**GLOBAL CLIMATE CHANGE AWARENESS OF WOMEN FARMERS; A CASE STUDY OF KARAPINAR DISTRICT, KONYA**

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**Abstract**

*Agriculture is an activity that depends on nature. Although there have been remarkable developments within, such as product varieties adapted to different conditions and irrigation systems, the climate is still the most compelling factor in agricultural production. In the future, no matter how much technology advances, agriculture will preserve this feature. Therefore, the sector that will be most affected by climate change will be the agriculture sector. Agriculture, besides being an activity that meets the food needs of people, is also an economic activity. The shortage or surplus of production that will occur with climate change is critical for both national economies and international trade. The main purpose of the study is to reveal the global climate change awareness of women farmers in Karapınar district of Konya and how they perceive climate change. The study includes the data obtained from women dealing with sheep and goat breeding in Karapınar District of Konya Province. The sample size was determined as 81 according to the stratified random sampling method. Water is the key to agricultural activities in the Karapınar region of Konya Province where the research was conducted. In the research area, although the producers were aware of global climate change, they have not been able to reflect this awareness to their agricultural activities. As a matter of fact, they do not take global climate change into consideration in their irrigation activities. In the area, agricultural extension programs that will raise awareness among the producers on issues such as global climate change, irrigation, alternative irrigation methods and producer organization have not been made or have been rather insufficient. Despite the projects conducted against desertification in the region, the knowledge level of the producers on climate change is very low and complicated. In the region, it is beneficial to organize activities related to drought and desertification and extension activities in a way to raise awareness among producers.*

**Key Words:** *Climate change, agriculture, drought, Karapınar, Konya*

1. **INTRODUCTION**

Climate is one of the most critical factors affecting the lives of living things and the distribution of life forms on earth. Climate change, on the other hand, is amongst the biggest environmental problems experienced today. Unusual climatic events such as hurricanes, floods and droughts witnessed in the world and Turkey in recent years have caused a colossal death toll. The disasters caused by climatic events are regarded as solid evidence of climate change. Climate change and especially global warming will also affect the agricultural sector. However, there is no consensus among scientists on how this interaction will occur. Some scientists suggest that in subtropical and temperate climates, water supply will increase and thus plant yields will increase too while other scientists state that increasing hurricanes, storms and floods will cause great damage to the agricultural sector in terms of production and erosion (Erkan et al., 2009). Regardless of the state of development, the agricultural sector seems indispensable for countries. Animal products are especially crucial for a balanced and healthy diet for future generations. Small ruminant livestock plays a very important socio-economic role in animal production (Brahmi et al., 2012). Small ruminant livestock breeding is also essential in terms of meat, milk, fertilizer, wool and leather production (Thornton, 2010). Considering the natural, economic conditions and agricultural structure of Turkey, it can be stated that some regions are more suitable for sheep and goat breeding (Kaymakçı & Engindeniz 2010; Semerci & Çelik, 2016). Especially in arid or semi-arid regions, small ruminant livestock has an important place (Sejian et al., 2017). According to FAO (2015), global demand for animal products is projected to double by 2050 due to the increasing standard of living and population pressure. In parallel with the increase in population and income in the world, the demands for animal food are increasing (Lemaire et al., 2019; Tarawali et al., 2018; Khan &Sameen, 2018; Godfray &Garnett, 2014; Speedy 2003; Steinfeld 2003). Climate change affects animal production directly and indirectly (Reilly et al., 1995; Gauly et al., 2013). Therefore, climate change is emerging as one of the biggest threats to the animal food supply (Nardone et al., 2010). The reduction of the negative effects of climate change will only be possible by adapting to these effects. Climate change adaptation efforts will only be possible by ensuring that the social and economic structures of countries, the agricultural sector and natural ecosystems are less affected by the negative effects of climate change. Agricultural production, which changes in terms of quality and quantity as a result of fluctuations in climatic conditions, affects food production and therefore human life. Therefore, it is important to know what the effects of climate change are. In addition, the knowledge level of producers, recognition and perception of climate change is also important to reduce the impacts (Masud et al., 2017; Somda et al., 2017; Tripathi, 2017; Chedid et al., 2018; Wetende et al., 2018). The issue seems up-to-date in our country as well as all over the world. Studies on climate change perception of producers in Turkey are also limited. One of them is the study conducted by Polat and Dellal in the Göksu Delta, a Ramsar area, in 2016, and it was determined that 85.8% of the producers had enough information to explain the effects of climate change.(Polat and Dellal 2016). Again, in their study conducted by Dellal et al., the economic effects of climate change were determined with the bio-physiological model established in some products (wheat, barley, corn, sunflower, cotton) (Dellal et al., 2011, Dellal, 2014; Dellal et al., 2015; Dellal et al, 2016). In another study in which the effect of climate change on yield in Turkey was investigated, they stated that the crop yield would be 2-7% on average in 2020, 4-12% in 2050, and 5-20% in 2080, and stated that productivity and production declines would pose a serious threat (Dellal and Unuvar (2019). Although it can be said that the current legal regulations in Turkey are in the fight against global climate change, the observations explicate that the rules in the laws and regulations are not fulfilled as they should be. As an example, it can be shown that the stubble burning continues by the farmers, the intensive cattle breeding activities are continued even though no forage crops are produced, the supports are given without taking into account the climate change, and the producers still include the products that consume excessive water in the production pattern in arid regions. In addition, the absence of an organization to directly struggle with this climate change can be viewed as a deficiency. Turkey is located in a semi-arid climate zone and Konya, which is in the 20th place in terms of provincial development level, is one of the driest provinces in Turkey. The sheep and goat stock in Karapınar district is 318,279 heads, 95.11% of which is sheep and 4.89% goats. Karapınar district constitutes 15.13% of Konya province sheep inventory. According to meteorological data, it is estimated that the temperature value in the district of Karapınar will be 13.69 oC in 2070 and the amount of precipitation will be 308 mm (Meteorology, 2019). Considering the temperature and precipitation amounts, Karapınar district is the driest district of Konya. In the research area, there has been no study on the direct and indirect effects of climate change in sheep farming businesses. It is especially important how rural women perceive climate changes and how they are affected. The study aims to analysis whether rural women have developed adaptation strategies to climate change on a local basis.

1. **MATERIAL AND METHOD**
   1. **Material**

The material to frame the basis for the producer awareness analysis of the land, population, workforce and global climate change of the enterprises was formed by the information collected from the agricultural enterprises that appeared in the sample. In the preparation of the questionnaire forms applied to the enterprises, the forms used in various studies were used, taking into account the subject of the study and the characteristics of the agricultural enterprises in the region. The questionnaire application was executed by the researcher in person by speaking to the women. Data from the Konya Provincial Directorate of Agriculture and Forestry and Karapınar District Directorate of Agriculture and Forestry were used in the research. The data collected in the research is of the production period of 2020 and the survey was taken in December and January.

* 1. **Method**
     1. **Method applied in selection of sample villages and enterprises**

In the study, the stratified sampling method was used to increase the accuracy of the findings to be collected from the information gathered from the enterprises and to ensure that the different sections in the population are represented adequately. The simple random stratified sampling method was used to calculate the sample volume, and 81 enterprises with 5% error at 95% confidence limit were calculated according to the formula below.

In the formula;

**N:** The number of units in the population,

**Nh:** Nh, the number of units in the hth layer,

**Sh:** standard deviation in the hth layer

**S²h**: the variance in the hth layer,

**D²:** d² / z²

**d:** Permissible error from the population mean

**z:** The value of the permissible safety margin (T) in the distribution table.

In the distribution of the determined sample volume to the layers;

Nh.Sh.n / ∑ ( Nh . Sh ) formula was utilized (Yamane, 1967).

**Table 1. Enterprise population groups and sample size**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enterprise population groups (heads)** | **Number of enterprises in the mainframe** | **The average number of sheep** | **Sample volume (n)** | **Ratio (%)** |
| **0 - 100** | 342 | 70.73 | 23 | 6,72 |
| **101 - 200** | 293 | 143.67 | 33 | 11,26 |
| **201 - +** | 193 | 268.99 | 25 | 12,95 |
| **Total** | 828 | 142.75 | 81 | 9,78 |

* + 1. **Method Applied in Enterprise Analysis**

The data collected from the sample enterprises via the survey were calculated as the number of sheep and the average of the enterprises. The analysis and evaluation of the enterprises have been created according to these average values. In the study, the effects of population and labour assets, land assets and climate change on the behaviour of rural women were analysed in the enterprises. The characteristics of the current population in the enterprises such as age, gender, education level and labour force potential were appraised separately. In the research area, women's perceptions of climate change were assessed according to the Likert scale and hypotheses were created. In the enterprises;

* For each statement under the title of “Awareness Status of Global Climate Change of Women and the Effects of Climate Change on the Socio-Economic Behaviour of Producers in the Enterprises Examined”, ‘‘1) Much increased, 2) Increased. 3) Unchanged, 4) Decreased, 5) Much decreased" responses were used.
* For each statement under the title of “Effects of Global Climate Change on Plant and Animal Production in the Enterprises Examined”, “1) I am definitely not aware, 2) I am not aware, 3) I am indecisive, 4) I am aware, 5) I am absolutely aware” responses were used.
* For each statement under the title of “Effects of Global Climate Change on Social Life in the Research Area, "1) Yes, 2) Not Aware, 3) No" responses were used.
* For each statement under the title of “The status of participating in Agricultural Extension Studies on Global Climate Change”, ‘1) Yes, I participated, 2) Not aware, 3) No, I did not participate, 4) Did not occur" responses were used.
* For each statement under the title of “Awareness of global climate change”, “1) I am definitely not aware, 2) I am not aware, 3) I am indecisive, 4) I am aware, 5) I am absolutely aware” responses were used.

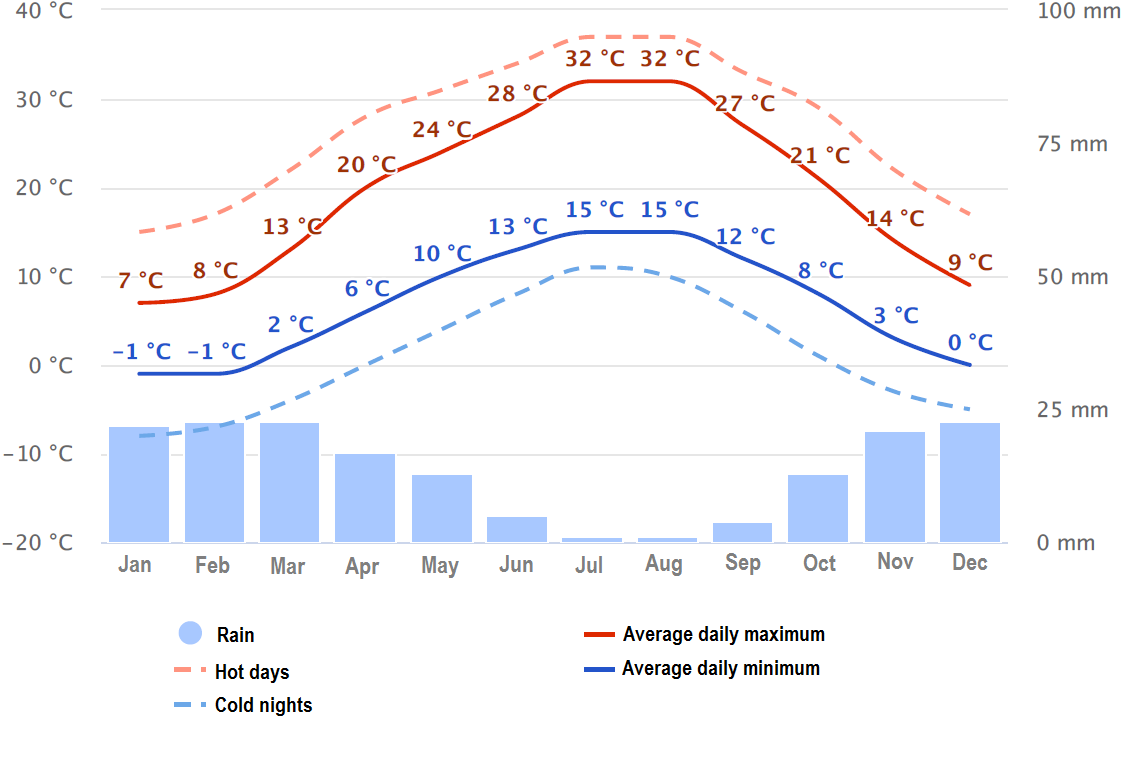
The severity of the attitude increases or decreases towards the extremes (Engindeniz, 2010).

The data in the study were exported to an Excel file and interpreted by creating tables based on simple averages and percentages.

1. **RESEARCH FINDINGS**
   1. **Climate structure of the research area**

The region is one of the areas with the lowest annual average rainfall in Turkey (Karapınar 285.6 mm, Konya 329.20 mm). The climate of the Karapınar district, which is mostly dry and hot in the summer months and quite cold in the winter months, resembles the typical continental climate of Central Anatolia. The climate data of the district are given in Graphic 1.

**Graphic 1. Average of meteorological data for Karapınar district for 2020**



Source: General Directorate of Meteorology, 2021

According to Graphic 1, the annual average temperature in Karapınar district is 19.67 ºC, the coldest months are January -1 ºC , February -1 ºC and December 0 ºC , the hottest months are July 32 ºC, August 32 ºC and June with 28 ºC. The annual average humidity in the district is 62.25%.The lowest humidity is in July, August and June respectively, and the highest months are December, January and February. Karapınar District is one of the centres with the lowest annual precipitation in our country and the average rainfall for many years is 285 mm. Although there is rain every month in the district, the months with the highest precipitation are December, January and February, and the lowest months are August, July and September.

* 1. **Socio-demographic characteristics of women in the research area**

The characteristics of the farmers are influential on the efficiency of both the public extension and other extension systems. For this reason, the distribution of women by age groups, the number of members in their families, education, income, social security, and membership to the cooperative and union was investigated within the scope of the characteristics of women reserved in sheep farming (Table 2). When the educational status of women participating in the survey is analysed, it is observed that 66.67% are primary school graduates while 6.17% are illiterate. The rate of high school graduate women is, on the other hand, 14.81%. In addition, the absence of a university graduate woman farmer is an issue that

**Table 2. Socio-demographic characteristics of women in the research area**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Features | Farm Size Groups (Heads) | | | Enterprise Total | Ratio (%) |
| 0-100 | 101-200 | 201-+ |
| **Age Groups** | | | | | |
| 15-64 | 12 | 17 | 20 | 69 | 98,0 |
| 65-+ | 1 | 0 | 0 | 12 | 2,0 |
| Total | 13 | 17 | 20 | 81 | 100,0 |
| **Education Status** | | | | | |
| Illiterate | 1 | 4 | 5 | 5 | 6,17 |
| Literate | 0 | 1 | 1 | 10 | 12,35 |
| Primary School | 12 | 11 | 14 | 54 | 66,67 |
| High School | 0 | 1 | 0 | 12 | 14,81 |
| Total | 13 | 17 | 20 | 81 | 100,0 |
| **Number of People in the Family** | | | | | |
| 1-3 | 3 | 1 | 1 | 20 | 24,69 |
| 4-6 | 7 | 9 | 15 | 47 | 58,02 |
| 7-9 | 3 | 5 | 4 | 12 | 14,82 |
| 10-12 | 0 | 2 | 0 | 2 | 2,47 |
| Total | 13 | 17 | 20 | 81 | 100,0 |
| **Annual Income Status of Enterprises** | | | | | |
| 5000-10000 | 4 | 3 | 2 | 15 | 18,52 |
| 10001-15000 | 4 | 5 | 4 | 37 | 45,68 |
| 15001-+ | 5 | 9 | 14 | 21 | 25,93 |
| Total | 13 | 17 | 20 | 81 | 100,0 |
| **Social Security Status** | | | | | |
| N/A | 0 | 0 | 1 | 5 | 6,17 |
| SSK | 0 | 0 | 2 | 7 | 8,64 |
| Bağ-Kur | 8 | 16 | 16 | 63 | 77,77 |
| Green Card | 2 | 0 | 1 | 3 | 3,70 |
| Retirement Fund | 2 | 1 | 0 | 3 | 3,70 |
| Total | 13 | 17 | 20 | 81 | 100,0 |
| **Cooperative or Association Membership Status** | | | | | |
| No | 2 | 0 | 2 | 5 | 6,17 |
| Yes | 11 | 17 | 18 | 76 | 93,83 |
| Total | 13 | 17 | 20 | 81 | 100,0 |

Should be taken into account in the publication services to be taken to the research area. In the research area, it is observed that more than half of the women (58.02%) have a family of 4-6 people, 24.69% have a family of 1-3 people and 14.82% a family of 7-9 people. While the nuclear family type, that is, the family type consisting of husband, wife and unmarried children (Erel, 1989), is common (80.7%) throughout Turkey, it is seen that the temporary-extended family type, that is, the family type consisting of the mother, father and brothers of the head of the family (Timur, 1972), is 13% (TURKSTAT, 2006).

In the research area, it is seen that the nuclear family type is more common (82.71%), and the temporary-extended family type with 10 or more members has a share of 2.47% (Table 2). While 25.93% of the farmers participating in the survey have annual income above 15000 TL, the rate of farmers with annual income between 10001-15000 TL is 45.68%, the rate of those with annual income between 5000-10000 TL is 18.52%. The income level is rather efficient in the adoption of new technologies. As a matter of fact, in a similar study, the income level of those who adopt innovations early turned out to be higher than those who adopt innovations late (Aktaş et. al., 2003). The high level of income raises the interest and desire for agricultural extension activities (Yavuz et. al., 2005). It is discerned that 6.17% of the women participating in the study do not have any social security.

Considering the overall of women, it is regarded that farmers from Bağ-Kur ([social security organization for artisans and the self-employed](https://tureng.com/tr/turkce-ingilizce/social%20security%20organization%20for%20artisans%20and%20the%20self-employed)) have the most with 77.77%, followed by SSK (S[ocial Insurance Institution](https://tureng.com/tr/turkce-ingilizce/social%20insurance%20institution)), pension fund and green card holders with 8.64% (Table 2). Membership in the cooperative is actually due to their spouses and beet production and is far from a conscious organization.

* 1. **Features of agricultural enterprises**

Within the scope of the characteristics of the agricultural enterprises, the land presence, the type of animal owned by the enterprises and the purpose of animal production were analysed. The land width per agricultural enterprise in Turkey is 60 decares (TEAE, 2006). It is observed that the land width in the enterprises analysed varies between 91 and 414 decares. The average land width in the enterprises was found to be 235.91 decares. All of the enterprises studied have a land size above the average of Turkey. As the land width of the enterprises increases, farmers tend to show more interest in technological developments to increase production and efficiency. Therefore, as the land width increases, the demand for agricultural extension activities rises (Yavuz & Atsan, 2003).

**Table 3. Characteristics of businesses in the research area**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Farm Size Groups (Heads) | Estate Land | | Rented Land | | Total Enterprise Land (Da) | |
| Area  (da) | Ration  (%) | Area  (da) | Ration  (%) | Area  (da) | Ration  (%) |
| 0-100 | 76 | 83,52 | 15 | 16,48 | 91 | 100,00 |
| 101-200 | 178 | 88,12 | 24 | 11,88 | 202 | 100,00 |
| 200-+ | 364 | 87,93 | 50 | 12,07 | 414 | 100,00 |
| Enterprise Average | 206,44 | 87,51 | 29,47 | 12,49 | 235,91 | 100,00 |

The enterprises studied in the field of research continue their sheep breeding activities in addition to herbal production. All of the enterprises analysed maintain sheep breeding. Sheep breeding is generally produced for consumption for the family and the Market.

* 1. **Global climate change awareness of producers**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Awareness for Area of Activity | Enterprises with Irrigated Agriculture | | | | | | |
| Frequency Distribution | | | | | | |
| 1 | 2 | 3 | 4 | 5 | Average | Ratio (%) |
| Groundwater resources | - | - | 15 | 29 | 37 | 4,27 | 85,40 |
| Rainfall | - | - | 13 | 33 | 35 | 4,27 | 85,40 |
| Effective amount of precipitation \* | - | - | 2 | 34 | 45 | 4,53 | 90,60 |
| Temperature values | 42 | 33 | 4 | 2 | - | 1,58 | 31,60 |

**Table 4. Women's awareness of global climate change**

Scaling: 1) Much increased, 2) Increased. 3) Unchanged, 4) Decreased, 5) Much decreased

\* Effective Rainfall: the amount of precipitation that falls during the vegetative development period of the plant.

In the research area, it has been ascertained that women are generally aware that underground water resources, amount of rainfall and effective rainfall have been decreasing, and 31.60% of women express that the temperature values have increased significantly. When asked about the producers' perception of the effective amount of rainfall in the research conducted, 90.60% of the women stated that the effective amount of precipitation has decreased significantly. Hence, it has been settled that women experience concept confusion in terms of both agricultural production and climate change.

* 1. **Producer Awareness of the Effects of Global Climate Change on Crop Production**

While deciding on crop production, 49.38% of the producers stated that global climate change did not affect their decisions at all, while 44.44% of the producers stated that this had little effect on their decisions. In the fallowing activities, 50.62% of women stated that they were affected at all while 9.88% were affected a lot. When asked whether the producers are doing their irrigation activities with the awareness of climate change, 66.67% of the women stated that they did not take it into account at all, 1.23% of them were very affected and they irrigated by considering the climate factors. It has been determined that 8,64% of women are aware of the influence of climatic conditions during harvest. This explicates that women in the research area do not have much information about whether climate changes are efficient in production and harvesting processes. Moreover, the drought in the region has been rather severe in the last decades, and the sinkholes having formed are being frequently mentioned in the press. However, women stated that they do not agree with the idea that these sinkholes were caused by the withdrawal of groundwater. While the women, in general, agreed that the temperatures increased while rainfall decreased in the last two decades, they declared that they did not make any changes in the production systems due to these climatic conditions, meaning that awareness training is essential in the region.

**Table 5. Producer awareness that global climate change will be efficient in crop production**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | | | | | Total |
| Area of Activity | Frequency Distribution | | | | | % Distribution | | | |
| 1 | 2 | 3 | 4 | Average | 1 | 2 | 3 | 4 |
| When deciding on the product to be grown | 5 | - | 36 | 40 | 3,37 | 6,17 | - | 44,44 | 49,38 | 100,00 |
| Fallowing | 8 | 6 | 26 | 41 | 3,23 | 9,88 | 7,41 | 32,09 | 50,62 | 100,00 |
| Irrigation | 1 | 1 | 25 | 54 | 2,63 | 1,23 | 1,23 | 30,86 | 66,67 | 100,00 |
| Harvest | 7 | 19 | 29 | 26 | 1,28 | 8,64 | 23,46 | 35,80 | 32,09 | 100,00 |

Scaling: 1) Very much 2) Much 3) Little 4) Never

* 1. **The Effects of Global Climate Change in Enterprises on the Socio-Economic Behaviour of the Producers**

The effects of global climate change on the economic behaviour of producers are given in Table 6. It is seen women stated that production costs increased very much by 46.91% on average, increased by 25.93% and 14.81% did not change.

**Table 6. The effects of global climate change on women's economic activities in the enterprises**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Actions | Frequency Distribution | | | | | | % Distribution | | | | |
| 5 | 4 | 3 | 2 | 1 | Average | 5 | 4 | 3 | 2 | 1 |
| Production Costs | 38 | 21 | 12 | 10 | - | 4,07 | 46,91 | 25,93 | 14,81 | 12,35 | - |
| Formation of product prices | 2 | 3 | 37 | 24 | 15 | 2,42 | 2,47 | 3,70 | 45,68 | 29,63 | 18,52 |
| Annual Income | 3 | 3 | 12 | 27 | 36 | 1,88 | 3,70 | 3,70 | 14,81 | 33,34 | 44,45 |
| Land Asset | - | 4 | 56 | 21 | - | 2,79 | - | 4,94 | 69,14 | 25,93 | - |
| Tool-Equipment Asset | - | 36 | 45 | - | - | 3,44 | - | 44,45 | 55,55 | - | - |
| Animal Asset | 2 | 1 | 16 | 27 | 35 | 1,86 | 2,47 | 1,23 | 19,76 | 33,33 | 43,21 |
| Credit Usage | 8 | 17 | 4 | 25 | 27 | 2,43 | 9,89 | 20,98 | 4,94 | 30,86 | 33,33 |

Scaling: 5) Much increased, 4) Increased. 3) Unchanged, 2) Decreased, 1) Much decreased

Producers state that their annual income has decreased 44.45% due to climate change (drought and diseases), decreased 33.34%, and did not change 14.81%. On the other hand, 44.45% of the enterprises asserted that there was an increase in the tool and machine assets while 55.55% declared that the assets did not change. While they said that there has been a decrease in the use of credit and animal stock in recent years, they also affirmed that this was not due to climatic conditions, but because of the problems in pasture areas and the lack of labour force. As a result, it can be said that women in the research field do not understand the concepts of climate change very much and they do not know exactly what the outcomes of this will cause.

* 1. **Effects of global climate change on social life in the research area**

In the research area, the questions such as migration, drinking water problems observed by women owing to global climate change and whether there is an increase in diseases were asked. 29.63% of the women declared that they migrated from the region, but this was not due to climate change, that they still had ties with Karapınar for education and work purposes while 62.96% of them were not aware of the migration, and that diseases and pests were not originated by the climate.

**Table 7. The effects of global climate change on social life in the enterprises**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Area of Activity | Frequency Distribution | | | | % Distribution | | |
| 1 | 2 | 3 | Average | 1 | 2 | 3 |
| Migration | 24 | 51 | 6 | 1,78 | 29,63 | 62,96 | 7,41 |
| Drinking water problem | 8 | 51 | 22 | 2,17 | 9,88 | 62,96 | 27,16 |
| Disease Status | - | - | 81 | 3,00 | - | - | 100,00 |

Scaling: 1) Yes 2) Not aware 3) No

The rate of those who think that global climate change has no effect on the negativities regarding drinking water in enterprises is 62.96%.

* 1. **The Existence of Agricultural Extension Studies for Producers in the Research Area**

In the research area, the participation of women in global climate change and Agricultural Extension activities has been examined and given in Table 8.

**Table 8. Agricultural extension studies for producers in dry and irrigated farming enterprises**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Agricultural Extension Activity | Frequency Distribution | | | | | % Distribution | | | |
| 1 | 2 | 3 | 4 | Average | 1 | 2 | 3 | 4 |
| Regarding global climate change | - | 1 | - | 80 | 3,96 | - | 1,24 | - | 98,76 |
| Regarding irrigation and alternative irrigation methods | - | - | - | 81 | - | - | - | - | 100,00 |
| Regarding producer organization | - | - | - | 81 | - | - | - | - | 100,00 |
| Regarding levelling, land reclamation or consolidation | 16 | 12 | 23 | 30 | 2,83 | 19,75 | 14,81 | 28,40 | 37,04 |

Scaling: 1) Yes, I participated, 2) Not aware, 3) No, I did not participate, 4) Did not occur

It was, hence, ascertained that training and informative meetings on irrigation and alternative irrigation techniques, producer organization, levelling, land reclamation, consolidation was held from time to time in the research area, yet no training activities were given on climate change. Most of the training on land reclamation and consolidation was given in the region, and it was determined that 28.40% of women did not attend these pieces of training.

1. **CONCLUSION AND RECOMMENDATIONS**

Scientists and policymakers around the world have formed a social alliance on the subject of global climate change. This alliance, however, could not be achieved regarding the solution of the problem. Opinions about the causes of the climate change process lie in the solution to the problem. The first of these views is that global climate change has been caused by human intervention, especially since the industrial revolution. The second view is that this is a periodic event. While those who defend the former argue that greenhouse gas emissions should be reduced in the process, the advocates of the latter claim that the process cannot be intervened, and it is necessary to adapt to the process. The studies carried out within the scope of combating global climate change in our country and the world are conducted by institutions and legal entities, taking into account these two views.

Water is the key to agricultural activities in the Karapınar region of Konya, where the research was conducted. The climate structure of the region and the annual precipitation amount are below the amount of water required for the cultivation of any cultivated plant, even without irrigation. In the study, the awareness of rural women about global climate change was reviewed, and it was discovered that women were actually aware of global climate changes. However, there exists a lack of knowledge about what causes global climate change or which of their activities are causing this change. In the SWOT analysis conducted by Mevlana Development Agency (MEVKA) in 2012 in the region, there are statements such as to have large and fertile lands in terms of opportunities in the agricultural sector, while in the expression of weaknesses, insufficiency of irrigation opportunities and widespread wild irrigation, unconscious water use and decrease in water level in the threats part. According to the research findings, 66.67% of the producers do not take into account the global climate change in their irrigation activities despite the drought experienced in the region. As the SWOT Analysis study employed by MEVKA clearly reveals, irrigation awareness must be created in the region quickly, and necessary support and information activities must be carried out for alternative products resistant to drought to take their place in the product pattern. Another issue that comes to the fore in the region is that in recent years, it has been discovered that input costs have increased, income has fallen, and tool-machine assets have risen. In the study, again administered by MEVKA, "the farmer's following the innovations and owning modern agricultural tools" has been assessed as one of the strengths of the region. However, the farmers of the region to follow modern tool equipment or to apply them in their business are generally used to gain social status. That being said, another issue appears as such that rural women do not partake in Agricultural Extension activities, so it is safe to say they are confused about climate change.

Investments have been expedited by Konya Plains Project (KOP) Development Administration to benefit from the agricultural areas of the Konya-Karaman region and related economic growth potential at the highest level in the region in recent years. An action plan was additionally appointed for the detailed studies to be carried out in the region within the scope of the project. Special projects on climate change and irrigation should be produced in the region under the leadership of KOP, bearing in mind the climate structure of the region. In the enterprises, 704 EIG family workforce is in the status of the idle workforce. When the region's suitability for sheep and goat farming is considered as an opportunity, the supports to be made in the area of sheep and goat breeding in the region may help establish a new field of activity for enterprises.

Considering that all economic activities carried out in the world are human-based, it is an imminent necessity to carry out sustainable environmental actions. In this sense, the most critical condition for the organization of the producers, who are the stakeholders of the sector, and to prevent local people's lives who are most affected by the process from being negatively affected by the process, is the extension studies. Surprisingly, it has been ascertained that no extension activities are carried out for the enterprises in the research area on the subjects of “global climate change, irrigation and alternative irrigation methods, producer organization”. Producer organizations, in particular, would be beneficial for them to get involved in this process and to include women in awareness-raising training by acting together with public institutions. Extension activities in the region are almost non-existent. Despite the projects made against desertification in the region, especially due to the low level of knowledge of the producers on global climate change, activities such as climate change awareness training, water and irrigation-oriented training, environmental awareness, educational initiatives with university support, congresses, conferences, panels, etc. can be organized swiftly. We must not forget that water and soil resources lost by us humans will not ever come back.

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