The effect of agricultural subsidies on production costs in cattle breeding in Turkey

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Abstract

In order to meet the animal food needs of people adequately and safely, this sector is tried to be guided by various agricultural policy tools. In this study, the contribution of credit and grant supports provided for livestock farming in Turkey to producer costs was examined. The research data were obtained in 2024 from 111 producers determined in the areas where intensive livestock farming is carried out in the Central Anatolia region. Breeders were divided into three groups according to the number of animals and compared, and the difference between the groups was tested with ANOVA. The results of livestock breeding activities were analyzed by indicators such as feeding time, live weight gain, carcass weight, feed utilization rate and production costs. In Turkey, livestock production supports have a share of 24% in total agricultural supports. Among the supports provided for livestock production, subsidized loans and fattening calf support stand out in terms of utilization rate and amount. The average number of livestock of breeders is 39 and the average fattening period is approximately 8 months. The average weight gain at the end of fattening period is 258 kg head^{-1} and the average carcass yield is 56.3%. The average variable costs of the participating livestock breeders were 51675.1 ₺ (91.4%), the average fixed costs were 4860.1 ₺ (8.6%) and the total production costs were 56535.2 ₺. Among the loans and grant supports, subsidized loans have the highest utilization rate (68%), followed by grant supports (28%) and young breeder support loans (4%). As the scale of the feeders increases, the level of utilization of grants and credit supports also increases. As a result of this, while the average costs per animal in the breeder groups were close to each other before the supports, when the contribution of the supports to the costs was taken into consideration, the cost difference between the first group (11.6%) and the third group (33.3%) increased three times. There is a need for reforms to increase the impact of subsidies, which have a low impact in Turkey. It would be useful to improve access to subsidized credit for small-scale subsistence family livestock breeders. In order to revitalize the livestock sector, general economic conditions (especially inflation, interest rates and exchange rates) need to be improved and fluctuations in input markets need to be resolved. In addition to economic sustainability, it is recommended to investigate the effects of environmental, social factors and climate change on the sustainability of livestock activities.

Keywords: Agricultural supports. Cattle breeding. Production cost. Turkey

1. Introduction

In all countries of the world, food production in sufficient quantities and at affordable prices is of critical importance in nutrition. In this context, the agricultural sector is the basis of countries and life. The agricultural sector is of strategic importance in terms of meeting the nutritional needs of people and contributing to the economy of countries.

The livestock sector has an important role in the global food system. Currently, 40 per cent of total agricultural products are derived from the livestock sector in developed countries, compared to 20 per cent in developing countries. Meat and milk from domestic herbivores provide 16 per cent of global protein consumption, with 20 per cent of meat and 83 per cent of milk coming from cattle (FAO, 2024). Beef cattle husbandry, as a significant subfield of animal breeding, encompasses targeted feeding and meticulous care of livestock to achieve substantial meat production within a brief timeframe. It assumes a pivotal role in addressing global meat demand. Cattle breeding serves as a critical pillar in sustaining the global economy by ensuring a consistent supply of dairy products, meat, leather, and associated by-products. Its economic significance stems from its substantial contribution to the agriculture and food sectors, thereby supporting livelihoods for millions of people worldwide. Moreover, revenue is generated through the sale of beef and dairy products, significantly impacting the GDP of numerous countries. Additionally, livestock farming creates employment opportunities across diverse domains, including transportation, processing, and marketing. Furthermore, the ripple effect of cattle breeding extends to local economies, stimulating demand for related services such as veterinary care, feed production, and equipment manufacturing. The economic importance of cattle breeding is paramount, as it underpins modern agricultural systems and plays a pivotal role in ensuring global food security and economic prosperity (Polak et al., 2020; Schneider and Tarawali, 2021; Houshyar et al., 2023).

In Turkey, there is a positive relationship between livestock production supports and animal production value over the years. The increase in animal production supports also increases the value of animal production (Gürer, 2020). Turkey has greatly increased the amount of agricultural support in recent years. Among OECD countries, Turkey has the highest agricultural support as a percentage of GDP. This ratio is approximately 1.5% for 2022. This situation brings to the agenda the impact of Turkey's agricultural support on production. In this study, it was determined whether the support policies applied in animal

husbandry contribute to production in cattle breeding, and if so, to what extent and for how long the effect continues.

2. Literature Review

Demand for animal products is increasing globally, particularly in low- and middle-income countries, and this represents an opportunity for small-scale livestock producers to contribute to supply response (Thornton 2010). This will require an increase in productivity and a transformation of the small-scale livestock sector from subsistence, low-input production to more commercial, market-oriented production. Cattle fattening activities are concentrated in regions where the necessary feed resources are abundant and cheap. When managed correctly, beef cattle fattening can maintain environmental balance with sustainable agricultural practices (Duncan et al., 2023).

The use of animal wastes as fertilizer increases soil fertility and contributes to the prevention of environmental pollution. Socially, fattening cattle is an important source of income especially for people living in rural areas. It also helps to improve the socio-economic status of families engaged in animal husbandry and to prevent rural migration. It contributes to different segments of the society with its economic, social and environmental dimensions and therefore it is a sector that should be supported.

Agricultural policies aim to address a wide range of issues, from assisting farmers to achieve adequate incomes to providing sufficient food at reasonable prices for consumers, and from improving the sector’s resilience to weather, market or other shocks to ensuring food safety and improving the environmental performance (OECD, 2024). In the agricultural sector, agricultural enterprises, which provide the nutrition of people, their place in population and employment, import-export balance, their place in national income and the supply of raw materials to the industry, need to be supported in order to continue their economic activities. Because agricultural support can contribute to many areas of agricultural enterprises. In addition, supporting the agricultural sector will benefit the increase in the level of development of national economies. Although agricultural subsidies come to mind when it comes to agricultural policies, it also includes many other issues such as rural development, organization and cooperatives, climate change and environment. Agricultural policy is the state's assumption of a regulatory role in the face of agricultural problems and the problems of rural areas and between the agricultural sector and other sectors and the economy as a whole, and the selection of the appropriate one among policy options (instruments). In this case,

agricultural policy can be seen as a set of measures to direct the country's agriculture in a way to achieve certain objectives. All kinds of expenditures made for the agricultural sector are within the scope of the support policy and these include expenditures for all kinds of support made to protect, develop, encourage, provide agricultural infrastructure, observe agricultural production and ensure agricultural productivity. Agricultural support is defined as all policies designed to increase the income level of those engaged in agriculture, to control pricing, to supervise and direct production, to ensure rural development and balanced use of natural resources. In other words, it is a set of decisions and measures taken by public institutions in order to meet the agricultural needs of a country, to ensure its agricultural development and to ensure proper agriculture.

Agricultural subsidies have an important position in ensuring sustainability in the agricultural sector. The aim of agricultural subsidies is to increase the economic and social welfare level of those engaged in agriculture at the micro level and to contribute to the national economy at the macro level. On the other hand, agricultural subsidies also aim to provide a fairer distribution of income by preventing price fluctuations and preventing income loss for producers and consumers. In addition, agricultural subsidies aim to increase competitiveness in agriculture, to maintain the supply and demand balance in agriculture, to offer affordable products to consumers, to raise the standard of living of those working in the agricultural sector, to protect the natural environment, to eliminate welfare imbalances by ensuring rural development, to create new job opportunities with agriculture-based industry, to increase productivity and to increase the export of agricultural products. Although the objectives of agricultural subsidies are expressed in different ways, they are gathered under a single roof as increasing social and economic welfare (Novak et al., 2020; Abdullahi and Arisoy, 2022; Bulut and Bayraktar, 2023). In Turkey, livestock farming subsidies are financial assistance provided by the government to increase the sustainability and productivity of the sector. These supports have an important role in promoting animal husbandry, increasing producer incomes and supporting rural development. These support programs contribute to the development of Turkey’s livestock sector and play a major role in improving the economic situation of people living in rural areas. In addition, these support programs aim to achieve social objectives such as reducing rural-urban migration and narrowing regional development gaps.

Livestock breeding has an important potential in both national nutrition and national development of Turkey, increasing exports, providing raw materials to industry, achieving regional and inter-sectoral balanced development and stabilization of development,

preventing hidden unemployment in rural areas, creating new employment opportunities in industry and services sectors and basing development financing on equity. In other words, animal production activities gain importance in terms of increasing labor productivity, balanced use of labor force, maintaining and increasing soil fertility (Aral et al., 2020). Although Turkey's natural structure and ecological conditions are considered to be suitable for animal husbandry, it has been observed that animal production has not reached a sufficient level for long periods and even regressed. As a result, due to the decrease in the number of animals, the prices of animal products have increased and people have started to consume less animal products (Gözener and Sayılı, 2014).

Although Turkey has significantly increased its beef production in the last fifty years with the protection and support policies implemented for animal production, it has not been successful in achieving self-sufficiency and stabilizing animal product prices (Alhas Eroğlu et al., 2021). Cattle, sheep, goat and buffalo constitute the source of red meat in Turkey. According to 2023 figures, the world cattle population is approximately 1.5 billion heads. In Turkey, the number of cattle is 16.5 million heads according to 2023 data (TUIK, 2024). In Turkey, 49.23% of the cattle population is cultivated, 43.46% is crossbred and 7.31% is indigenous breeds. In 2023, 71.8% of red meat production was beef, 22.3% was sheep meat, 5.3% was goat meat and 0.6% was buffalo meat. The number of cattle slaughtered was 5480 thousand heads and 1572 thousand tons of meat was obtained from these slaughters. Cattle meat constituted 71.76% of the total amount of meat obtained from slaughtered animals. When the livestock production in Turkey is analyzed in general, it is stated that the increase in the proportion of cultivated and crossbred genotypes in the total cattle population has an important share in the increase in cattle productivity.

3. Material and Method

The research data were obtained from the center and districts of Konya province in central Anatolia, where cattle breeding is intensively carried out, at the beginning of 2024. Cattle breeding is carried out in every region of Turkey, but regions that will provide advantages in animal feeding stand out. Because one of the most important inputs in animal husbandry is feed costs. Central Anatolia is one of these regions and it was chosen as the research area. Livestock breeding farms were obtained from the Animal Registration System (TURVET) where the records of animals in Turkey are kept. In the Animal Registration System, in accordance with the EU standards, the information on the enterprise where the

animals are located, the owner of the enterprise, the address where the enterprise is located, species, breed, sex information, birth, movement and death dates are kept continuously updated. Since the presence of at least 10 heads of animals is taken into consideration in the support applications applied by the Ministry of Agriculture for cattle fattening, sampling was carried out by taking this situation into consideration in the fattening enterprise groups. It was ensured that the sample number in each breeder group was at least 7% of the total number of enterprises. The research data were collected by face-to-face questionnaires from 111 sample enterprises randomly selected among the feeders divided into three groups according to the number of animals (Table 1). The differences of the feeder groups in terms of indicators related to activity results were tested with One-Way ANOVA. This test is used to calculate the significance of the difference between three or more independent means in a normally distributed series (Ross and Willson, 2017).

Table 1: Groups of cattle breeding farms and number of samples

Breeder groups (Cattle-head)	Number of producers	Sample	Sample percent (%)
10-50	1,254	92	82.9
51-100	218	15	13.5
101-+	51	4	3.6
Total	1,520	111	100.0

3.1. Cost analysis

The cost factors that make up the cost in enterprises were grouped as livestock purchase, feed costs, labor, veterinary health expenses, depreciation, maintenance-repair expenses, foreign capital interest, marketing and other expenses (fuel, electricity, water and general administrative expenses) (Halich et al, 2023). In this study, while animals and feed supplied from outside the enterprise were included in the transportation/transportation costs and expenses, the costs of the animals raised and fattened in the enterprise and the feed produced in the enterprise were taken into consideration or their equivalent market values. According to the average of the enterprises, fattening period is approximately 8 months (236 days).

Formulas used in the calculation of feed utilization status and feed utilization rate and 1 kg live weight cost:

Feed utilization rate=Live weight gain ₺ head^{-1}/Feed cost ₺ head^{-1}*100

1 kg live weight cost=Production cost / End of fattening live weight (for I, II and III groups).

Carcass yield=Carcass weight / Live weight*100

4. Results and Discussion

Turkey has greatly increased agricultural subsidies, especially in recent years. According to OECD data, Turkey has the highest agricultural support as a percentage of GDP among OECD countries (Bayraktar and Bulut 2016). Since the beginning of the 2000s, Turkey's support to the agricultural sector has started to change within the scope of harmonization with the EU Common Agricultural Policy and the obligations imposed by the World Trade Organization. In this change, according to social, environmental, economic and international developments, it is aimed to create a sustainable agricultural sector with high competitiveness, where efficient use of resources, producer organization can be ensured, agricultural marketing infrastructure is improved and easy access of producers to marketing opportunities is increased. Among the types of support, especially price-based support, which has a market distorting effect, has been abandoned. Instead of these, direct income support and supports for productivity, quality and modernization, increasing the use of technology, competitiveness and improving infrastructure have become more prominent. The supports implemented by Turkey between 2007 and 2024 are categorized under six different groups and shown proportionally in Figure 1. The main types of support consist of area-based support payment, differential payment support and livestock support. The proportional share of these three support types reaches 75 per cent for 2024.

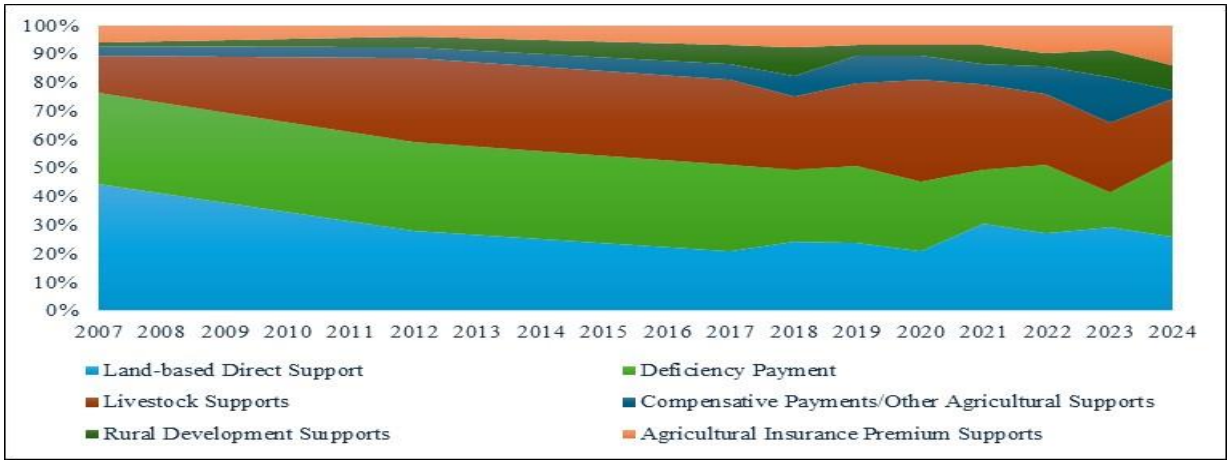

Figure 1: Proportional distribution of agricultural support types implemented between 2007-2024 in Turkey.
Source: SBB, 2024.

The distribution of Turkey's agricultural support budget by amount and type between 2022 and 2024 is given in Table 2. The table shows that area-based supports, differential

payment and livestock support are the most important types of support. Although these three types of support fluctuate between years, they tend to increase, and the same is true for other types of support.

Table 2: Distribution of Turkey's agricultural support budget for 2022-2024

	Million ₺			Share of support budget (%)		
Support Types	2022	2023	2024	2022	2023	2024
Land-based direct support	10,857	18,584	23,726	27.39	29.32	25.91
Deficiency payment	9,524	7,759	24,890	24.03	12.24	27.19
Livestock supports	9,753	15,406	19,740	24.60	24.31	21.56
Compensative payments/Other agricultural supports	3,827	10,124	2,548	9.65	15.97	2.78
Rural development supports	1,825	6,307	7,900	4.60	9.95	8.63
Agricultural insurance premium supports	3,856	5,200	12,750	9.73	8.20	13.93
Total	39,642	63,380	91,554	100.00	100.00	100.00

Average exchange rate (₺/$): 2022: 16.57; 2023: 23.74; 2024: 31.24
Source: SBB, 2024.

In Turkey, a series of support systems are implemented to develop animal husbandry. The system aims to increase the quality and productivity in the livestock sector, as well as to increase producer welfare. In addition, positive discrimination is made against family businesses and young entrepreneurs, and the participation and development of these groups in the sector is encouraged (Erdal and Erdal, 2020). It is also aimed to increase the number of specialized livestock enterprises in the livestock sector. As a result of the expansion of the scope of the implementation, the share of livestock support in the agricultural support budget has increased up to 30%. In addition to the existing support instruments, meat premiums, marketing supports, supports for the modernization of livestock enterprises and measures for environmental measures were introduced in order to improve breed breeding, increase roughage production, increase productivity, specialization of enterprises, ensuring hygiene conditions in enterprises, animal health and welfare, promotion of animal identification system, processing and marketing of animal products and related control, monitoring and standards (Yavuz, 2022).

Some of these practices, which are livestock incentives and supports, consist of grants, while others consist of long-term and subsidized low-interest loans. The incentive and support systems are updated every year and coordinated by the Ministry of Agriculture. Other organizations also provide financial support such as incentive loans and grants to encourage and support entrepreneurs who want to invest in the livestock sector. These include low-interest livestock loans provided by the agricultural bank and agricultural credit co-operatives, interest-free loans provided to entrepreneurs by KOSGEB (Small and Medium Enterprises

Development and Support Administration) and grants provided by TKDK (Agriculture and Rural Development Support Institution). In addition, it is seen that some local governments in Turkey provide various supports through producer unions and co-operatives in order to develop animal husbandry.

The incentive and support system are applied for development activities in existing livestock enterprises as well as for new enterprises to be established. Grants and loans with favorable interest rates are provided for the purchase of breeding animals, construction of animal shelters and other animal husbandry facilities, establishment of fodder plant production and feed preparation facilities, animal health related expenditures and purchase of tools and equipment. For cattle, 50% grant support is provided for the construction of animal shelters or capacity increase/renewal expenditures of breeders with a minimum capacity of 10 heads and a maximum capacity of 50 heads for cattle, and investments for the purchase of tools and equipment. Support payment per animal for male cattle in fattening and support for annual and perennial fodder crops according to fodder crops production area are provided as grants (TOB, 2024).

4.1. Production costs in livestock production

Cattle breeding enterprises in Turkey are generally small farms with high costs and low productivity. These farms are well below the European scale and operate with similar methods across regions. Therefore, they need to be developed in terms of harmonization with EU norms and competitiveness.

Profitability in cattle breeding is affected by technical parameters such as breed, sex, age, origin, condition, care, health and nutrition, and economic criteria such as optimum fattening period, choice of establishment location and capacity, fattening system, subsidies, financial record keeping and marketing opportunities. On the other hand, total or per animal income is basically affected by two factors. The first one is the price margin, which refers to the income arising from the difference between the purchase and sale prices of the fattened animals, and the second one is the weight margin, which refers to the income arising from the live weight gain of the fattened animals during fattening. In addition, factors such as the market preference and conditions of the enterprise, the evaluation of by-products, carcass classification and quality grading are among the factors affecting the income in fattening (Sadiq et al., 2003; Piszcz et al., 2022).

There are significant differences between the livestock breeds used by cattle breeding enterprises in terms of criteria such as body structure and measurements, live weight gain,

growth performance, yield, carcass quality characteristics, retail meat product yield and valuable meat preparations. The main factors that lead to economic efficiency and profitability changes between production systems in cattle fattening include biological performance values of the animals raised, management strategies related to housing and feeding, regional and natural conditions, cost structure related to cattle and beef and marketing opportunities of the enterprise (Koknaroglu et al., 2005). Among the basic and structural problems in cattle fattening; supply of healthy and high productive fattening material with high feed utilization level and high fattening performance, access to quality and affordable feed and feed raw materials are the main ones. Feed and other production costs are constantly changing during fattening and at the end of the production period, the breeder cannot predict where and at what price he will sell his slaughter animals. The high level of inflation experienced in the Turkish economy in recent years has caused price formation to the detriment of the producer in the purchase or sale of livestock, while causing unexpected fluctuations in the prices of inputs used during fattening, resulting in increased production costs and reduced producer profits.

Various indicators related to the activity results of the feeders, who were divided into three groups according to the number of animals fed, are presented in Table 3. The differences in the mean values of the indicators except carcass yield were found to be statistically significant. While the average number of animals fattened by the breeders was 39, the average fattening period was 236 days (approximately 8 months). The average weight gain at the end of fattening period was 258 kg head^{-1} and the average carcass yield was 56.3%. Feed conversion ratio ranged between 1.24 and 1.86 and the average feed conversion ratio was calculated as 1.31. This means that the feeders spent 1.31 ₺ feed cost for 1 kg live weight gain on average.

In Turkey, carcass yield in cattle varies between 60-65% in meat breeds while it varies between 55-60% in domestic and cross breeds. Factors such as fattening period and feeding conditions are effective on this change (Duru and Sak, 2017). It can be expected that the carcass yields of the breeders in the research region will increase depending on the increase in the meat breeds they feed. Because the ratio of culture and hybrid breeds among the participant breeders is about 20%.

Table 3: Indicators related to activity results of livestock groups

Indicators	I (N=92)	II (N=15)	III (N=4)	Average	p value
Number of livestock fattened (head farm^{-1})	28.5	78.4	137.0	39.1	0.001
Fattening time (days)	236.0	240.2	213.5	235.7	0.003
Weight at the beginning of the period (kg head^{-1})	261.5	268.1	275.3	262.9	0.026
End of period weight (kg head^{-1})	515.2	535.1	610.0	521.3	0.002
Weight gain (kg head^{-1})	253.6	267.0	334.8	258.4	0.007
Daily weight gain (g head^{-1})	1074.8	1117.8	1567.9	1096.8	0.001
Feed cost (₺ per head^{-1})	20505.6	18662.9	18020.3	20167.1	0.029
Feed utilization rate	1/1.24	1/1.43	1/1.86	1/1.31	0.001
Carcass weight (kg head^{-1})	289.0	305.3	348.8	293.4	0.001
Carcass yield (%)	56.1	57.1	57.2	56.3	0.875

Production costs of cattle fattening are shown in Table 4 according to cost elements. The sum of variable costs and fixed costs in production costs are indicated with the letters (A) and (B), respectively. The average variable costs of the participant breeders were calculated as 51,675.1 ₺ (91.4%) and the average fixed costs as 4,860.1 ₺ (8.6%). The total production costs were 56,535.2 ₺ on average. Among the variable cost elements, fattening animal purchase and feed expenses received the highest value. It has been revealed that specialization in beef production will help to increase technical efficiency and specialized farms are more technically efficient than mixed farms (Alhas Eroğlu, 2023).

It can be said that livestock costs in Turkey generally consist of 3 main items as livestock material (50-60%), feed expenses (25-40%), labor, loan interest, medicine, veterinary-health etc. other expenses (5-15%) (Can, 2015; Aral, et al., 2020). The distribution of cost elements of the participating breeders coincides with the results obtained from the studies conducted in previous years. It can be said that the cost elements in cattle fattening do not change much between years and regions.

Table 4: Cattle breeding production costs (₺ head^{-1}) and proportional distribution (%)

Cost factors	I (N=92)	II (N=15)	III (N=4)	Average	Percent (%)
Livestock purchase	27392.6	30153.2	32433.3	27947.3	49.43
Feed expenses	20505.6	18662.9	18020.3	20167.1	35.67
Veterinary expenditure	1471.2	932.1	1257.5	1390.7	2.46
Labor	662.2	1120.9	878.0	732.0	1.29
Marketing expenses	218.4	311.5	295.3	275.1	0.49
Other expenses	1266.1	647.3	725.0	1162.9	2.06
Total Variable Cost (A)	51516.1	51827.9	53609.4	51675.1	91.40
General administrative expenses (A*0,03)	1545.5	1554.8	1608.3	1550.3	2.74
Capital interest	2575.8	2591.4	2680.5	2583.8	4.57
Amortizations	392.7	411.5	437.6	413.9	0.73
Repair and maintenance expenses	251.4	310.2	374.6	312.1	0.55
Total Fixed Cost (B)	4765.4	4867.9	5101.0	4860.1	8.60
Total Production Cost (A+B)	56281.5	56695.8	58710.4	56535.2	100.00

In Table 5, the amounts of loans and grants utilized by the breeders are discussed. Participants' level of benefiting from grants and supports and the amount of benefiting for fattening vary. Feeders benefited from subsidized loans and feeder calf grants the most. It was observed that other support types remained at very low levels proportionally. The average total amount of support utilized by the participants was determined as 74683.7 ₺. The agricultural sector is provided with subsidized agricultural loans with a discount on the market interest rate in line with the agricultural policies implemented (Baysa and Cihangir, 2021). The high loan interest rates that have developed due to the high inflation experienced in Turkey in the last few years have made subsidized agricultural loans used in the agricultural sector attractive and all producers have taken advantage of this advantage. It has been determined that only a portion of the loans used is directed directly to the financing of expenditures for crop production or animal production.

To produce more beef with less environmental impact, livestock farmers need to be incentivized to use their land more efficiently (Claire et al., 2023). Livestock are central to the livelihoods of small-scale farmers in low- and middle-income countries, but livestock are often malnourished, limiting their potential to reduce poverty (Duncan et al., 2023). Globally, increases in livestock productivity in the recent past have been largely driven by animal science and technology, and scientific and technological advances in breeding, nutrition and animal health will continue to contribute to increased potential production and further productivity and genetic gains (Thornton, 2010).

Table 5: Distribution of loan and grant support types utilized by livestock breeders (₺)

Support Types	I (N=92)	II (N=15)	III (N=4)	Average	Percent (%)
Subsidized loans	52451.4	109502.1	193682.8	65250.3	87.4
Feeder calf support	5978.3	14466.7	31625.0	8049.5	10.8
Area based supports	509.1	569.7	1003.3	535.1	0.7
Young breeder support	374.2	305.6	260.0	360.8	0.5
Animal insurance	249.3	315.2	292.0	259.8	0.3
Input subsidies	107.5	197.1	133.5	120.5	0.2
Fodder crops support	90.3	88.2	188.3	93.6	0.1
Total Support	59760.0	125444.6	227184.8	74683.7	100.0

Figure 2 shows the proportional level of the participants' utilization of the grants and loans provided to the livestock breeders. The types of loans and grants utilized vary according to the groups of feeders. While all of the participants benefited from animal insurance support, all of the feeders in the third group benefited from subsidized loans. While the level of utilization of subsidized loans was 53% in the second group, this rate decreased to 27% in

the first group. It is seen that credit utilization is closely related to the size of the enterprise. However, it is seen that small-scale breeders are disadvantaged in the use of subsidized loans.

It was shown that the value of production was affected by fodder crop subsidies, liveweight gain and the number of animals on the farm. Animal presence is important for high feed prices and profitability. New policies need to be developed to reduce feed prices or provide animal purchase support (Yüzbaşıoğlu, 2021).

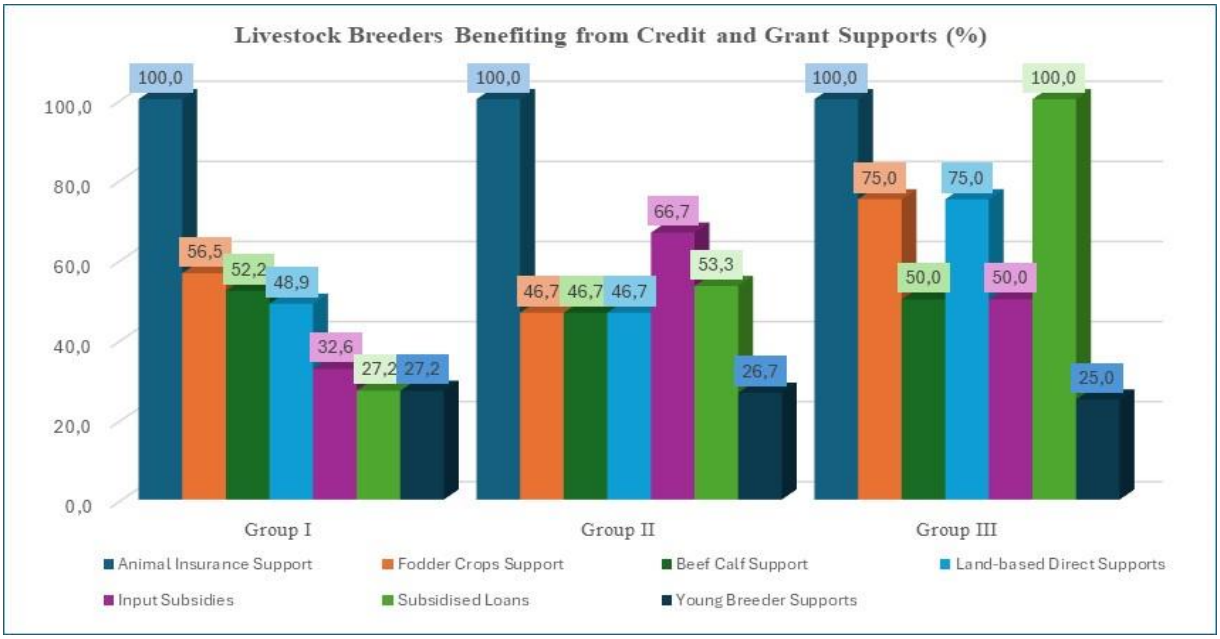

Figure 2: Level of utilization of credit and grant supports according to breeder groups (Percent)

The rates of utilization of credit and grant supports by the breeders examined within the scope of the research are presented in Figure 3. The highest utilization rate (68%) among the loan and grant supports provided to feeders in Turkey is determined as subsidized loans. This is followed by grant supports (28 per cent) and young breeder support loans (4 per cent). In general, the highest proportion of the grant supports provided to the agricultural sector utilized by livestock breeders is the support for fattening calves (89%). The proportion of other grant supports is very low. In the credit and grant support programs implemented to support the agricultural sector in general and animal fattening in particular, it can be said that some types of support are prominent, and some are ineffective.

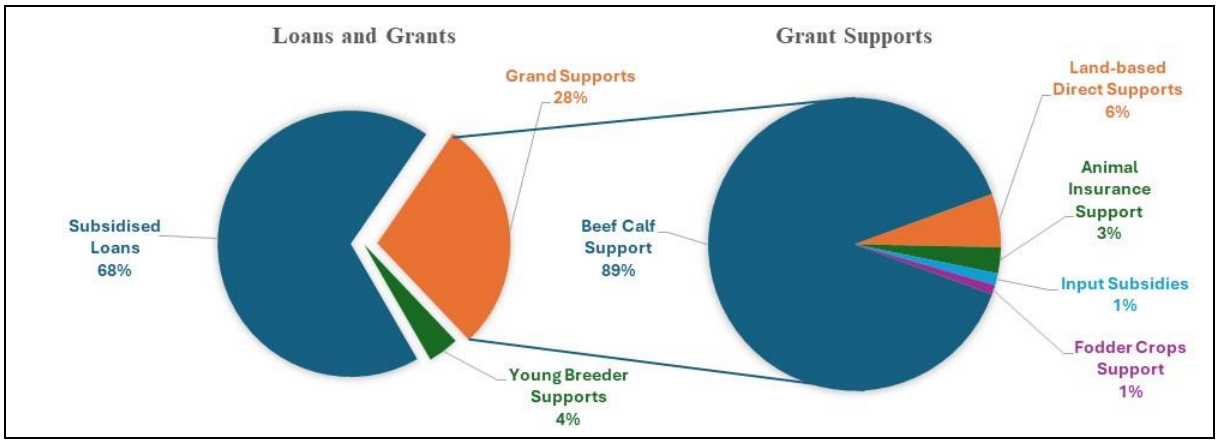

Figure 3: Distribution of loans and grants utilized by livestock breeders (%)

4.2. Contribution of loans and grants to production costs

Support payments for animal production are an important factor that will affect the production process of farmers. Support payments can increase the attractiveness of livestock investments and accordingly raise expectations for an increase in supply for animal production. In addition, thanks to the supports provided for animal husbandry, animal production can be increased in the following years (Gürer, 2020). It is known that the supports provided to date have been insufficient to solve the problems and the supports should be made for the sustainability of animal husbandry rather than short-term projections (Keskin, 2022).

It is estimated that approximately 10 per cent of the loans and 30 per cent of the grants used by animal breeders are used for animal husbandry activities. Accordingly, the contribution of the calculated credit and grant supports to production costs is shown in Table 6. Since the level of utilization of loans and grants is different among the participating breeder groups, their contribution to production costs is also at different levels. In addition, the rate of direct financing of the subsidized loans and grants utilized is not the same for each breeder. Accordingly, the production costs of the breeders, who were divided into three groups according to the number of animals taken into fattening, were calculated as 48918.6 ₺ head^{-1}, 41024.0 ₺ head^{-1}, 29343.5 ₺ head^{-1} and 47256.5 ₺ head^{-1} on average. The proportional contribution of the supports to the costs varied between 11.6% and 33.3% with an average of 14.1%. After the supports, the highest production cost was in the first group while the costs of the feeders in the third group were realized at the lowest level. It can be said that there is a very close relationship between the reflection of the grants and supports utilized on animal production costs and the scale of the activity area.

Table 6: Contribution of supports to the production costs of livestock breeders (₺)

Cost and supports	I (N=92)	II (N=15)	III (N=4)	Average
Average production cost	56281.5	56695.8	58710.4	56535.2
Loans (%10)	5282.6	10980.8	19394.3	6561.1
Grants (%30)	2080.4	4691.1	9972.6	2717.6
Total contribution of support	7363.0	15671.9	29366.9	9278.7
Total contribution of support (%)	11.6	21.7	33.3	14.1
Final cost	48918.6	41024.0	29343.5	47256.5

The share and amount of agricultural subsidies in the income obtained by the enterprises is important in terms of its effect on the economic sustainability of the enterprises (TOB, 2024). Figure 4 shows the proportional distribution of grants and subsidized credit supports that the participating livestock breeders benefit from within the production costs per animal. As the scale of the participating breeder groups increases, the share of supports in costs increases and therefore production costs decrease. Here, the level of utilization of grants and credit supports increases with the increase in the scale of the breeders. While the average costs per animal of the breeder groups were close to each other before the supports, the difference between the first group (11.6%) and the third group (33.3%) increased three times when the contribution of the supports to the costs was taken into consideration.

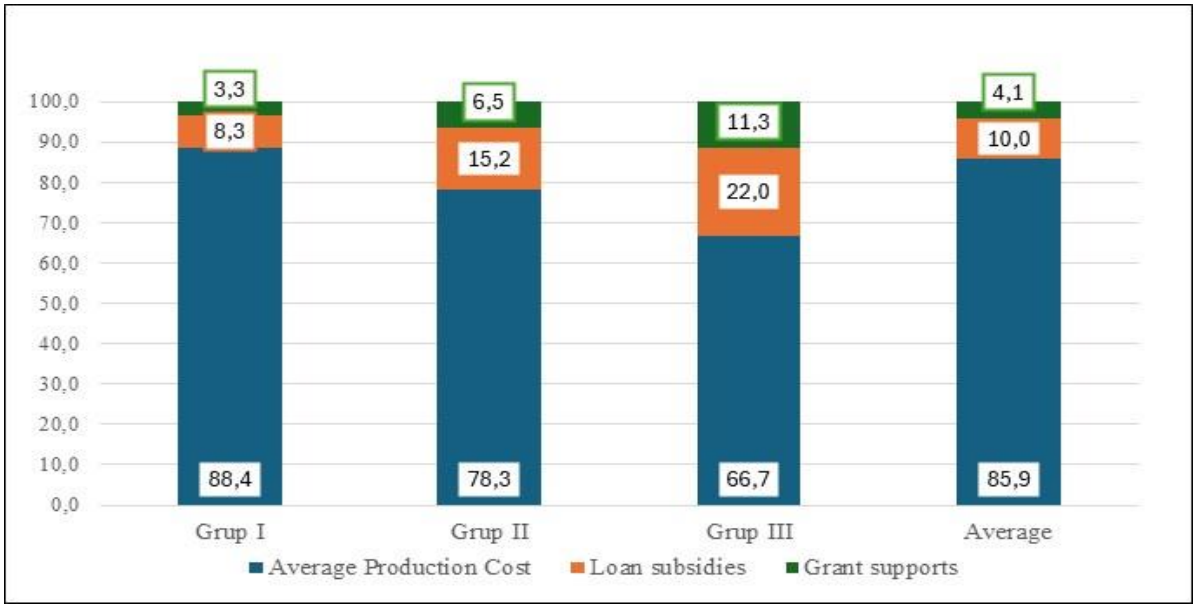

Figure 4: Contribution of subsidies to production costs in livestock production (%)

5. Conclusion

Rural households in developing countries are highly dependent on the livestock sector for employment and income. The livestock sector contributes greatly to the economic empowerment of most rural households in developing countries (Niloofar et al., 2023). Beef production contributes significantly to food security. However, livestock production, especially ruminants, has also been criticized for its low efficiency in converting natural resources into edible food (Mosnier et al., 2021).

In Turkey, a large portion of the public's red meat requirement is obtained from cattle. However, increasing production costs in the sector limit the activities of breeders and cause some producers to leave the sector. Governments take various measures to provide sufficient quantity and quality of animal production, which is among the basic food sources of the public, to the public at an affordable price. In this study, the effects of the incentives and supports implemented for the sector are analyzed. In Turkey, there are various incentives and subsidies for plant production as well as for animal production (milk, meat, eggs, honey and other animal products). While most of these supports are provided by central governments, local governments, producer organizations, credit institutions and some non-governmental organizations also provide various supports. Types of support include grants, subsidized loans, marketing support, training, provision of breeding stock, feed crop support and other inputs. In times of economic crisis or uncertainty, which in Turkey is still experiencing an economic downturn with high inflation, the focus should be on investments and policies in the livestock sector that contribute to solving problems of employment, rural development and migration.

In Turkey, livestock support has a share of 24 per cent in the total support provided to the agricultural sector. The amount of support provided to the livestock sector increases in current terms between years but does not change much in real terms. Supports can be provided to breeders with at least 10 heads of livestock and can be given to producers to improve their enterprises, as well as to new enterprises to be established. On the basis of agricultural support policies, changes should be made in order to adapt to internal and external dynamics, to improve the agricultural structure, to ensure sustainable competitiveness, and to utilize technology and resources in the most effective way.

The average fattening period of the participating enterprises is about eight months, and it can be said that the size of the enterprises is at medium scale. As in the whole of Turkey, it can be said that small fattening enterprises are decreasing since they are mostly not

economically sustainable. In the research region, increases in indicators such as feed utilization, live weight gain and carcass yield have been achieved due to the fact that the animals fattened are cultivated and their hybrids. The biggest share in the production costs in fattening is composed of animal purchase and feed expenses. The level of utilization of subsidized loans and fattening calf grants is at the best level. It can be said that other types of support remain at very low levels proportionally. It is clear that there is a need for reforms in order to increase the impact of the supports with low impact in the support policies implemented in Turkey. It has been observed that the access to subsidized loans for small-scale subsistence family farmers should be improved.

Livestock production in Turkey can be solved with long-term and stable structural livestock policies and the competitiveness of the sector can be increased. For the development of the sector, it is important to improve structural characteristics and to strengthen training and support mechanisms. It should be facilitated for livestock breeders to access sufficient financing for the supply of high-yielding animals of culture breed for fattening, which is among the most important cost elements. Encouraging young entrepreneurs with professional equipment and competence, especially in cattle fattening and all livestock sub-sectors, was found important.

In addition to economic sustainability, it is recommended to investigate the effects of environmental and social factors and climate change on the sustainability of livestock activities (Molossi et al., 2023). In order to increase the scale and capacity of cattle fattening enterprises and to ensure sustainability, it is recommended to improve general economic conditions (especially inflation, interest rates and exchange rates) and to solve fluctuations in input markets, as well as structural and marketing problems.

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