

How Is Land Degradation Perceived by the Farmers of Beypazarı-Ankara?

Arazi Tahribatı Beypazarı-Ankara Üreticileri Tarafından Nasıl Algılanmaktadır?

ABSTRACT

One of the most significant land-related challenges is land degradation. Especially, fertile agricultural lands are under serious threat because of inappropriate land management strategies. The result-oriented ways to overcome this difficulty are to know attitudes and knowledge levels of farmers on this issue and to develop appropriate agricultural policies based upon assessing biophysical indicators of land degradation. Land transformations, typically linked to land degradation processes, have been dynamically occurring for many years as land competence increases by different competing uses at national level. Within the scope of this study, biophysical land-use transformations have been evaluated for a 33-year projection from 1986 to 2018 by using remote sensing technologies for mainly rangeland, forest and agricultural lands in Beypazarı. The results depicted that the proportion of agricultural land increased up to 41% with an increasing rate of 16% during this period. Subsequently, a survey was conducted to test the awareness of farmers about the socio-economic effects. A face-to-face survey with farmers revealed that 137 of the interviewed farmers have an idea about land degradation threat with marked low productivity and soil erosion as principal indicators, but 33.5% has no idea about the issue.

Keywords: Land transformation, land degradation, socio-economic indicators, survey

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Gönderilme Tarihi : 28 Şubat 2022
Kabul Tarihi : 06 Nisan 2022

ÖZET

Arazi ile ilgili en önemli zorluklardan biri arazi tahribatıdır. Özellikle, verimli tarım arazileri, uygun olmayan arazi yönetimleri nedeniyle her geçen gün tehdit altında kalmaktadır. Bu zorluğa aşmanın sonuca yönelik yolu, ise üreticilerin bu konudaki tutum ve bilgi düzeylerinin bilinmesi ve arazi tahribatının biyofiziksel göstergelerinin değerlendirilmesine dayalı uygun tarım politikalarının geliştirilmesidir. Tipik olarak, arazi tahribatı süreçleriyle bağlantılı arazi dönüşümleri, ulusal düzeyde farklı kullanımlar tarafından arazi yetkinliği arttıkça uzun yıllardır dinamik bir şekilde gerçekleşmektedir. Çalışma kapsamında, Beypazarı'nda ağırlıklı olarak mera, orman ve tarım arazileri için uzaktan algılama teknolojileri kullanılarak 1986-2018 yılları arasında 33 yıllık bir projeksiyonda biyofiziksel arazi kullanım dönüşümleri araştırılmıştır. Sonuçlar, bu dönemde tarım arazilerinin oranının %16 artarak %41'e ulaştığını göstermiştir. İlâveten, üreticilerin sosyo-ekonomik etkiler konusundaki farkındalıklarını test etmek için bir anket yapılmıştır. Üreticilerle yüz yüze yapılan ankette, katılım sağlayan 137 üreticinin, arazi tahribatının tehdidi hakkında bir fikre sahip olduğunu, %33.5'inin ise konu hakkında hiçbir fikri olmadığını ortaya koymuştur.

Anahtar Kelimeler: Arazi dönüşümü, arazi tahribatı, sosyo-ekonomik indikatörler, anket.

INTRODUCTION

In parallel with rising food price and food shortage, unsuitable management of natural resources, conducive to land degradation, under the increasing pressures of the climate change put the sustainability of the agricultural production at risk more than ever. Besides, 25% of the earth is highly degraded (UNCCD, 2014; GEF, 2020). In this respect, IPBES (2018) highlighted the negative impacts of land degradation on ecosystem services and biodiversity. Moreover, it is assumed that degradation rates will sharply increase in Asia, sub-Saharan Africa, and Central and South America soon. Thus, its influence is seen even more intensively on people whose lives are directly dependent on the use of natural resources (Nkonya,

Mirzabaev ve Braun, 2016). Therefore, it is necessary to implement long-term strategies that focus on increasing the productivity of land resources, ensuring conservative and sustainable management strategies, while also improving the living conditions of these people. In order to develop these strategies, it is important to consider knowledge, attitudes, and behaviors of rural people, who have a critical role in compressively mitigating land degradation threat at national and regional scales.

This is why land degradation is a complex process (Boer ve Hannam, 2019) and is affected by both "socio-economic" and "biophysical" indicators. A multidisciplinary framework and approach are needed to understand the interaction between these two sets of indicators correctly. This complexity can be encountered at many levels (UNCCD, 2017a). For example, degraded lands affect all climate zones on a global scale (Gurewitz, 2009; Jouanjean, Tucker ve te Velde, 2014; Vu, Le, Frossard ve Vlek, 2014; Tibebe and Tamene, 2016; Topçu, 2018; Zhai, Tao, Lall, Fu, Elliot ve Jagermeyr, 2020; Gambella, Quaranta, Morrow, Vcelakova, Salvati, Morera ve Rodrigo-Comino, 2021). It is necessary to implement long-term strategies that focus on increasing the productivity of land resources, ensuring conservative and sustainable management strategies, while also improving the living conditions of these people. In order to develop these strategies, it is important to consider knowledge, attitudes, and behaviors of rural people, who have a critical role in compressively mitigating land degradation threat at national and regional scales. However, land degradation neutrality (LDN) is known as an important tool to combat degradation threat (UNCCD, 2016; UNCCD, 2017b), Its implementation can be quite challenging due to existing established management systems (IUCN, 2015). Within the scope of the LDN studies, satellite data integrated with Geographic Information System (GIS) and remote sensing technology is widely used in terms of observing land cover efficiencies with some indexes, e.g. Normalized Difference Vegetation Index (NDVI) (Gichenje ve Godinho, 2018; Singhand Javeed, 2020; Moonrut, Takrattanasaran, Khamkajorn ve Chaikaew, 2021). Lately, these studies have been piling more upon the socio-economic indicators, especially soil and land governance in the world (Vu et al., 2014; Mythili ve Goedecke, 2016).

This study is unique by examining the biophysical and socio-economic indicators of the land together. Even if a national draft study to put forward the national targets for the LDN has been conducted, more comprehensive studies are needed at the local scales. In this context, Kırbaşı and Tacettin villages, which are located within the borders of Ankara province, Beypazarı district were examined to socio-economic and biologic factors of land degradation. With this survey, it was mainly aimed to measure the perception of the farmers regarding the making hierarchical plans for awareness detection and balancing of land degradation in these villages where the agricultural sector is concentrated.

MATERIAL AND METHOD

The study was conducted in Kırbaşı and Tacettin villages in Beypazarı district located 100 km from the Ankara province (40° 00' 55" to 40°00'51" N, 31° 49' 19" to 31°53'15" E) (Figure 1). The villages are located in the Central Anatolian Steppe with a semi-arid continental climate. It has been altered by intensive agricultural practices accelerated with climatic unawareness, especially from the steppe ecosystem to dry farming areas. Hot summers and cold winters are the main climatic characteristics in the region. The hottest months are August and September, and the coldest month is January. Average temperatures are 12.2°C and 12.4°C, and annual average precipitations are 436 mm and 430 mm, respectively for Kırbaşı and Tacettin villages.

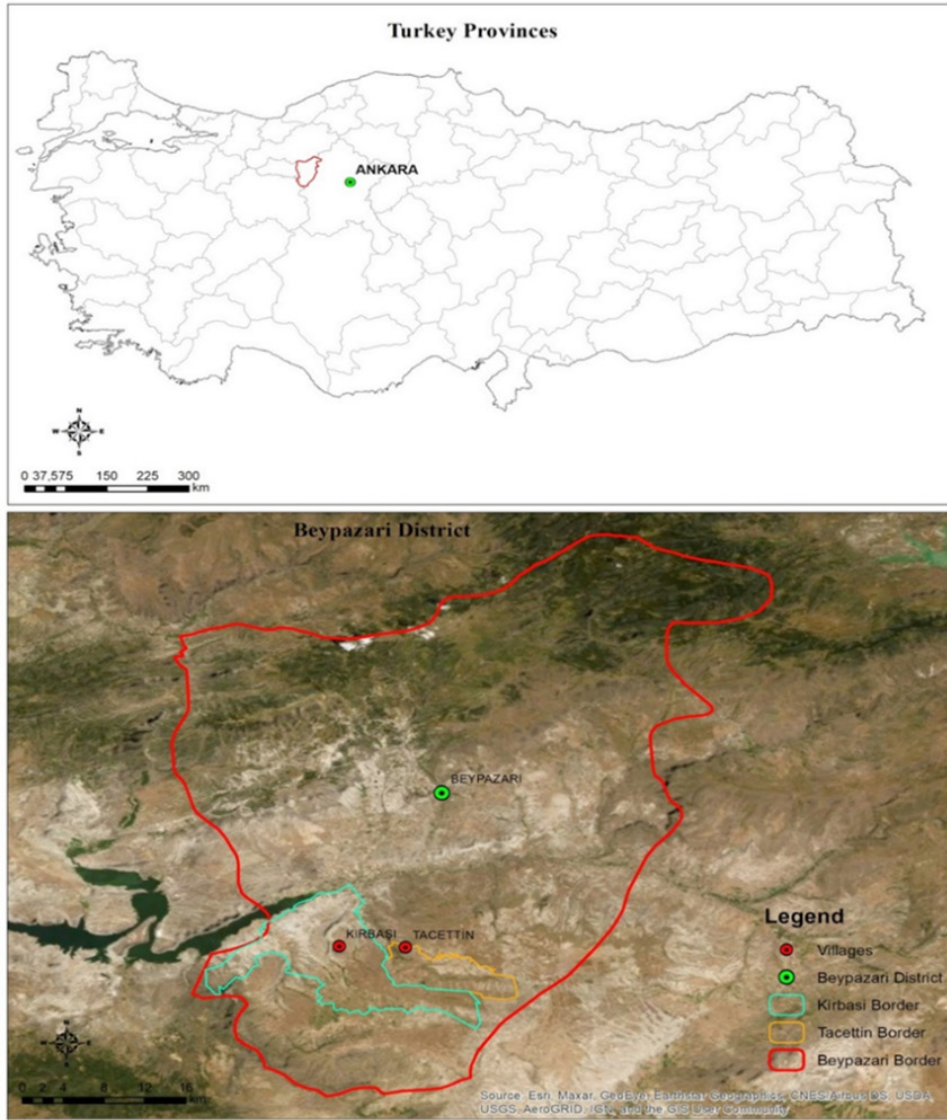


Figure 1. Location of the research area

Land Cover/Land Use Analysis

Land cover and land use analysis were carried out in 6 periods between 1986 and 2018 to monitor the changes in the Beypazarı district. Supervised Image Classification method using Landsat TM5, Landsat ETM7 and Landsat OLI8 obtained from the United States Geological Survey were used for spatial analyses.

Survey

The biophysical indicators of the study were collected using satellite images. However, to reach the LDN target, socio-economic indicators are needed including the biophysical indicators in this study. As a result, a survey of the study was conducted in the Kırbaşı and Tacettin villages, Beypazarı district of Ankara province, in Turkey in May 2019. The number of farmers that formed the universe of the study was taken from the Turkish Farmer Registration System (FRS). According to the 2018 FRS records, a total of 444 farmers were registered in this system. The study

was based on 5% error margin and 95% confidence level. In the analysis of the data, it was evaluated as percentage and frequency by using frequency analysis. SPSS for the Windows 22 program was used for statistical analysis.

RESULTS AND DISCUSSIONS

Demographic characteristics of the farmers

The demographic characteristics of the survey villages are given in Table 1. In terms of the gender distribution, 56.3% of the farmers are “men” and 43.7% are “women”. The farmers’ ages range from 31 to 74 and the mean age is found as 52.8. In the study, 44.7% of the farmers were graduated from “high school”, 27.6% “secondary school”, 22.8% “primary school”, 4.9% is at the level of “college, faculty and above”. The most important determination here is that 92 people graduated from a “high school”. Since, in most of the surveys conducted in the rural areas, most of the farmers are “illiterate” or there is no farmer with a “college” degree.

Table 1. Socio-economic characteristics of the farmers (n=206)

| Variable | Category | Frequency (f) | % |
|--|----------------------------|---------------|--------------|
| Gender | Women | 90 | 43.7 |
| | Men | 116 | 56.3 |
| | Total | 206 | 100.0 |
| Age | Mean age 52.8 | | |
| Education | Primary school | 47 | 22.8 |
| | Secondary school | 57 | 27.6 |
| | High school | 92 | 44.7 |
| | College, faculty and above | 10 | 4.9 |
| | Total | 206 | 100.0 |
| Profession | Farmer | 198 | 96.1 |
| | Public employee | 8 | 3.9 |
| | Total | 206 | 100.0 |
| Family size (household size as person) | 3 | 24 | 11.7 |
| | 4 | 33 | 16.0 |
| | 5 | 55 | 26.7 |
| | 6 | 49 | 23.8 |
| | 7 | 30 | 14.6 |
| | 8 | 12 | 5.8 |
| | 9 | 3 | 1.4 |
| | Total | 206 | 100.0 |

Another more interesting detail is that all the farmers surveyed have graduated from at least “one school” and similar to Alemdar, Akkurt ve Ataseven (2019)’s study, there is no illiterate farmers have been encountered. When the occupation status of the participants is examined, it is naturally expected that the “farmer” is the predominant profession in the findings. Inherently, 96.1%’s main occupation is a “farmer”. Considering the agricultural potential of these districts, this was expected. Under the same heading, it is apparent that the real profession of 8 people is a “public employee”. These people consider the agricultural sector as a “secondary income source” or helping their elderly parents to “cultivate agricultural lands”. In both cases, it is seen that these people do not want to break away from the agriculture sector. When the household data are examined, it is seen that the weight of the household

is mostly in families of “5” to “6” people. This shows that “family farming” is dominant in these villages. Family farmers have a great impact on the sustainable use and management of natural resources as well as their other role in society (Shaban, Quendler, Kadhum ve Drioush, 2021).

Land use changes

The land use change is one of the critical and mostly anthropogenic drivers for the soil ecosystem. To detect this phenomenon in Kırbaşı and Tacettin villages in Beypazarı district, over the 33 years from 1986 to 2018 has been scrutinized by using remote sensing techniques. According to the results, the agricultural lands have become dominant in 41% of the region with an increase of approximately 16% (Figure 2). However, pasture areas decreased by about 12%, and forest areas increased by 26%.

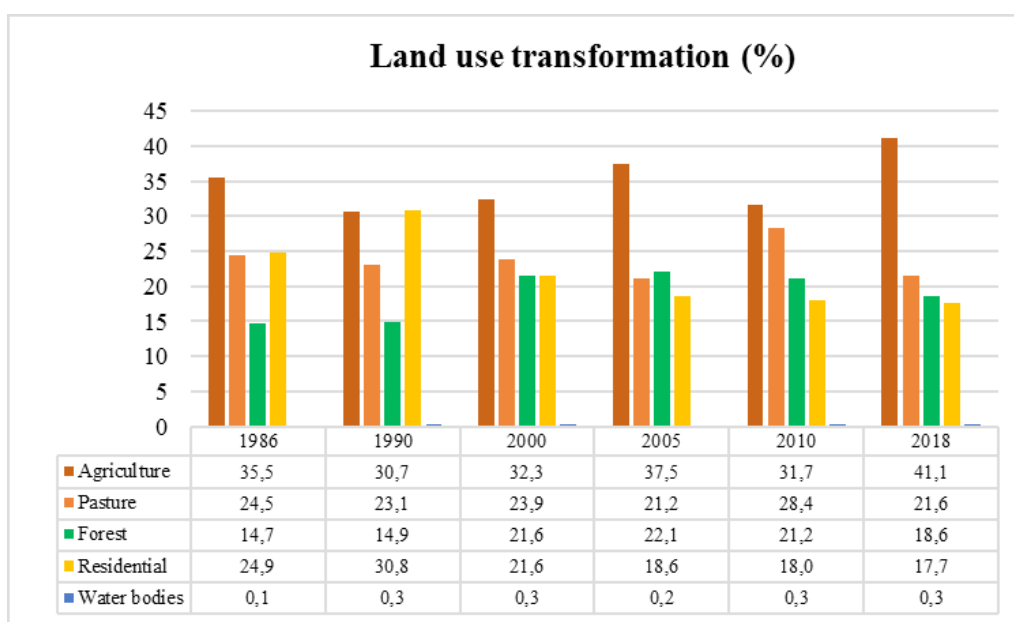


Figure 2. Illustration of land use changes between 1986 and 2018

These findings reveal the situation of the pasture in Beypazarı. In general, these grazing ecosystems of semi-arid climate, which is one of the most endangered terrestrial ecosystem in Turkey after wetland ecosystems, are transformed into agriculture. The main reason for this is closely related to the property status of the pastures. This fully changed in Kırbaşı and Tacettin villages, and now the pastures are considered as potential agricultural land, highly

reducing resilience of these short grass steppe ecosystems against degradation under the threats of climate change, drought, and marginal soil properties mostly unsuitable for agricultural production. These areas, whose boundaries are not determined and registered in the land registry, are cultivated and transformed into agricultural land by the farmers over time.

Another severe factor that threatens the asset and sustainability of the pastures and their relevant biodiversity and ecosystem services including cultural and spiritual services is to convert pastures for afforestation since there is misconception that. When the forests in the study area are examined, it is seen that this asset was 24.498 ha in 1986, reaching 30.998 ha in 2018. Even though one of the main reasons behind this is the afforestation and rehabilitation activities carried out regularly by the government, but it is undeniable that the forest's existence is increased by converting the pastures into forests.

General perception of the land degradation

The land degradation is another factor that adversely

affects agricultural production. Because of this significant justification, the questions about “land degradation” were also included in the survey. In this context, the first question was posed about the “meaning of land degradation”. It is understood that the meaning of land degradation is known by the 66% of farmers in both villages (Figure 3). According to the educational status of these farmers (66%), it is seen that the highest rate is among those who have received a “high school” education. It was also determined that those who did not know this subject was graduated from a “primary school”. All these findings indicate that there is a directly proportional relationship between education level and the answers received.

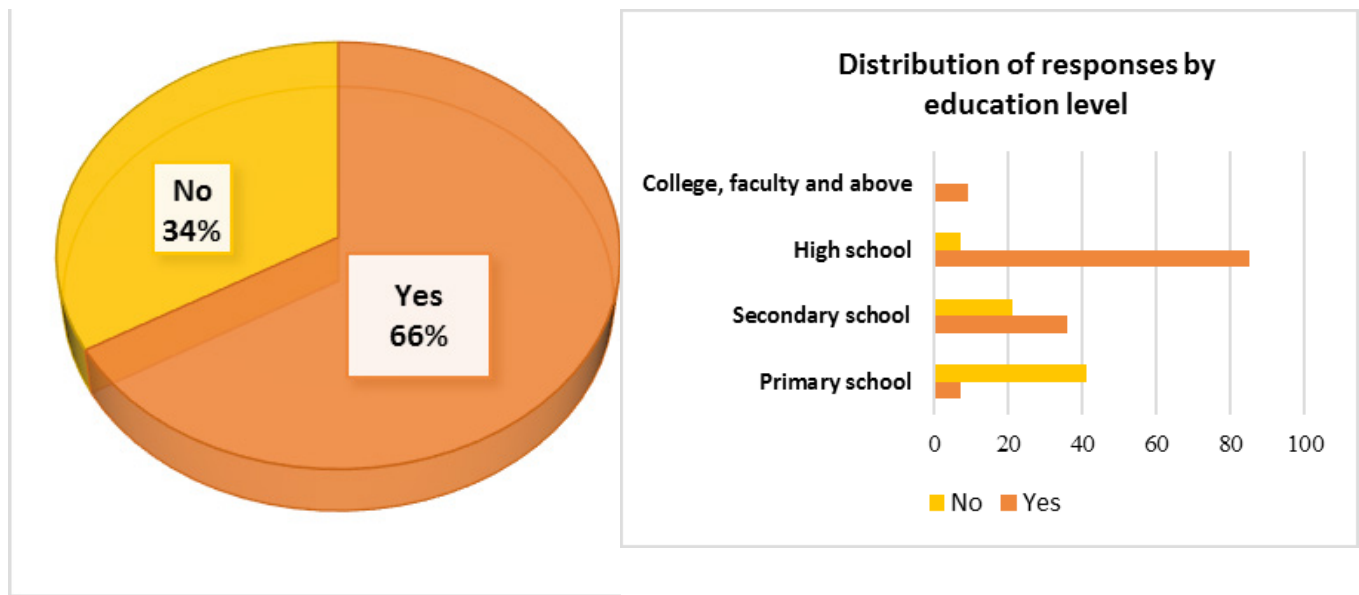


Figure 3. Distribution of the responses of the farmers regarding the definition of the land degradation

Accordingly, the general perception of the farmers is given in Table 2. It is seen that the basic definition of land degradation is made as “low productivity” and “erosion”. It is especially striking that 103 farmers perceive land degradation as low productivity. Despite all this, a much more critical determination is that 69 farmers do not know anything about this concept. This rate (33.5%) is at a very serious level and this situation reveals that these farmers should be informed more about the land degradation.

Coordinated efforts to increase awareness should be made, and land use planning should be expanded on a regional scale. Among the farmers who stated that they have information about land degradation, the percentage of those who say they have sufficient knowledge is quite low (26.7%). This situation shows that the concept of land degradation has been recognized by the farmers in question, but they do not have sufficient knowledge on this issue.

Table 2. Farmer's general perception of land degradation (n=206)

| Variable | Category | f | % |
|--|-------------------------------|------------|--------------|
| Meaning/Definition | Low productivity | 103 | 50.0 |
| | Erosion | 29 | 14.1 |
| | Other (different definitions) | 5 | 2.4 |
| | No idea | 69 | 33.5 |
| | Total | 206 | 100.0 |
| Knowledge level | Sufficient | 55 | 26.7 |
| | Insufficient | 72 | 35.0 |
| | Partially | 79 | 38.3 |
| | Total | 206 | 100.0 |
| Impact on the village? | Yes | 33 | 16.0 |
| | No | 173 | 84.0 |
| | Total | 206 | 100.0 |
| How is the effect? (answered "yes", n=33) | Low productivity | 22 | 66.7 |
| | Erosion | 8 | 24.2 |
| | Land abandonment | 3 | 9.1 |
| | Total | 33 | 100.0 |

The third question directed to the farmers under the title of the land degradation was whether this situation affected their villages. 84% of the farmers think that the land degradation has no effect on their village. On the contrary, 33 farmers said that land degradation affects their villages and they evaluate this impact under 3 headings: "low productivity", "erosion" and "land abandonment". Many studies highlighted that land degradation affects land productivity negatively (Senjobi ve Ogunkunle, 2011; Hamdy ve Aly, 2014). To support this, the highest rate (66.7%) among them belongs to the response of the low productivity. Although erosion is seen as the second important impact, there are many studies (Podhrázská, Kučera, Karásek ve Konečná, 2015; Scholten ve Seitz, 2019) that puts erosion in the center as the main reason of the degradation as much as the productivity.

CONCLUSION

In this study, it attempted to reveal the general approaches on land degradation of 206 farmers in Kırbaşı and Tacettin villages in Beypazarı district of Ankara province. In order to support the study, land-use

transformations were also examined by using the remote sensing technologies in a 33-year projection for the district where the mentioned villages are located. It seems that agricultural activities are actively carried out in these two villages with the information obtained from both the maps and the survey. Likely, pasture and forest areas were also converted into agricultural lands for this reason. Another important output of this study is that 66.5% of the farmers know the concept of land degradation. Hence, this status seems to be positive in the initiation of the studies to be planned and projects to be carried out for land degradation in these areas at first sight. Nevertheless, when asked additional questions regarding the concept, it is seen that even the farmers who stated that they do not have enough information about land degradation exactly. On the one hand, the fact that 33.5 % of the farmers have no idea about this issue. It is considered as a risk in terms of the sustainability of the activities to be implemented in these villages. However, one of the most important steps to make rational investments in the agricultural sector and to adopt them by the rural population is the necessity of having a high level of awareness and ownership.

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