

**Past, present and future perspectives of indigenous livestock production systems in the seyhan basin,  
southern turkey**

**Livestock Sub-Group**

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## **1. Introduction**

Climate change is particularly threatening agriculture in undeveloped and developing countries because sustainable water management measures are not developed together with land management policies.

An internationally recognized method for assessing the environmental effects of livestock production should follow a standard pattern and should be applicable to all sites and to an integrated system of agriculture. In order to satisfy these requirements, relevant key indicators are selected for the respective site conditions. The method for testing the environmental impact is demonstrated above in the flow-chart for selected indicators (Figure 1). Livestock activities influence ecosystems which lead to a change in societal responses and subsequently, the market structure and prices that are affected by the society itself. Since natural resources are strongly influenced by these changes, some precautions have to be taken in the management of the livestock. The advantages of this method are that it provides a transparent evaluation and takes account of the sensitivity of the resources.

The ICCAP (Impact of Climate Changes on Agricultural Production System) project focuses on predicting the future situation of agricultural production systems in 2100 under the above mentioned conditions of climate changes in the Seyhan basin (Southern Turkey). Livestock products provide self-sufficiency for families, in situations where the land is of poor quality and crop cultivation

is often difficult and constrained by several environmental factors such as rainfall, very high temperature and poor soil fertility. Diversification in farming is a difficult task to attain, however integration of livestock production to the system would make significant contribution to poor farmers and the stability of small farm systems. It is evident that livestock husbandry/pastoralism will continue to be important for the food producing system in the 21st century throughout the world.

The purpose of this study is to determine the current livestock activities in the Seyhan basin and predict its changes due to the climate in 2100. The current and past perspectives of the livestock production systems will primarily be evaluated in the period of 2004-2005, together with future changes.

The following items of priority were specified for this aim;

- To determine the current situation of the grazing pattern, grazing area and feed resources
- To determine the current situation of crop cultivation
- To determine the current economic situation related with the livestock production system
- To determine the current social relationships on farm/village and inter-village levels
- To determine the past situation of pastoralism

## **2. Methodology and materials**

### **Material**

Data collection was done with a questionnaire\* interviewing the farmers about their family

background in this study. On the other hand some points are noted for the Project implementation as well.

#### Survey Area

The survey area of the Project is indicated below.

in the following points.

Zones	Elevation	Towns	Total Number Villages	Selected villages	Names of villages
I	1300-1400	Tufanbeyli	14	2	1.Kirazlıyurt 2. Kayarcik
II	1000	Saimbeyli	9	1	1. Himmetli
III	700	Aladag	18	2	1.Kökez 2.Dölekli
IV	400	Karaisali	37	3	1.Gildirli 2.Bolacalı 3.Güvenç
V	0	Karatas	6	1	1. Ataköy
		Total	84	9	

\* Questionnaire form is enclosed at the end of the text

#### Method

Kind of livestock, daily patterns of grazing (time to go out and come back) and feeding (time and amount per livestock), grazing areas (natural rangeland and/or cultivated field and/or pen) as well as the annual period of its utilization was surveyed by interviews in the winter of 2004 and summer of 2005. The distribution of the grazing areas was also drawn on topographic maps (1/25.000).

1. To determine the current situation of crop cultivation

Types of crops, patterns (time of seedling and harvesting) as well as the area and production of each crop cultivation/yard were surveyed by interviews in the winter of 2004 and summer of 2005.

2. To determine the current economic situation related to the livestock production system

Income resources, such as the income obtained from milk-meat products, crops and labor.

3. Determination of the current social on farm/village structure

Compiling information on the current education level and structure of families and sizes of the households and management of plant residues (stubble, forage etc.) by cooperative action. Determination of intra and inter numbers of people employed.

4. Determination of indigenous pastoralism

Patterns of migration in the area were considered as

-Migration patterns in the Seyhan basin partly depend on available natural resources, communal politics and etc. The migration patterns of several indigenous groups differ according to temporal variations.

-Migration routes

-Composition of migrated flocks

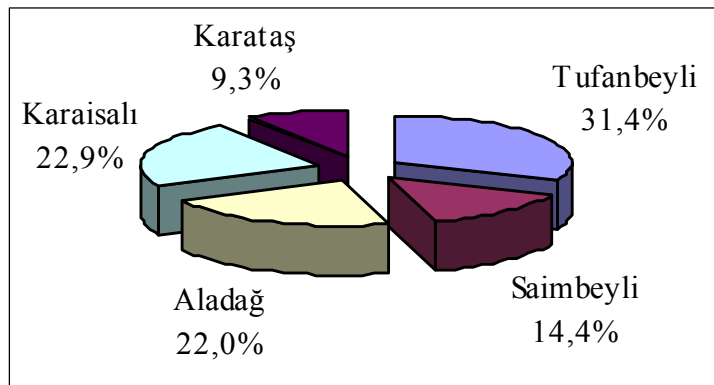
-Seasonal movements of the flocks will be followed during the field survey.

-Migration patterns of the historical changes i.e. time serial changes and transitions in grazing patterns will be determined.

The public survey has been carried out in the villages of 5 districts within the borders of Adana province and in the Seyhan basin. The altitude and animal population have been taken into consideration while defining the villages and districts. These data have been obtained from The Directorates of Agriculture in districts and provinces and from the mukhtars. In this context, the animal farmers in villages of Kirazlıyurt and Kayarcik in Tufanbeyli, Himmetli in Saimbeyli, Kökez and Dölekli in Aladag, Gildirli, Bolacalı and Güvenç in Karaisali, and Ataköy in Karatas have been interviewed. (See Figure 2) The public survey has been carried especially on the animal farmers out of the 10 % of the total house number in each village by Intentional Illustration Method. The numbers and the frequency of the questionnaires administered are given in Table 1.

**Table 1.** Questionnaire Numbers And Distribution By The Villages And Districts (The Data Were Collected By Garmin GPS Device).

Research Area	Frequency	%	Altitude	Position
<b>Tufanbeyli</b>	<b>37</b>	<b>31,4</b>		
Kirazliyurt	12	10,2	1474m	N38 06.239 E36 17.514
Kayarcık	25	21,2	1463 m	N38 10.212 E36 16.860
<b>Saimbeyli</b>	<b>17</b>	<b>14,4</b>		
Himmetli	17	14,4	680 m	N37 51.936 E36 03.495
<b>Aladag</b>	<b>26</b>	<b>22,0</b>		
Dölekli	12	10,2	786 m	N37 35.257 E35 18.234
Kökez	14	11,9	1083 m	N37 35.937 E35 15.147
<b>Karaisali</b>	<b>27</b>	<b>22,9</b>		
Gildirli	9	7,6	728 m	N37 21.625 E35 03.042
Bolacalı	7	5,9	512 m	N37 13.741 E34 59.285
Güvenç	11	9,3	236 m	N37 13.606 E35 05.339
<b>Karatas</b>	<b>11</b>	<b>9,3</b>		
Ataköy	11	9,3	22.5m	N36 45.207 E35 06.811
<b>Total</b>	<b>118</b>	<b>100,0</b>		



**Fig. 3.** Frequency of Questionnaire

Totally 118 questionnaires have been carried on aimed at the farmers in the area. As mentioned before, the frequencies and percentages shown in the Table 1 and Figure 2 have been realized on the basis of the data obtained from the mukhtars. Therefore, 37 questionnaires in Tufanbeyli, 17 questionnaires in Saimbeyli, 26 questionnaires in Aladag, 27 questionnaires in Karaisali and 11 questionnaires in Karatas have been carried out.

#### **Vegetation analyses**

Plant cover, botanical composition, and grazing capacity of these pastures were determined at June 2005. The nets (60 x 80 x 100 cm) were nailed on to the different parts of pastures at February 2005, before the grazing period, for determination of the pastures fodder yield and so grazing capacity. Three nets were placed to the different directions of the

pastures for each village. At the end of the grazing period, the nets were removed and the space inside of a quadrate (33 x 33 cm) was harvested from the soil surface. This is replicated three times for each net. The plant material harvested was weighted and the obtained value was converted to the yield for 1 hectare.

Vegetation measurements were done with the loop method modified from the dot quadrate techniques especially for the arid and semi arid regions. In this technique, each 20 cm from the line of 20 m was identified in relation with plant species. Accordingly a hundred records were obtained along a line around the each net.

#### **Identification of plant species**

Undefined plant species during the measurement

were collected, mounted and identified as herbarium specimen. The codes temporary given in the field for the undefined ones were replaced the corrected names after identification.

### Plant Cover

The equation below is used to calculate how much land covers with the plant.

$$\text{Plant Cover (\%)} = \frac{\text{Total Plant Cover}}{\text{Investigated land}} \times 100$$

On the other side the place without plant was determined with the help of the formula below;

$$\text{Surface without plant (\%)} = 100 - \text{total plant cover}$$

### Calculation of botanical composition

The percentage of a species among the total is expressed as botanical composition for that species. And it is calculated using this formula.

$$\text{Botanical Composition (\%)} = \frac{\text{Plant cover of species 'A'}}{\text{Plant cover of whole species}} \times 100$$

## 3. Results

### 3.1 Past and Current Situation of the Land Using System in the Seyhan Basin

Generally, from 1991 to 2002 total forest area of the Seyhan basin has increased. The percentage of this increment is approx. 6 %. Decreasing has only been observed in Pozanti district. If we would like to criticize this situation, it can be said that these area is using for building summer houses. Especially in summer season people, live in city center, prefer to stay at upland regions of Pozanti. Due to this reason new buildings have been established for summer tourism.

Totally 48.970 ha land is used for shrub and grassland in the area. As it is expected, shrub and grassland area is larger at Tufanbeyli and Saimbeyli than the other towns. Tufanbeyli and Saimbeyli towns are plain area. The hilly and mountainous lands of these two towns are lower than the others.

According to farmer's reports, the grazing starts in March and ends at the end of November or beginning of the December. Only in Aladag, the period is different due to the altitude. Aladag is hilly and mountainous region and snowing starts earlier than the other regions. In Aladag, Tufanbeyli, Kozan and Karaisali, flocks have transferred to grassland during to daytime both in winter and summer while

flocks of Saimbeyli and Karatas have transferred both in day time and night time. Herds of all towns have been grazed even in winter season in whole area.

In high lands grazing starts at August and ends in September for all species. But in low-land areas such as Kozan, Karatas and Karaisali, grazing starts and ends earlier than the others. Both grazing in grasslands and harvested areas stated in day-time.

The number of goat, sheep, cattle, horse and donkey slump down during 18 years. The reasons of this decrement are political and socio-economical which will be discussed following sections.

In the scope of ICCAP, the results of the public survey on the animal raising have been evaluated and the findings have been summarized as below.

**Table 2.** Changing In Forest Area Of Seyhan Basin From 1991 To 2002 (Ref. Ministry Of Forest, Adana Branch.)

TOWN	YEARS	
	1991 (Ha)	2002(Ha)
ADANA	29.330	37.113
FEKE	22.269	22.589
KOZAN	8.645	8.922
İMAMOĞLU		11.355
ALADAĞ	13.492	13.866
POZANTI	20.634	13.394
TUFANBEYLİ	18.444	24.889
SAİMBEYLİ	21.867	22.676
KARAIŞALI	24.847	25.656
<b>ADANA TOTAL</b>	<b>550.473</b>	<b>582.374</b>

**Table 3.** Shrub-Grassland Area At Seyhan Basin From 1991 To 2002 (Ref. Ministry Of Forage, Adana Branch)

TOWN	YEARS 2004(Ha)
<b>ADANA (TOTAL)</b>	<b>48.970</b>
Feke	5000
Kozan	1770
İmamoglu	250
Aladag	1600
Pozanti	3500
Tufanbeyli	10600
Saimbeyli	11700
Karaisali	3400

**Table 4.** Grazing Periods And Duration Of Grazing In Seyhan Basin (Ref. Interview Of Farmers)

TOWN	Grazing Season	Months	Grazing Hours		
			Goat	Sheep	Cattle
Tufanbeyli	Summer	April-End of Dec	07-19	08-15 21-05	07-19
	Winter	Jan-March	07-16	09-16	09-15
Saimbeyli	Summer	April-Dec.	03-10 14-21	17-08	13-17
	Winter	Jan-March	07-16	07-16	07-16
Aladağ	Summer	April-Sept.	08-12 15-18	08-17	08-17
	Winter	October-March	08-15	08-15	08-15
Kozan	Summer	Always	08-17	08-17	08-17
	Winter	Always	08-16	08-16	08-16
Karaisalı	Summer	March-Dec.	08-12 13-18	08-12 13-18	08-15
	Winter	Jan-Feb	08-13	08-13	08-13
Karataş	Summer	March-Novem.	06-22	06-20	06-18
	Winter	Dec.-Feb.	07-20	07-18	07-18

**Table 5.** Period And Duration Of Grazing In Harvested Lands Ref. Interview Of Farmers)

TOWN	Months	DURATION (h.)		
		Goat	Sheep	Cattle
T.BEYLİ	August-Sept.	07-19	08-15 21-05	07-19
S.BEYLİ	August-Sept.	07-10 14-21	17-08	13-17
ALADAĞ	August-Sept.	08-12 15-18	08-17	08-17
KOZAN	July-August	08-17	08-17	08-17
K.İSALI	July-August	08-12 13-18	08-12 13-18	08-15
KARATAŞ	June-July	06-22	06-20	06-18

**Table 6.** Changing In Livestock Population In Seyhan Basin (Ref. Ministry Of Agriculture)

Years	Species	Aladağ	Karaisalı	Karataş	Kozan	S.Beyli	T.Beyli
1984	Sheep	-	30442	16397	41540	22811	31703
	Goat	-	101621	644	69177	35290	10601
	Cattle	-	21838	18964	33717	7823	13230
	Horse	-	1442	191	22059	1129	116
	Donkey	-	4224	180	3137	1675	1938
	Donkey	699	400	17	1720	1985	1330
2002	Sheep	17448	23450	9081	46000	17465	6200
	Goat	32749	41750	220	48000	59910	6700
	Cattle	7854	8935	7022	28055	2095	9300
	Horse	490	622	50	1145	990	95
	Donkey	700	408	9	1720	1970	1330

### 3.2 Village Questionary

Some general information's according to villages are given below, as well.

As it is shown that, the larger villages are Kirazliyurt, Gildirli and Güvenç. Household number of Himmetli village is higher than the others. Additionally Kayarcik is the most crowded village in the survey area. Kirazliyurt, Kökez, Gildirli, Güvenç, Bolacali and Kayarcik are the mountainous villages. Total surface areas of these villages contain forest, shrubs areas spread on the high mountains. Due to this fact the total surface area of these villages are seems to be higher.

Mosque, electricity and communication are available in all villages of the survey area. School and clinic are not available in Bolacali while only clinic is not established in Ataköy and Gildirli villages. River and springs are reported as water resource of some village such as Gildirli, Bolacali and Kirazliyurt.

### 3.3 Animal Keepers Questionary

The applying methods of the Animal keepers for using natural pasture are stated in the Figure 2. It has been noticed that there is a conflict about the natural pasture areas between the data obtained from the villages in which the study are being carried out and the reports obtained from the Directorates of Agriculture in districts and provinces. The findings which were stated in this table have been obtained completely from the statements of the farmers. Therefore, it is seen that majority of the farmers feed their animals in the pastures that are the common properties of the village. As the majority of these areas are used for vegetal production, the areas being talked of are the areas that aren't used by the farmers and that are in the extent of the forests).

The maximum level of the frequency of grazing in the field edges and harvest residues (stubble) also verify these results. Consequently, it is seen that grazing in the residues after the harvesting of crop production is more common than grazing in the natural areas. Also grazing in fallows supports this explanation.

The villages in which bush and shrub areas are densely used by the mountainous villages, which have high altitudes. In these villages, sheep and goats raising are performed more densely. As a result of the interviews with the farmers, it is determined that especially goats are pastured in these areas.

Although it is forbidden to graze in the forestry area, usage of these areas in a density which can not be underrated in the activities of sheep and goats

raising -carried out especially in Aladag and Tufanbeyli- attracts high attention. Another point which must be emphasized is that the rate of the animals which are kept in the barns is 13.6 %. These animals contain rather the cattle which are kept in the plains. It is also stated in the table that only one farmer hired a pasture.

According to the statements of the farmers, the changes in the grazing capacity in the pastures in the working area and their frequencies are given in the Table 11. According to the findings obtained, the number of farmers who state that grazing capacity in the grassland change in the last 25 year is 80 and the rate of it is 67, 8 %. However, another finding which attracts attention is that some of the farmers declared that there is no change in the grazing capacity (32, 2 %). It can be said that this condition results from two causes: (a) the farmers take their animals to the higher areas during the summer months that these areas have already been used for animal production only.

Depending on the reduction in the number of animals, in a parallelism with this, the number of animals which use these areas is much less than before; (b) Because the usage of the pastures are so seldom in cattle raising in which the pastures are not so common, the farmers have less information about this.

Depending on the statement above, the opinions of the farmers about the aspects of these changes are given in the Table 12. The data in the Table 12 are obtained from the basis of the statements of the farmers about the change in Table 11.

The 88, 8 % of the farmers who declared that there has been a change in the grazing capacity stated that there has been a reduction in the grazing areas, and 8% stated that there has been an increment and 7, 5% stated no reason.

The reality about the reduction in the grasslands is not only special to this particular area but also to the whole area and the causes of this have been debated above. And it is also seen that the number of the farmers who claim that there has been an increase in the pasture capacity is so few. It can be said that this claim results from the reduction in the number of animals grazing in the working area (A table or a graphic related to the previous reports stating the reduction in the number of animals in the district in the last 25 year can be given here). In the Table 13, changes in pasture capacity in village grassland are given according to the Table 11 and 12.

The fact that most of the farmers who claimed that there had been a change in pasture capacity are

from Tufanbeyli and Saimbeyli attracts attention. According to the farmers' point of views, it can be seen that the minimum change occurred in Karaisali. The causes of this change will be evaluated in the light of the data in the Table 14.

The farmers that have been interviewed claimed that the change in the capacity of grassland depends on the reduction in the number of animals and reduction in the annual precipitation. This declaration overlaps with other situations in most of the regions. However, when Table 14 is studied it is seen that the most important factor is that the grasslands are converted to crop production fields (30%). The farmers stated the government's enlarging the cultivated forest areas and banning the goats to be grazed in the forests (32, 5 %) as another reason for the reduction in the grazing areas. A few group of the farmers stated that the grazing areas were reduced because of the drought and reduction in the precipitation (22, 5 %).

During the process of getting the opinions of the farmers, it was stated that there have been some changes in the revival of the vegetation as a result of the change in the time of the precipitation.

When the Table 15 is taken into consideration, the existing situation of the grazing season in animal species terms can be seen.

It was determined that economic potential the goat farmers who allow their animals to the grasslands during all year was 48,8 % and the level of the goat farmers who take their goats to the grasslands during all months except from winter months was 51,2 %. As it was expected, it is seen that only small number of the cattle breeders take their animals to the grasslands during all year (10,8 %) and the majority of them (89, 2 %) take their animals to the grasslands during all seasons except from winter-time. It is understood that constant grazing is realized in the level of 25 % and grazing in all seasons except from winter months is realized in the level of 75,1 %.

The distribution on account of grazing time in the species basis is shown in the Table 16. It is seen that a majority of the goats go to the grasslands in the early morning and stay there till evening (67, 6 %). It was determined that the rest of them take their goats to the grasslands in the early morning (like 3 a.m. at night) till 10 a.m. in the morning. These flocks are generally stayed at the pastures and grazing in the hours when the atmosphere heat is high is not seen.

When the Table 16 is examined, it can be explained that 63, 2 % of the cattle are stocked to the

grasslands from the early morning till late evening, and the rest of them are taken to the grasslands, like goats, from the early morning till noon. It is also seen that the 77, 8 % of the sheep are taken to the grassland from the morning till evening, and the rest of them are taken to the grasslands in the duration from the early morning till noon.

The distribution of the feeds that are used in barns is summarized in the Table 17. Feeding the sheep or goats in barns is realized rather in winter months. During the insufficient times of the grasslands, the sheep or goats are kept inside and meanwhile they are fed by some kind of feeds. Additional feeding in cattle is seen generally during the whole year and is done addition to the grazing. It is determined that feeding in barn is based on mostly to pulp (77, 1 %) and to straw (75, 4 %) but at the same time, concentrate feeds prepared by the factories are also given highly (72 %). In addition to these, using the various seeds, grass and dry grass attract attention. Some of the farmers stated that they only gave their animals only grains and straw twenty years ago. However, because of the increase in the performance capacity of the animals and increasing number of the crossbred animals, indoor feeding has increased as well.

The data about the changes occurred in feeding in barn in the recent 25 year shown in Table 17 are dealt with in Table 10. Depending on this, the proportion of the farmers who declared that there has been a change in hand-feeding in the recent 25 year was 57, 6 %, the proportion of the farmers who declared that there haven't been any changes was 30, 5 %. The farmers declared that the changes occurred in feeding resulted from the reduction in the number of grasslands and animals' hunger because of this. Some of the farmers reported that they gave less feed to the animals because of the increase in the prices of the feeds.

It can be seen in the Table 19, a great amount of the farmers reported that there have been some changes in animals' feeding behavior. 69 persons in 71 (97 %) who reported that there have been some changes in animals' feeding behavior stated that this resulted from the reduction in the number of the grasslands and hand-feeding increased because of this.

As it was mentioned above, the responses of the farmers to the question about the terms of giving concentrate feeds to the animals are summarized below (Table 20). Hand-feeding is generally applied more often during the winter months when the grazing is not possible. Nevertheless, feeding is

realized limitedly but at a specific level in the cattle production in the durations of pregnancy, estrus and lactation.

The data related with the distribution of the animal species in villages are summarized in the Table 21. It can be seen that the cattle breeding is realized more often through the dairy cattle and the breeding through stock farming is realized at a low level. According to these data, it can be said that cattle feeding is only common in grasslands. Dairy cattle feeding are intensely seen in grassland, Ataköy but in the other villages it can also be seen at a specific level. Sheep or goat production is densely populated in the villages of Karaisali, Saimbeyli and Tufanbeyli and is not preferred in the mountain villages. Another topic that must be taken into consideration is that goat raising is a branch of animal production which is intensively carried out in the area. Also, some findings were obtained which support the literature declarations. It was appeared here once again that goat raising is an activity which is preferred by the people living in highlands.

In the Table 22, the changes in number of animal species during last 25 years were stated

After studying all the findings, it can be inferred that there haven't been many changes in the cattle population, but on the other hand, a considerable decline in sheep and goat numbers could be observed. The decline in sheep and goat numbers wasn't reflected to the cattle production. Consequently, it can be said that there has been an evasion from the stock-breeding and this has been resulted from various factors. These factors are resulted from the changes in the social and economical extents. But if it is studied on the basis of villages, it is seen that some data occur in opposition to those obtained generally. There have been some small developments in sheep production thanks to some incentives related to the policies of the government. It can be seen that, although all these negative conditions in goat production, in the mountain villages like Kökez and Güvenç, the people didn't abandon from this production activity and even the goats increased in number. The causes of the changes according to the farmers are given in the Table 23.

The farmers' transferring their animals because of being no economical depending on the various factors is considered to be one of the most important causes of the reduction in number of animals. In addition to this, the changes resulting from social facts became a cause for farmers' renouncing from animal production. These factors are dealt with in a

detailed way in the Table.

The farmers' taking their animals to the cooler areas with them or hiring a shepherd to take them to the cooler areas especially during the summer months have been a strategy for long years. However, as it can be seen in the Table 24, the farmers have been renouncing from this application gradually. The statements related with the changes in the migration routes are given Table 25.

There has been a change in the migration routes of the flock owners related with the previous table. But this change is a very small. The flock owners showed the causes of this change like this; crop production on the areas which they used to go, offended grasslands, the high cost of migration and security problems.

As it was emphasized before, when the economical affects of the migration have been asked to the migrating farmers, 37, 5 % of them stated that migration didn't bring an extra cost to them and their migration routes were to the near surroundings. They also emphasized that as the migration prevented some negative conditions, it also became a benefit economically. Only 27, 5 % of the migrating farmers stated that migration to the farther surroundings bring out some extra costs. From the farmers' point of view, the changes occurred during young animals' weaning time is given in the Table 27.

When it is studied generally, it can be seen that there has been a change in suckling periods of all animal species in the last 25 year. This change has been realized in cattle production because of getting milk at a high level. Generally, sheep or goats are being sucked for 3 months fully according to their birth season and then they are fed with residual milk (after milking). The farmers said that, in the past, they used to use milk for only their own needs and it was enough for both young animals and themselves. However, they declared that now they are used to use some of the milk for cheese making and some amount of it for marketing. Consequently, it is understood that they weaned the young animals in the early stages and they increased the milk production. The seasonal changes that occur related with the estrus and weaning periods are given in the Table 28.

As it can be seen in the Table, most of the farmers are not aware of this subject. Only 27 % of them could give a reason for this change. These reasons were declared as climate conditions (13, 5 %), changes in feeding sources and feeding conditions (10, 2 %) and changes in genotype of animals (4,



2 %). The changes in feeding conditions and grasslands result from the seasonal changes. A considerable finding is that the farmers who declared that there has been a change said that this change resulted from the climates. The proportional distribution of the farmers' responses about what the basic objective is in animal production is seen in the Table 30.

Most of the animals are generally raised for milk production. (42, 4 %) But it is also seen that in some of the business enterprises meat production is also important addition to the milk (41, 5 %). The level of the business enterprises which are using animals for breeding and stud is 11 %. Consequently, it is realized that buying of the studs depend on the public sector. And it was also determined that the business enterprises which are active in meat production were in the sheep raising sector. It is seen in the Table 31 that the farmers didn't make much changes in their production aims in the last 25 year. Only about 12 % of them changed their production aims.

The milk amount due to species today and 25 years ago has been asked to the farmers who kept milk type animals and the distribution of the responses are given in the Table 32.

Milk is processed in different ways in the business enterprises which kept milk type animals (Table 34). Generally, no change in the milk yield of the sheep and goats is seen depending on their genetic capacities. On the other hand a change in cattle in the level of 135, 2 % is seen. This change results from both feeding the animals with concentrate feed in the covered areas and crossing with exotic breeds such as Holstein Friesian. The responses of the farmers about this change are seen in the Table 33. The declarations of the farmers get along with the declarations above (Improvement in the nourishment conditions 14, 3 %, change resulting from genotype 42, 9 %).

Totally 55, 9 % of the farmers process the milk as cheese and an important part of them sell raw the milk directly. Some of the products given in the table are used for the family's own needs and the rest of it is sold for income. Most of the farmers stated that the cooperatives or merchants bought the milk in a very low price and even they could buy only 1 kg of feed by the income of 1 kg milk. Consequently, they stated that fresh milk selling wasn't economical.

The proportional distribution of the dairy products depending on the previous table is given in the Table 35. According to this table, milk is mostly used for cheese making (70, 3 %), and the rest of it is used

for making yoghurt, butter and çökelek. An income is being got by selling the most of the cheese. White cheese and cheese encased in a goat skin is generally produced.

Commercial yeast is also used for cheese making in addition to the traditional yeast (Table 36). The number of farmers who use commercial yeast is more than the proportion of the farmers who use natural yeast. Plug milk, sarkanak (kind of animal tissue) and dried fruit are intensively used as traditional yeasts.

Questions about the changes in the technologies used in processing milk were asked to the housewives and the proportional distribution of their responses was summarized in the table 29. 50 % of the women in farm stated that they used the same ways. 28, 8 % of them stated that there has been a change and added that they used to use traditional ways but now they are used to use commercial yeasts as they are more practical.

It was determined in the working area during different periods that there have been some changes in preservation methods of the processed dairy and meat products. It was seen that they are preserved in the refrigerator as they were spoilt in the past because of being embedded under snow or soil and being kept in caves. After the questions related with this topic, it was determined that 77,1 % of the farmers no longer use the traditional ways and 27 % of them use only caves and skins of the animals. It was determined that most of the farmers (48, 1 %) use the refrigerator, and rest of them uses the traditional methods for preservation of their products.

It was determined that in the table 32, 16 % of the farmers still use the traditional methods and the rest of them used to embed their products into the soil (29,9 %), preserve them in skins (13,8 %), in caves (6,9 %), in highlands (3,4 %) but now they no longer use these methods.

Most of the farmers stated that their preservation methods have been changed due to technological improvement. And 20, 5 % of them thought that as the reason of this changing are climate changes. The proportional distribution of the farmers statements related with this subject was given in the Table 41.

The proportional distribution of the problems occurring in the animals which are raised in the working area was given in the Table 42. According to the farmers, the proportion of the epidemic diseases is 36, 4 %. Abortion and infertility follow the epidemic diseases. These two problems generally result from the Brucella disease and it is

very common in the area. In addition, the farmers' complains about their animals' low productivity is understood from their responses (16, 9 %).

The farmers stated that generally the cause of the diseases that appear at their flocks was the insufficient feeding. And they declared that their animals came down with a disease because of infection or problems that occur during the grazing.

It is seen that the proportion of the diseases resulting from climate conditions is 9, 3 %. It is a well-known reality that there have been problems in health protection in the working area. Especially, vaccination with money is one of the basic causes of their non-vaccination. The costs per animal are given in the Table 44 related with the vaccination. It is seen that the vaccination program is only applied in cattle; the number of farmers who apply the vaccination program to their sheep or goats is very low (2, 8 %). The reason of this, sheep or goat farmers generally work with local animals but on the other hand the cattle farmers work with crossbred animals. Because the crossbred animals are not as resistant as the local animals, the farmers apply the vaccination program only on cattle against different diseases.

The farmers declared that there has been a change in the health protection programs in the last 25 year. These business enterprises are the enterprises who generally work with crossbred cattle. As the crossbred animals are more sensitive than the local animals, it is unavoidable to apply the vaccination program to them. The costs increased in parallel to the health protection application (Table 45). Most of the farmers who were interviewed declared that the cost has changed in the expenditures for health protection.

When the causes of the change during the health protection program were asked to the farmers (Table 46), most of them declared that the fee of the vaccines, medicines and veterinary service prices that are used for this program has increased (56, 2 %), an other part of them declared that in the past there weren't too much diseases but today the proportion of the disease are much higher than the past (49, 4 %). Some of them declared that also lack of the knowledge and changes in genotype of the animals are affective in these problems.

The opinion of the farmers about the change in the size of animals in the last 25 year is in Figure 6. Most of the farmers observed a change in the size of animals in the last 25 year (61, 9 %). The proportion of the farmers who declared that there hasn't been a change can not be undervalued.

Most of the farmers who declared that there has been a change in the size of animals in the previous table stated that this development results from genetic improvement (42.5%). About 32, 9 % of them showed the decreasing to pasture land as the cause of these changes in the size of the animals. While defining the cause, the causes depending on feeding as a result of the reduction in natural feed sources were considered.

The findings about employment in the business enterprises who are dealing with stockbreeding take place in the Table 48. Only 11 % of the business enterprises give employment and the rest of them don't. The farmers define the shepherds as the workers. The shepherds are generally the workers who are hired in common when the flocks are taken to the higher lands during the summer months. They are hired only as seasonal workers.

The sources of income of the business enterprises who are dealing with livestock production are given in the Table 49. It is seen that the incomes of most of these enterprises are from stockbreeding. However, it is understood that crop production is also an important source of income (69, 5 %). A small amount of the farmers works at a paid work. Especially, the villagers from Bolacalı and Güvenç became skilled and preferred at some kinds of work such as whiteners or woodcutters.

When the money which is separated for animal production incomes from the total income due to the villages is studied, it can be seen that the proportion in plain villages and in the villages in which the business enterprises on livestock production are active is higher. This is an anticipated situation. As it was emphasized before, cattle raising is being executed in a vertical system. In addition, as the animals are crossbred, the costs for their welfare are higher. But it is seen that incomes are generally at minimum levels when the mountain villages in which sheep or goat raising is executed intensively are studied. The farmers' opinions about the change in the allocated funds for animal production in the last 25 year were given in the Table 51. 68, 6 % of the farmers declared that expenditures for animal production increased in the last 25 year. The others declared either no idea or a decrease. Most part of farmers declared that there has been a change in allocated funds from the total income for the animal production (92 %) showed the reasons of this change as; the small amount of the grasslands and so usage of feed highly because of this and the low price of the productions.

The opinions of the farmers about the changes in

climates were given in the Table 52.

About 87, 3 % of the farmers declared that there have been changes in climate in the areas on which they live. When they were asked about the causes of these changes (Table 53), most of them stated that the temperature of the atmosphere increased (82, 5 %) and some of them stated that the temperature of the atmosphere decreased (2, 9 %). However, the farmers gave responses to these questions by stating their opinions about how the changes in climates affected the animal and crop production. The responses which were given in this way can not be undervalued. It is generally understood from the responses that because of the negative conditions of the climates, plant and animal production degraded. The farmers who are active in the working area were asked a question about the number and species of the wild animals and the proportional distribution of their responses were given in the Table 54.

87, 4 % of the farmers who declared that there has been a change in climate also said that there has been a change in the number and species of wild animals. 100 % of the farmers who declared that there hasn't been a change said that there has been a change in the number and species of the wild animals. Generally the farmers stated that the number and the species of the wild animals decreased. A question about the direction of this change was asked to the farmers who declared that the number and the species of wild animals increased. It is understood from their responses that the number of wolves and wild pigs increased because of the hunting ban not the changes in climate. In addition, they stated that especially some of the wild winged animals became extinct. Besides, some animals like foxes, wild rabbits and deer became extinct.

**Table 7.** Number Of Household, Population And Square Measure Of The Villages

Name of Villages	Square measure (ha)	Number of Household	Population
Kirazliyurt	52000	120	870
Dölekli	200	120	900
Kökez	3300	210	1260
Gildirli	8500	80	250
Bolacali	6000	14	160
Kayarcik	6000	240	2000
Ataköy	1500	150	1000
Himmatli	2300	342	948
Güvenç	8000	100	600

**Table 8.** Infrastructure Of Villages In Survey Area

Infrastructure	Number	%
School	8	88,9
Clinic	7	77,7
communication	9	100,0
Electricity	9	100,0
Water establishments	8	88,9
Access road	8	88,9
Mosque	9	100,0

**Table 9.** Frequency And Distribution Of Grassland Areas By Farms

Grasslands	Frequency	%
Harvest residues and field edges	62	52,5
In-village common property	59	50,0
Shrubs	34	28,8
Housed (not grazed)	16	13,6
Grasslands in forest	19	16,1
In fallow	19	16,1
Hired areas	1	0,8
In horticulture areas	4	3,4
In private property	5	4,2

**Table 10.** Frequency And Distribution Of Grassland In Farms

Grasslands	Frequency	%
Harvest residues and field edges	62	52,5
In-village common property	59	50,0
Shrubs	34	28,8
Housed (not grazed)	16	13,6
Grasslands in forest	19	16,1
In fallow	19	16,1
Hired areas	1	0,8
In horticulture areas	4	3,4
In private property	5	4,2

**Table 11.** Change In Farm-Grassland Capacity In The Last 25 Years

Change	Frequency	%
Yes	80	67,8
No	38	32,2
Total	118	100,0

**Table 12.** Change In Farm Pasture Capacity Of Grasslands.

Change	Frequency	%
Reduction in grassland	71	88,8
Increasing in grassland	3	3,8
Unknown	6	7,5
Total	80	100,0

**Table 13.** Change In Pasture Capacity In Village Grassland

Villages	Change in grassland capacity					
	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Kayarcik	21	26,3	4	10,5	25	21,2
Himmetli	12	15,0	5	13,2	17	14,4
Kirazliyurt	11	13,8	1	2,6	12	10,2
Kökez	11	13,8	3	7,9	14	11,9
Ataköy	8	10,0	3	7,9	11	9,3
Dölekli	6	7,5	6	15,8	12	10,2
Bolacali	4	5,0	3	7,9	7	5,9
Gildirli	4	5,0	5	13,2	9	7,6
Güvenç	3	3,8	8	21,1	11	9,3
<b>Total</b>	<b>80</b>	<b>100,0</b>	<b>38</b>	<b>100,0</b>	<b>118</b>	<b>100,0</b>

**Table 14.** Cause Of Change In Grassland

Reasons	Frequency	%
Pastures converted to cultivated areas	24	30,0
Forestation activities	20	25,0
Decrease in pasture land due to climate change	18	22,5
Unknown	6	7,5
Prohibition of grazing in forests	6	7,5
Decreasing of pasture land due to erosion	2	2,5
Increasing in pasture land due to the decreasing animal intensity	2	2,5
Decreasing of pasture land due to increasing animal intensity	1	1,3
Increasing in pasture land due to increasing in vegetable growing	1	1,3
<b>Total</b>	<b>80</b>	<b>100,0</b>

**Table 15.** Grazing Seasons Of Different Species

Grazing Season	Goat		Cattle		Sheep	
	Frequency	%	Frequency	%	Frequency	%
Spring,summer,autumn	11	25,6	38	58,5	9	56,3
Spring	1	2,3	-	0,0	2	12,5
Spring, summer	10	23,3	14	21,5	1	6,3
Autumn, summer	-	0,0	6	9,2	-	0,0
Continuous	21	48,8	7	10,8	4	25,0
<b>Total</b>	<b>43</b>	<b>100</b>	<b>65</b>	<b>100</b>	<b>16</b>	<b>100</b>

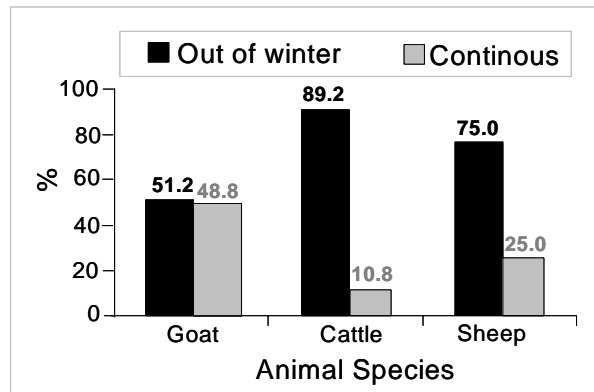


Fig. 4. The percentage of the grazing season in the species basis

Table 16. Daily Grazing Times Of Different Species

Grazing Period	Goat		Cattle		Sheep	
	Frequency	%	Frequency	%	Frequency	%
From morning to evening	25	56,8	28	57,1	6	66,7
From morning to afternoon	-	0,0	9	18,4	0	0,0
From dawn to morning	9	24,3	7	14,3	2	22,2
From dawn to afternoon	3	8,1	2	4,1	0	0,0
From dawn to evening	4	10,8	3	6,1	1	11,1
Total answered	37	100	49	100	9	100

Table 17. Type of feeds in barn

Feed stuff	Frequency	%
Pulp	91	77,1
Straw	89	75,4
Concentrate	85	72,0
Cereals	43	36,4
Grass	43	36,4
Dry grass	42	35,6

Table 18. The Recent 25-Year Changes In Hand-Feeding

Change	Frequency	%
Yes	68	57,6
No	36	30,5
Unanswered	14	11,9
Total	118	100,0

Table 19. Change Of Animal Behavior In Feeding

Change	Frequency	%
Yes	71	60,2
No	47	39,8
Total	118	100,0

Table 20. Additional Feeding Periods

Periods	Frequency	%
In winter time	86	72,9
In pregnancy	45	38,1
In lactation	40	33,9
In estrus duration	15	12,7

**Table 21.** Average Number Of Animal Species In Villages (X 1000 Heads)

Villages	Dairy Cattle	Breeding Bull	Sheep	Goat
Kirazhyurt	1.3	0.0	12.5	48.8
Dölekli	2.6	0.0	2.5	0.4
Kökez	1.8	0.1	1.4	35.9
Gildirli	2.0	0.0	0.0	17.4
Bolacalı	1.4	0.0	0.0	34.3
Kayarcık	3.1	0.6	0.0	0.0
Ataköy	6.4	11.0	4.5	4.5
Himmetli	2.2	0.0	12.4	26.2
Güvenç	0.8	0.3	15.1	56.1
Average	2.5	1.2	5.3	22.0

**Table 22.** Numeral Changes Of Animal Species In Last 25 Year

Villages	Dairy Cattle		Breeding bull		Sheep		Goat	
	1980	2005	1980	2005	1980	2005	1980	2005
Kirazhyurt	0,8	1,3	0,0	0,0	8,3	12,5	88,8	48,8
Dölekli	3,0	2,6	0,0	0,0	125,0	2,5	47,5	0,4
Kökez	1,4	1,9	0,0	0,0	69,6	1,8	28,9	35,9
Gildirli	2,6	2,0	0,0	0,0	5,6	0,0	18,3	17,4
Bolacalı	3,3	1,4	0,0	0,0	7,1	0,0	92,9	28,6
Kayarcık	4,4	2,9	0,2	0,4	15,8	0,0	10,4	0,0
Ataköy	8,4	6,3	7,7	9,1	27,3	4,5	13,6	4,5
Himmetli	4,2	1,9	0,0	0,0	10,0	12,4	67,4	20,3
Güvenç	0,3	0,6	0,0	0,1	7,2	11,7	37,3	55,6
Average	3,3	2,4	0,8	0,9	30,7	5,0	40,8	20,8

**Table 23.** Causes Of Change In Animal Species Pattern In The Last 25 Years

Reasons	Frequency	%
Decreasing in pasture land and increasing in feed prices	30	35,3
Lack of labor power	18	21,2
Sold due to economic problems	10	11,8
Began production after the 1980s	8	9,4
Increasing in number of animals due to proliferation	7	8,2
Increasing number of animals for living standards	6	7,1
Shift to other species due to decreasing profit	3	3,5
Increasing of number of animals due to direct income payment for cattle	2	2,4
Sold due to migration	1	1,2
Total answered	85	100,0

**Table 24.** Role Of Migration For Feeding

Migration	Frequency	%
Yes	40	33,9
No	78	66,1
Total	118	100,0

**Table 25.** Change In Migration Routes

Change	Frequency	%
Yes	6	15,0
No	34	85,0
Total	40	100,0

**Table 26.** Cost Of Migration

Reasons of Cost	Frequency	%
No cost	15	37,5
Cost of fuel and transportation	11	27,5
Unanswered	14	35,0
Total	40	100,0

**Table 27.** Weaning Time Due To Species (Month)

Species	1980	2005
Cattle	6	5
Sheep	5	4
Goat	5	4

**Table 28.** Seasonal Movements Of The Flock Different Physiologic Stage Of Animals

Seasonal changes	Estrus period		Lactation season	
	Frequency	%	Frequency	%
Move from winter to spring	1	0,8	2	1,7
Move from spring to summer	13	11,0	8	6,8
Move from summer to autumn	10	8,5	3	2,5
Move from autumn to winter	3	2,5	2	1,7
No changing	60	50,8	64	54,2
Unanswered	31	26,3	39	33,1
Total	118	100,0	118	100,0

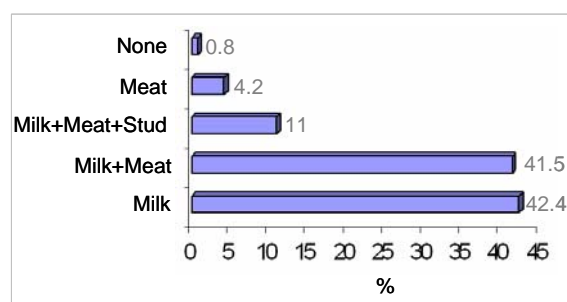
**Table 29.** Cause Of Changes At The Estrus Period

Reasons of Changes	Frequency	%
No changing	44	37,3
Unanswered	41	34,7
Increasing ambient temperature	15	12,7
Changing in feeding conditions	12	10,2
Changing of genetic capabilities of animals	5	4,2
Decreasing ambient temperature	1	0,8
Total	118	100,0



**Table 30.** Aim Of Livestock Production In The Farms

Main purpose	Frequency	%
Milk	50	42,4
Milk+meat	49	41,5
Milk+meat+stud	13	11,0
Meat	5	4,2
None	1	0,8
Total	118	100,0



**Fig. 5.** The percentage of the basic aims of the animal production in the business enterprises.

**Table 31.** Changing Purpose Of Livestock Production

Changing	Frequency	%
Yes	14	11,9
No	104	88,1
Total	118	100,0

**Table 32.** Change In Milk Production At Different Species (Kg/Animal/Lactation)

Species	1980	2005	Changing (%)
Cattle	7,1	9,6	135,2
Sheep	0,7	0,8	111,6
Goat	0,8	0,8	100,0

**Table 33.** Cause of change in milk productivity due to the years

Reasons of changing	Frequency	%
Genetic improvement	30	42,9
Decreasing rangeland	22	31,4
Well managed	10	14,3
Climatic reasons (high ambient temp.)	6	8,6
Grazing in up-land	1	1,4
Some problems of crossbred animals	1	1,4
Total	70	100,0

**Table 34.** Evaluation Of Raw Milk, Produced In The Farm

Processing Type	Frequency	%
Cheese	66	55,9
Saleable milk	47	39,8
Yogurt	36	30,5
Butter	19	16,1
Drinking milk(home consumption)	15	12,7
Traditional Cheese	6	5,1
All	14	11,9

**Table 35.** Processed Milk Of Milk Products

Products	Frequency	%
Cheese	83	70,3
Yogurt	50	42,4
Butter	27	22,9
Traditional Cheese	8	6,8

**Table 36.** Types Of Yeast Used In Animal Products

Types of yeast	Frequency	%
Artificial yeast	44	69,8
Sarkanak (traditional type)	17	27,0
Dried fruit	2	3,2
Total answered	63	100,0

**Table37.** Change In Methods Of Processing Methods Of Milk

Changing	Frequency	%
Yes	34	28,8
No	59	50,0
Unanswered	25	21,2
Total	118	100,0

**Table 38.** Preservation Of Processed Products By Traditional Methods

	Frequency	%
Yes	27	22,9
No	91	77,1
Total	118	100,0

**Table 39.** Traditional Methods Used In Processed Milk Products

Methods	Frequency	%
In refrigerator	13	48,1
In caves	6	22,2
Preserved in skin	3	11,1
Preserved in salted water	2	7,4
Unanswered	3	11,1
Total	27	100,0

**Table 40.** Change In Preservation Methods Of Processed Animal Products

Changing	Frequency	%
Bury into soil	26	29,9
Cold places at home	17	19,5
No changing	14	16,1
Preserved in skin or pot	12	13,8
Preserved in rock cavities	6	6,9
Daily production and marketing	5	5,7
Preserved in salted water	4	4,6
Preserved under snow at high lands	3	3,4
Total answered	87	100,0

**Table 41.** Changes Due To Preservation Methods Of Milk Products

Reason of changing	Frequency	%
Technological improvement	64	87,7
Climate change	15	20,5
Changing in consumption behavior	1	1,4
Positive responded	73	100,0

**Table 43.** Reasons Of Diseases In The Region**Table 42.** Health Problems In Flocks

	Frequency	%
Epidemic diseases	43	36,4
Abortion	36	30,5
Sterility	28	23,7
No problem	25	21,2
Sudden mortality	22	18,6
Low production	20	16,9
Defect at birth	18	15,3

Reasons	Frequency	%
Insufficient Feeding	32	27,1
Weeds	25	21,2
Insufficient hygiene	12	10,2
Adaptation	11	9,3
Climate	11	9,3
Unknown	8	6,8
Management systems	5	4,2

**Table 44.** Cost Of Health Expenditures Due To Species (YTL/Animal)

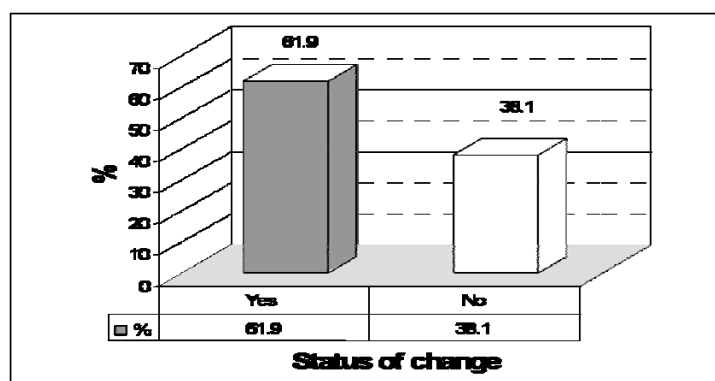
Species	Average
Cattle	96,6
Sheep, goat	2,8

**Table 45.** Annual Change In Cost

Change	Frequency	%
Yes	89	75,4
No	29	24,6
Total	118	100,0

**Table 46.** Change In Costs

Reasons	Frequency	%
Feeds, veterinary services, vaccination etc.	50	56,2
No health problems initially	44	49,4
Lack of knowledge	15	16,9
Improvement in technologies	4	4,5
Genetic improvement	2	2,2
Answered as yes there is total change	89	100,0



**Fig. 6.** Changes in the size of animals in the last 25 year

**Table 47.** Change In The Size Of Animals In The Last 25 Years

Reasons	Frequency	%
Genetic improvement	31	42,5
Smaller body due to decreasing pasture land	24	32,9
Larger body for good managed	8	11,0
Smaller body due to genetic capacity	5	6,8
Smaller body due to disease	1	1,4
Smaller body due to climate	1	1,4
Unanswered	3	4,1
Total	73	100,0

**Table 48.** Labor Utilizing

	Frequency	%
Yes	13	11,0
No	105	89,0
Total	118	100,0

**Table 49.** Income Sources For Farms

Income sources	Frequency	%
Livestock Production	116	98,3
Crop Production	82	69,5
Work against payment	13	11,0
Rent	2	1,7
Hand scale	1	0,8
Other	10	8,5

**Table 50.** Average Of Allocated Funds For Animal Production Input In Terms Of Total Income In Villages (%)

Village	Average (%)
Ataköy	70.5
Dölekli	52.9
Kirazhyurt	56.3
Gildirli	47.8
Kökez	50.4
Kayarçık	43.8
Bolacalı	40.7
Güvenç	41.4
Himmetli	25.6
Avarage	46.5

**Table 51.** Change In Allocated Funds For Animal Production Input In Terms Of Total Income

Change	Frequency	%
Increased	81	68,6
Decreased	5	4,2
No change	24	20,3
No idea	8	6,8
Total	118	100,0

**Table 52.** Opinions On Climate Change In The Last 25 Year

Climate Change	Frequency	%
Yes	103	87,3
No	15	12,7
Total	118	100,0

**Table 53.** Opinion Of The Farmers For The Climate Change On Various Parameters.

Effects of Climate Change	Frequency	%
Increase in ambient temperature	85	82,5
Decreasing in crop production productivity	62	60,2
Increasing in animal disease and decreasing in production	50	48,5
Decreasing in ambient temperature	3	2,9
Climate had nor been effected to animals due to well management conditions	1	1,0
The change in climate	103	100,0

**Table 54.** Variation In Wild Animal Species Due To The Climate Change

Climate Change	Variation in animal species and numbers				Total	%
	Yes		No			
	Frequency	%	Frequency	%		
Yes	90	87,4	13	12,6	103	100,0
No	0	0,0	15	100,0	15	100,0
Total	90	76,3	28	23,7	118	100,0

### 3.4 Investigations on Available Grassland Potential in the Project Area

#### The village Gildirli

This village is dominated with forestland, and has very typical maqui vegetation in the slope lands. A moderate grazing was observed in the area. The dominant plant species was determined as *Aegilops ovata* L which is regarded as an invasive plant group for the pastures. The observed plant species in this village and their families comprised 13 families and 37 different species.

The plant cover, botanical composition and the characteristics of the species were determined by the undertaken vegetation measurements. The plant cover was determined to be 71.53% for the pastures of this village. But the species in this percentage are not totally the climax. The botanical composition of the climax species was calculated as 44.93 %, whereas the upward species were 10.07 % and the invasive ones were 44.91 %. The higher percentage of the invasive species is one of the indicators of pasture deterioration. Consequently the range conditions were determined to be at a moderata level based on the botanical composition and distribution of the species.

#### The village Kökez

The pastures of this village are generally inside or under the forest. The dominant type and the climax plant species was *Bothriochloa ischaemum* in the moderately grazed pastures of the area.

The plant species observed in this village and their

families were composed of 27 different species determined from 15 families.

The plant cover of the pastures in Kökez was calculated as 65.85 %. The 36.48 % of the whole species were determined as climax for this village while the percentage for the upward species is 28.38 % and 35.14 % of this are the invasive species.

The results of the botanical composition has revealed that pasture deterioration is in a critical level in this village as well.

#### The village Kirazhyurt

This is the village, located at the highest elevation among the investigated ones. It is observed that a large percentage of the pastures have been cleared for agriculture. Grazing is conducted between the fields and in the slope lands that are uncultivated. The species *Lolium perenne* is the dominant in the pastures heavily grazed. The plant species observed in this village and their families belong to 28 different species that were determined from 10 families.

The plant cover of the pastures in Kirazhyurt was determined as 81.04 %, despite the decline observed in the distribution of the climax vegetation, and the increase of the upward and the invasive species getting dominant in the botanical composition. The 19.09 % of the whole species were determined as climax for this village while the percentage for the upward species is 40.42 % and 40.49 % for the invasive. Consequently the status of the pasture is at a moderate level facing degradation.

#### 4. Conclusion and recommendation

This study is unique because of this is the first study on global warming and its possible effects on livestock production that designed by notification of rural people live in research area. While the results were interpreted, new approaches of technology and some political applications were concluded as well. Evaluated data are given below.

1- Grazing in the field edges and harvest residues (stubble) is at the maximum level. Consequently, it is seen that grazing in the residues after the harvesting of crop production is more common than grazing in the natural areas. Grassland capacity and grassland areas decreased almost 67,8 % and 88.8 % during to last 25 years, respectively. The reason of slumping in annual precipitation, cultivation in these areas, early grazing and over-grazing and some regulations for grassland using. The pastures of the village Gildirli was converted with the percentage of 71.53% by 13 families and 37 different plant species. The dominant plant species was determined as *Aegilops ovata* L. The pastures of village Kökez was covered with the percentage of 65.85% by 27 different species from 15 families. The dominant plant species was determined as *Bothriochloa ischaemum*. The pastures of the village Kirazlıyurt was covered with the percentage of 81.04 % by 28 different species from the 10 families. The species *Lolium perenne* was determined as the dominant. Grazing starts in March and ends at the end of November or beginning of the December. But in Aladag, due to snowing, grazing starts and ends earlier than the other regions.

2- Due to economic reasons (such as feed expenses and low price of some products in the market) the farmers eventually could give up animal production. During the insufficient times of the grasslands, animals are kept inside and meanwhile fed by concentrate feeds. Feeding in barn is based on mostly to pulp (77, 1 %) and to straw (75, 4 %) but at the same time, concentrate feeds prepared by the factories are also given highly (72 %). The farmers declared that in the past they used to take their animals to the plains at the end of the winter because the vegetation awakened early, after the reduction of the sources in the plains, they used to go to the backward highlands and pasture their animals.

3- About 87, 3 % of the farmers declared

that there have been changes in climate in the areas on which they live. Most of them stated that the temperature of the atmosphere increased (82, 5 %) and some of them stated that the temperature of the atmosphere decreased (2,9 %). However, the farmers response to these questions by stating their opinions about how the changes in climates affected the animal and crop production. It was determined that 77,1 % of the farmers no longer use the traditional ways and 27 % of them use only caves and skins of the animals. Milk products technologies and other conservation methods have developed in the region due to the climate changes. As an example, cheese is produced on daily conditions instead of traditional methods. Only, in a few regions cheese fermentation is still done by the traditional methods. In the past, products were digged into ground or into the snow in highlands where it's impossible these days.

4- Small ruminant owners indicated a seasonal change in estrus and it has moved from spring to summer. Additionally, some of the farmers mentioned about the positive (1, 4 %) and negative (8, 6 %) affects on the milk productivity occurring in the change of climate conditions.

5- Most of the goat farms were family managed. Besides, whole family took part in goat production; particularly women and daughters were responsible for the flocks and production. Male teenager was also helping their mothers by holding animals in milking time. The most common type of business is the family type. Woman continued to work in livestock production even if she was pregnant. Few male took part in livestock production. Livestock production was unique source of family livelihood in this area. They did not have any other alternatives because of land structure, infrastructure and economic conditions. A main income of families was based on goat and sheep production. According to questionnaire results, goats spend the days in higher zones between spring to winter (nomadic system). Greatest part of farms is involved in housing for their livestock in winter.

6- Main dairy products of the farms were milk, cheese and yogurt. Farmers' family consumed average 25 % of the whole milk. Families prefer to sell their milk as a cheese because of high income opportunity. Animal keepers produce white cheese, tulum cheese, lor, çökelek and butter.

7- The number of cattle, sheep and goats decreased sharply during to last twenty years. The most important reasons of this decrease were socio-economical and political. Goat production has been forbidden in forest area by government. This was the most effective obstacle in goat production sector in Turkey. Besides migration of rural people, from rural to urban had also negative effects on animal production. In fact, livestock farming is the most important animal production activity in mountainous area of Mediterranean Region of Turkey.

8- It's obviously clear that, climate has significant effects on livestock production. Type of grasses, grassland potential, processing of products and especially some Physiological aspects of farm animals has been affected adversely. For this reason following adjustments should be urgently realized in the region. The future development of livestock farming systems in mountainous area of East Mediterranean part of Turkey in term of intensive systems will largely depend on the application of modern management strategies, especially for planning and monitoring functions together with political and financial adjustments. Grazing should be planned with new regulation in the area. It has to be emphasized here that, small ruminant production is essential for this area. People living in this area do not have any other alternatives for the sake of life. Moreover, educational studies should be started at utmost priority right away. People should be acknowledged on new technologies. And lastly some heat-resistant farm Animal species and genotypes should be adapted in the region.

## 5. REFERENCES

- Anonim. 2004.  
<http://www.meteor.gov.tr/2003/arge/iklimdegis/iklimdegis3.htm>.
- Bartolome. J., Franch. J., Plaixats. J., Seligman. N.G. 2000. Grazing alone is not enough to maintain landscape diversity in the Montseny Biosphere reserve. *Agriculture, Ecosystems and Environment*. 77. 267-273.
- Biçer.O., Can E., Keskin. M., Kaya. Ş.. 1998. Hatay ili köylerinde çayır mera yem bitkileri tarımı ile hayvancılık ile ilgili sorunların saptanması üzerine bir araştırma M.K.Ü. Ziraat Fakültesi Dergisi. 3(1): 83-98.
- Boyazoglu. J., Flamant. J.C.. 1990. Mediterranean Systems of Animal Production. *The World of Pastoralism*. Ed. John G.Galaty and D. L. Johnson. 353-393.
- Boyazoglu. J.. 1998. Livestock farming as a factor of environmental, social and economic stability with special reference to research. *Livestock Prod.Sci.*. 57(1):1-14.
- Hirata. M., Fujita. H., Miyazaki. A.. 1998. Changes in grazing areas and feed resources in a dry area of north-eastern Syria. *J. of Arid Environments* 40 : 319-329.
- Hoffman. I., Willeke-Wetstein C., Schafer.C.. 1998. Description of a grazing ecosystem in North-Western Nigeria Using Environmental Indicators. *Animal Research and Development*. Vol.48. 69-83.