Republic of Kazakhstan for 2017*, Astana .- 158p.
- [9] *Agriculture, forestry and fisheries in Kazakhstan in 2012-2016*. [Electronic resource]. -2012-2016. -URL: WWW.stat.kz (reference date: July 10, 2013).
- [10] *On approval of the maximum permissible load norm on the total area of pastures* [Electronic resource] .- 2015.-URL: <http://online.zakon.kz/> (referencedate: July 10, 2013).
- [11] Robinson S., Whitton M. Biber-Klemm S. Muzofirshoev N. 2010a: *The Impact of Land Reform Legislation on Pasture Tenure in Gorno-Badakhshan: From Common Resource to Private Property* [Electronic resource]. - 2010.-URL: [https://www.thecommonsjournal.org.](https://www.thecommonsjournal.org/)(reference date:04.08.2018).
- [12] Papelo V.N., Kovtun B.A. *The management of the accelerated development of rural territories // International Journal of Experimental Education*. - 2014. - No. 6. - P. 65-68.
- [13] *Electronic farm book on rural districts of the Yermentau district*, 2018. - 195 p.
- [14] *Passports of socio-economic development of Erkin-Shilik, Turgai*, Novomarkovsky rural districts of the Yermentau district, 2018.-76p.
- [15] *Electronic-farm book on rural districts of Arshalinsky district*, 2017. - 67p.
- [16] *Passports of socio-economic development of Anar, Turgen rural districts of Arshalinsky district*, 2018. - 25p.
- [17] Pender J., Mirzabaev A. Kato E.: *Economic Analysis of Sustainable Land Management Options in Central Asia*. Final Report. Asian Development Bank, 2009.
- [18] Person, Family, and Society: *Interdisciplinary Approach to the Harmonization of Interests*. Monograph. Opole: The Academy of Management and Administration in Opole[Электронныйресурс].-2016.- URL:<http://dspace.tneu.edu.ua/bitstream/Monograph.pdf>(reference date:04.08.2018).
- [19] J. Burian, J. Brus, V. Pechanec, V. Vozenilek, and S. Stastny,"*Urban Planner – model for optimal land use scenario modelling*,"*Geografie - sborníkČeskégeografickéspolečnosti*, (to be published)[Electronic resource].-2015.- URL:http://www.urbanplanner.cz/publikace/INASE_urban_planner.pdf(reference date:06.08.2018).
- [20] V.B. Limanskaya. *Pastures: lost potential [Electronic resource]*. -2014. -URL: <http://ibirzha.kz/pastbishha-uteryannyj-potentsial/> (date of reference: 06.08.2018).