



Ecological Balance and Human Health in Forested Areas^x

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ABSTRACT

This study aims to determine the effects of environmental degradation on human health. We reviewed the related literature from environmental and medical science. The most important factors which degrade ecological balance in forested areas are forest fires, excessive and irregular grazing of the animals, obtaining materials for fuel, buildings and paper production and using the land in an unsustainable manner. Decrease of biodiversity by deforestation is a major problem in terms of human communities based on plant and animal species, the vast majority of which are living resources. As a result, CO₂ is elevated, threatening human health. Along with these, lung disease increase due to air pollution, and allergic diseases are seen with climate changes. With erosion caused the loss of soil, decrease in the nutrients in the soil and in turn the damage which takes place in flora, infertile areas created with the increase in the tendency of desertification will cause natural disasters, decrease in natural

plant-animal species, decrease in forest areas, hindering of husbandry, the dams being exposed to the threat of getting filled by alluvial deposits and being destroyed and all these create negative impacts on human health. In order to avoid all health problems arising from the consequences of deforestation, the factors that degrade ecological balance in forest areas should be considered holistically. The necessary actions should be taken by fulfilling the responsibilities related to the institutions and organizations belonging to the state, especially the related ministries.

Key Words: Biodiversity, deforestation, environment, erosion, health

Review Article

Orman Alanlarında Ekolojik Denge ve İnsan Sağlığı

ÖZ

Bu çalışmada orman alanlarındaki ekolojik dengenin bozulmasının insan sağlığı üzerindeki etkilerinin belirlenmesi amaçlanmıştır. Bu bağlamda çevre ve sağlık bilimleri alanlarında ilgili literatür taraması yapılmıştır. Orman alanlarında ekolojik dengeyi bozan en önemli etmenler arasında; orman yangınları, aşırı hayvan otlatma, yakıt, yapı, kâğıt malzemesi elde etmek, kentsel alanlarının genişletilmesi, tarım alanı ve mera açılması için ağaç kesilmesi (yanlış arazi kullanılması) sonucunda ormansızlaşma ve ormansızlaşmaya bağlı olarak erozyon öne çıkmaktadır. Ormansızlaşma ile biyoçeşitlilik üzerindeki tahribatlar yaşam kaynaklarının büyük çoğunluğu bitki ve hayvan türlerine dayalı insan toplulukları açısından büyük sorunlar oluşturur. Bu durum sonucunda atmosfere fazla miktarlarda salınan CO₂ insan sağlığını tehdit etmektedir. Bunlarla beraber hava kirliliğinden dolayı akciğer rahatsızlıkları artmakta, iklim değişiklikleriyle beraber alerjik hastalıklar da görülmektedir. Erozyon ile toprak kaybı, toprak besin maddelerindeki azalma ve buna bağlı olarak bitki örtüsündeki tahribat, alandaki çölleşme eğiliminin artması ile oluşan verimsiz alanlar, doğal afetlere (toprak kayması, çığ, vb.), doğal bitki-hayvan türlerinin azalmasına, orman alanlarının azalmasına, hayvancılığın yapılamaz hale gelmesine, barajların alüvyonlarla dolup yok olma tehlikesi ile karşı karşıya gelmesine neden olarak insan sağlığında olumsuz etkilere sebep olmaktadır. Ormansızlaşma neticesinde ortaya çıkan tüm sağlık sorunlarının önüne geçebilmek için orman alanlarında ekolojik dengeyi bozan tüm etmenler birlikte değerlendirilerek başta ilgili bakanlık olmak üzere devlete ait kurum-kuruluşlar ve toplumun üzerine düşen sorumlulukları yerine getirerek gerekli çalışmaları yapılmalıdır.

Anahtar Kelimeler: Biyoçeşitlilik, çevre, erozyon, sağlık, ormansızlaşma

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1. Introduction

Ecology is the science which deals with the relationship between organisms and the environment (Sevgi, 2015). The environment is defined as the habitat, which surrounds the organisms (Görcelioğlu, 1995). In this regard, all factors which provide the necessary conditions for organisms to exist and continue their lives in the environment are defined as ecological balance. Ecological balance changes in accordance with the energy movement or cycle of certain elements/substances (carbon, oxygen nitrogen, sulfur, phosphor, and water) between earth, air and, water. The abnormal changes in the energy movement of these elements/substances affect all organisms, including humans. On the other hand, its continuity without breaking down is an indication of a healthy ecosystem. Therefore, forest areas which are parts of the ecosystem are regarded as an aspect of ecological balance and they are significant in terms of human health as well as other organisms' health.

Forest areas have a rich bio-diversity treasure with the different plant and animal communities they contain. Therefore, they are being protected by national and international laws (Can, 2013). In addition, forest areas which are a source of natural carbon and oxygen provide firewood and timber, medicine, food and shelter besides they protect soil, water, prevent soil erosion and preserve human health. However, forest areas are negatively affected in directly or indirectly through the interventions of humans and deteriorate in certain ways. As a consequence, environmental problems are experienced on earth due to these deteriorations and certain changes take place in the ecological balance as well. The most important factors, which degrade ecological balance in forest areas are forest fires, excessive and timeless grazing of the animals, gathering materials for fuel, buildings and paper production and using the land in an unsustainable manner (expansion of urban areas, cutting trees to open agricultural areas and pastures).

It is quite apparent that all these negative factors are caused by humans and that the environment is reacting against these factors. %99 of the forest fires, which take place as a result of the activities we unconsciously carry out (stubble burning, burning fires in forest areas for reactive purposes) are known to be caused by anthropogenic reasons (Ayanoğlu et al., 2017). In general, it is regarded that we damage trees in forest fires, however flora, fauna, air, soil, and water sources get damaged as well and the result is the devastation of forest areas, which in turn results in deforestation (Ayanoğlu et al., 2017). The clearings of forest areas, which emerge as a result of

this are gradually covered with primary flora and can transform into areas like pastures. Although this is initially seen as a positive change, the locals can insensibly use them for excessive and irregular grazing for their animals. This in turn causes soil compaction and soil infertility. As a consequence, the diversity in plant species decreases, the plants lose resistance against extreme situations such as droughts and cold, and deforestation takes place (Gökbülak, 1997).

In Turkey, there are forest villages in the immediate vicinity of forests. The livelihood of the locals who live in these areas depends completely on the forests. As a result of the locals who continue their vital activities in these areas obtaining materials for fuel, buildings and paper and their wrong land-use practices (cutting trees to have agricultural areas and pastures), greenhouse gases increase, air pollution accelerates, biological variety decreases, the physical, biological and chemical structure of the areas get deteriorated, soil fertility decreases, soil compaction takes place and erosion increases and excessive pesticides are used in agricultural areas. All of these negative disturb the ecological balance and cause deforestation (Gülersoy, 2014; ÇOB, 2005).

The American Indian proverb "One day, you are going to see that the eagles in the sky, the forests which cover the mountains have disappeared, the horses are tamed and the scent of mankind has covered everywhere. That day will be the end of life for humanity and the beginning of the attempt to sustain their existence," implies what we live as a consequence of our careless actions or what we are going to live in the future. Do you think that we have begun to spend the effort to continue our existence?

This study, which deals with the effects of the events which take place in forest areas due to the factors which disturb ecological balance on human health, has mostly been prepared by reviewing the literature and is based on the naturalists' observations of lands and the medical data of scientists who deal with environmental health and work-human health. The study firstly attempts at determining and discussing the factors which disturb ecological balance in forests. The numeric data related to deforestation which takes place as a result of these determining factors have been obtained from FAO's publications and other academic publications. It has been attempted to display the effects of deforestation and the reasons, which emerge as a result of deforestation on human health.

According to the Food and Agriculture Organization (FAO), deforestation is defined as using forests as lands for other purposes,

transforming forests into lands related to agriculture, pastures, catchment areas, rural areas, or the canopy cover of forests falling under 10%. In addition to this, it is also accepted as deforestation when the canopy cover decrease under 10% for a long period of time due to natural causes (fires, changing ecological conditions, environmental changes, etc.). However, deforestation does not cover areas, in which trees are removed as a result of harvesting and logging and forests which are to be regenerated through natural and civil-cultural interventions (Yegül, 2010; FAO, 2010)

According to Global Forest Resources Assessment (FRA) 2015 report, the forest areas of the world during 1990 - 2015 decreased in the rate of 3.1% (129 million hectares) from 4.1 billion hectares to less than 4 billion hectares for various reasons. On the other hand, the global forest loss which was an annual average of 7.2 million hectares during 1990-2000 has regressed to 3.3 million hectares during 2010-2015 and has slowed down over 50% (FAO, 2016) (Table 1).

Table 1. Forest presence in the world 1990-2015 (FAO, 2016).

Year	Forest (x1000 ha)	Annual net change		
		Period	Area (x1000 ha)	Rate ^a (%)
1990	4 128 269			
2000	4 055 602	1990-2000	-7 267	-0.18
2005	4 032 743	2000-2005	-4 572	-0.11
2010	4 015 673	2005-2010	-3 414	-0.08
2015	3 333 134	2010-2015	-3 308	-0.08

^a Calculated as the total annual growth rate.

However, although this deceleration became stable mostly in Europe and Oceania, deforestation has remained at the same level in developing countries and regions in South America, Africa, Asia, North and Central America and is causing the loss of forests (FAO, 2016). The shrinking of tropical forest areas in these lands, loss of biodiversity, and increase in the greenhouse effect is a source of concern for these countries (Chakravarty et al., 2012). Although Turkey is among the developing countries, the existence of forest areas has been determined as 20.2 million hectares during 1963-1972; 21.2 million hectares by the end of 2004; 21.7 million hectares during 2005-2012 and 22.3 hectares during 2013-2015. According to these numbers, it has been seen that 2.1 million hectares increase has taken place in the last 42 years. It is stated that this is the result of the great volume of forestation activities and the contribution of the success of these activities (OGM, 2015). However, although it is stated that the existence of forest areas has increased, the extremely fast and increasing activities carried out by people (forest fires, excessive and irregular animal grazing, obtaining materials for fuel, buildings and paper, expansion of rural

areas, cutting trees to have agricultural areas and pastures [wrong use of lands] and not registering these activities in fact shows how effective deforestation is. The field surveys which are carried out on the scientific activities regionally and locally prove that these damages are at a level, which cannot be overlooked.

2. Deforestation and human health

In the world as wells in Turkey, Deforestation and damages are given in terms of biodiversity, in particular those observed in plant species richness and diversity have caused serious problems for human communities whose livelihood greatly relies on plant and animal species. This causes respiratory tract diseases and other diseases, infectious diseases and mental illnesses in terms of human health. Deforestation and especially the increase in greenhouse gases and air pollution, which results from this, cause respiratory tract diseases in people. Öztürk (2013) states that air pollution causes 1.15 million deaths in the world and could be responsible for 2% of all deaths. World Health Organization states that in particular, the risk of developing asthma, chronic bronchitis,

respiratory tract infections, and lung cancer, etc. has significantly increased due to people's being subject to air pollution for extended periods of time (Öztürk, 2013; Arbex et al., 2012). The increase in air pollution affects the prevalence of asthma and allergic diseases (the rate of all subjects who have a certain disease). With the changes in the climate, the density of pollens and spores (aeroallergens) which are frequently found in our environment, cause allergic diseases, their diversity and structure display a change. This density in pollens and spores increase simultaneously with the level of temperature and carbon dioxide and causes an increase in particular in cases related to asthma and allergic rhinitis (Öztürk, 2013). At the same time, the damages are given to forest areas, transforming them into agricultural areas and using excessive amounts of nitrogenous manure to grow crops cause serious health problems in humans and animals who feed on these crops (URL-1; Ardiç, 2013).

Ardiç (2013) states that people who feed on these crops experience problems such as anoxia, hemodynamic disorders due to extremely low blood pressure and diseases that have a carcinogenic effect and problems related to the shaping of nitrosamines in newborns (3-6 months) since the enzyme system does not develop.

As a result of the climate changes caused by deforestation, especially global warming which develops in relation to temperature increase and the cycle between the balance of forests, both infectious diseases and vector related diseases (parasitic insects such as lice, fleas, ticks and flies) come into the picture. In general, with the rise in temperature, vector related diseases such as malaria, yellow fever, dengue fever, chagas (American sleeping sickness), encephalitis (brain infection) and diseases not caused by vectors such as dysentery, typhoid, paratyphoid, cholera and giardiasis have been observed to increase. It is a non-negligible reality that this is the result of the ecological damage given by humans to nature (Tekbaş et al., 2005; THSK, 2015).

On the other hand, one of the important functions of forests is that they are recreational areas. It is known that these areas have positive psychological effects on humans and protect them from stress, depression and psychosomatic diseases. Both the recreational areas found in urban living areas and the scantiness of forest areas result in an increase in psychological diseases in terms of human health and the

creation of an unhealthy society with each passing day. Therefore, deforestation should be dealt with not only as the destruction of forests or damaging them, but as an important component of ecological balance as well. Otherwise, erosion caused as a result of deforestation; loss of soil, decrease in the nutrients in the soil and in turn the damage which takes place in flora, infertile areas created with the increase in the tendency of desertification will cause natural disasters (landslides, floods, avalanches, etc.), decrease in natural plant-animal species, decrease in forest areas, hindering of husbandry, the dams being exposed to the threat of getting filled by alluvial deposits and being destroyed and all these create negative effects on human health. In particular the direct (drowning, getting injured and dying due to floods) and indirect effects of flood disasters (infections caused by water [*Enterogenic E. coli*, *Shigella*, *Hepatitis A*, *Leptospirosis*, *giardiasis*, *dermatitis*, *conjunctivitis*] on living organisms, the acute and chronic effects of being subject to the chemical contaminants, which are released in flood water, lack of food, etc., emotional trauma, stress, depression, isolation from the society, behavioral changes and cardiovascular diseases) are the most frequently experienced cases (Yaşar Korkanç, et al., 2006).

3. Conclusion and Suggestions

Forests are very important for the health of human and plant-animal communities. Because fresh air without trees, healthy food without soil is not possible. Obviously, we cannot ignore the benefits that forests offer us. For this reason, the forest-human relationship is an inevitable reality of our life. In order to prevent all health problems arising from the consequences of deforestation, all factors that disturb the ecological balance in forest areas should be evaluated holistically. It should carry out the necessary activities by fulfilling the responsibilities related to the institutions and organizations belonging to the state, especially the related ministries. Particularly, it should be given conscious and educative works by emphasizing that damages in forest areas are mostly due to human-induced actions. It is thought that deforestation can be avoided if care is taken to ensure a sustainable use of forest resources.

Conflict of Interest

The authors declare that they have no conflict of interest.

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