Failure or Success: Reading the Effectiveness of Legislative Regulations and Reasoning Forest Area Losses in Turkey through a Quantitative Research

Başarı ya da Başarısızlık: Yasal Düzenlemelerin Etkinliğini ve Türkiye'deki Orman Alanı Kaybını Nicel Araştırma Yoluyla Okumak

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ABSTRACT

Today "Global Warming" is an emerging issue which is also a popular research topic for urban planning. Having several reasons, deforestation is one of the major parameters that cause global warming. Legislative and governmental tools such as laws, planning, etc. are expected to serve in the scope of conserving natural assets. This article aims to examine in what extent these tools are effective in forest conservation practice. From this perspective a quantitative evaluation is carried out in order to determine this issue where provinces are accepted as research units. Nine independent variables were observed to explain the change on the dependent variable (namely 'loss of forest area of provinces') by using correlation coefficients and multiple regression analysis. As a result two basic outcomes have appeared. Firstly, related legislations mentioned in the study do not serve to a holistic conservation purpose in Turkey. Secondly, independent variables explain the loss of forest areas in the level of (R^2: 0.548) 55%.

Keywords: Deforestation; legislative regulations; Turkey.

ÖZ

"Küresel Isınma" içinde bulunduğumuz zaman diliminde kentsel planlama disiplininin güncel araştırma alanlarından birisi ve önemli konuların başında gelmektedir. Bir çok nedeni olmakla birlikte, ormansızlaşma küresel ısınmaya sebep olan başlıca etkenlerden biridir. Kanun, plan vb. yasal ve yönetsel araçların doğal değerlerin korunmasına hizmet etmesi beklenir. Bu çalışmanın amacı, ormanların korunmasında, söz konusu araçların uygulamada ne derecede etkili olduğunu sorgulamaktır. Buradan hareketle konuyu açıklamak amacıyla nicel bir değerlendirme süreci izlenmiştir. Türkiye'deki 81 il araştırma birimi şeklinde kabul edilmiştir. Korelasyon katsayısı ve çoklu regresyon analizi kullanılarak dokuz bağımsız değişken, illerin orman kayıplarını ifade eden bağımlı değişkeni açıklamak için, incelenmiştir. Sonuç olarak iki temel neticeye ulaşılmıştır. Bunlardan birincisi, ilgili yasal ve yönetsel araçların Türkiye'deki bütüncül koruma amacına hizmet etmediğidir. İkincisi ise, bağımsız değişkenlerin orman alanı kaybına ilişkin konuyu (R^2: 0.548) %55 oranında açıklamasıdır.

Anahtar sözcükler: Ormansızlaşma; yasal düzenlemeler; Türkiye.

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Introduction

Humanity has struggled to control, exploit and shape nature according to material and spiritual needs throughout its existence. This effort particularly gained momentum during the industrial age and has reached levels to the extent of potentially causing certain problems for human population in the present and the future. Deforestation, as the basic keyword of this article, is one of these problems that could be conceptualized both as a driver and a consequence of climate change and global warming, for which several international and national precautions have been formulated.

While reasoning deforestation as an emerging problematic, some has to mention that there are two major reasons for degradation in nature. The first one is natural (natural disturbances and ecosystem processes) and the second is depending on human activities (sector based developments, industrial processes etc.). Disturbance of nature from human activity has a greater impact than naturally occurring disturbances (Zeledon and Kelly, 2009:2866). With the exception of certain natural causes, human activity is mostly responsible for global warming, which is resulting in global climate change.

Forest reserves are a sink for greenhouse gas emissions -known as one of the causes of global warming. For this reason forests are essential ecosystems that should be sustained and this is a complex aim which must be supported by legislations, landuse decisions, precautionary actions etc both in the national and international levels. The originality of this article could be summarized as enlightening the causalities between forest area losses and (national) plans, national legislations and landuse changes considering their sectors, where very limited studies were carried out for different natural assets like agricultural lands in the literature (Özügül, 2010:91-101).

From the perspective of the very well-known sustainability motto "think global, act local", the aim of this study is to present the state and reasons of human activity related forest reserve loss in Turkey; and also, to explain the relation between deforestation and selected parameters and to show the linkages between these parameters. In this context, each province of Turkey is accepted as a sample. Study parameters, which assumed to have meaningful relation with forest losses, are the amount of buildings constructed for; "tourism", "industry" and "housing" and "the capacity of the mining sector" in 81 provinces. For this purpose, a multiple regression analysis has been performed on the variables mentioned throughout the study and based on the calculated R2 result the extent of these parameters explaining the forest losses in Turkey is also identified.

Deforestation
Basic Definitions & Supra-national Context

Mostly mentioned main factors responsible for global warming are greenhouse gas emissions and factors originating from the sector/resource categories. Within the greenhouse gases carbon emissions in particular have the highest rate. Factors triggering this outcome include population, gross domestic product, energy intensity, carbon intensity and deforestation (UN Kyoto Protocol, 1998:3-5,19).

The basis of the relation between carbon based gas emissions and forest reserves is the fact that forests are a fundamental carbon sink. As a form of vegetation, forests can store approximately 80% of carbon and can store about 40% of that in soil (Sarvasova and Kaliszewski, 2005:108). Forests retain half of terrestrial carbon emissions. Having the most leaves, forests are able to absorb greater volumes of CO_2 compared to pastures and agricultural plant varieties. Forests are superior to other ecosystems for their ability of retaining fixed carbon for long times, sometimes hundreds of years. On the other hand, deforestation and forest degradation is increasing carbon emissions. Extreme and uncontrolled deforestation continues particularly in tropical regions. This is leading to the destruction of forest reserves to accommodate growing populations (open agricultural land, acquire firewood, infrastructure projects, urbanisation and industrialisation etc.). According to calculations, deforestation and forest degradation account for 17.4% of global greenhouse gas emissions (Bayçelebi & Demir, 2009; FAO, 2008:1).

Deforestation describes the process of losing forests to human activity and/or natural disasters where deforested land is ultimately used for other purposes or left untouched (Wibowo and Byron, 1997:2-4). The Food and Agriculture Organisation of the United Nations – FAO defines deforestation as: "The conversion of forest to other land use or the long-term reduction of the tree canopy cover below the minimum 10 percent threshold" (FAO, 2004:25-26). Deforestation also refers to the cutting, clearing and removal or rainforest or related ecosystems into less bio-diverse ecosystems such as pasture, cropland or plantations, urban use, wood production (logging, etc.) and landfills (Kricher, 1997:334). The term deforestation is also used for complete loss of forest cover, partial reduction of forests as ground cover and loss of primary forests. Deforestation is also used to express the permanent or in some cases temporary loss of forests.

There are two basic outcomes based on the discussions related to the definition of deforestation. The first refers to the content of the definitions. The common denominator of definitions used to explain deforestation is a loss of forest reserves and the conversion of these areas to other

land use and/or leave empty/stripped. That said, explanations on deforestation suggest that these definitions are based on the outcome, the processes that led to that outcome and the methods employed within those processes (Pagiola, 2001:1-2). The second outcome is that these discussions do not change the fact that deforestation is the main cause of increased greenhouse gas emissions.

Nowadays, countries that are stakeholders in the globalised world have signed agreements prepared and regulated by international organisations in order to preserve and sustain natural assets just as in fields like healthcare, agriculture and energy. There also is a national scale effort to strike a balance between preservation and use of local assets. In this context and with regard to international and national dimensions, Turkey has developed a vision and various strategies concerning the preservation and sustainability of forests, and has implemented certain legal and administrative regulations. Nonetheless, it is evident that there are certain contradictions between the visions and strategies that have global and national level acceptance, and the legislation in Turkey.

Contradictions amongst upper scale decisions and those between applicable laws and regulations play a role in the loss of forest reserves in Turkey. In fact, these exact regulations make it possible to use forest areas for housing, industry, tourism and mining functions, which are the parameters of this study; and allow businesses to choose locations on the basis of the nation of superior public interest. FAO's Strategic Framework for Forests and Climate Change document states that deforestation is generally regarded as a part of development. The document also states that some countries undergo periods of intense deforestation, which supports economic growth, and in this context allow certain degrees of deforestation for agricultural and urban expansion in their development strategies. More so, it is argued that the success of the Reducing Emissions from Deforestation and forest Degradation - REDD in developing countries programme (announced in 2008) is tied to REDD making a clear distinction between the level of acceptable and unacceptable deforestation in policy options. In this context, some countries and developing countries in particular, might need to set a specific level of deforestation in order to support their national development targets. Unacceptable deforestation is loss of forest area for additional income or the irreversible transformation of forests damaged or cut beyond rehabilitation into another form of land use. Therefore, in order to reduce unacceptable deforestation there is a need to go beyond ordinary scenarios and determine initiatives on rewarding the reduction of deforestation with adequate incentives; present risks related to forest degradation and international loopholes and achieve implementing a consistent

cut-back of emissions (FAO, 2008:15). Economists are inclined to be lenient towards certain forms of deforestation on condition that it returns net economic development in scope of a social cost-benefit analysis and economical efficiency. Through the perspective of development benefit, all forms of deforestation are not necessarily negative (Wibowo, and Byron, 1997:4). It is questionable that an organisation such as the UN approaches this issue through the perspective of development benefit. From this point of view, it becomes evident that the UN acknowledges that deforestation is inevitable and develops policies aimed at reducing and adjusting deforestation. From this perspective deforestation is seen as an inevitable endpoint which can't be prevented, can only be postponed.

Local Context: Plans, Legal and Administrative Regulations

Basic strategies in Turkey are determined with national development plans that concern the entire country. Development plans are documents that determine the social and economic vision of the country and layout related strategies. Through an economic perspective, such documents contain strategies developed for existing sectors within the country such as mining, tourism, forestry and agriculture. However these contradict each other. There are several articles emphasising the necessity of protecting forests and fighting deforestation to prevent the loss of forest reserves on the one hand, development targets for various industries undermine forest protection objectives on the other. Some examples of such contradictions are presented below:

Examples from the 7th National Development Plan

- The 7th Development Plan recommends legal arrangements to exclude degraded forestland from forests. Meanwhile, the same plan recommends arrangements concerning the preservation and development of natural resources in scope of Forest Law Nr. 6831.

- Although the plan sets out the target of protecting the natural environment in forests and public land allocated for touristic investments, it is nonetheless a suggestion that brings with it the threat of opening forests to tourism.

Examples from the 8th National Development Plan

- The 8th Development Plan sets out the objective of preserving and developing forests. The plan also recommends that various organisations and companies should protect forests while involved in activities like constructing buildings and roads, mining etc. However, cutting trees and changing the ecosystem becomes inevitable if mining activity is permitted in forests. In other words objectives are contradicting.

- The same plan also sets out the target of developing

and expanding protected areas like Nature Reserves and National Parks in order to protect biodiversity, aquatic and wild life, cultural and aesthetic values; explore currently unknown benefits of forests; prevent soil erosion, landslides and avalanches; and develop ecotourism. However, there is a contradiction because the same objective supports ecotourism in nature reserves, in other words, the prospect of commercial activity and development.

Examples from the 9th National Development Plan

• One of the targets of the 9th Development Plan is to effectively protect the natural forest ecosystem from various factors, especially fires and pests. The same plan recommends development of ecotourism. As mentioned earlier, this increases the likelihood of forests becoming a part of commercial activity and development of facilities to accommodate the activity.

Examples from the 10th National Development Plan

• The section on climate change and the environment in the 10th Development Plan notes that man-made pressures linked to population, urbanisation, economic activities and associated problems like pollution, deforestation, water shortage and global warming remained as important concerns, which in this context, magnified the need to adopt environmentally friendly growth models. The plan also emphasises the need to utilise ecological potential in the production industry and more environmentally sensitive sectors like tourism and agriculture in order to create environmentally friendly and economically efficient cities. However, there is still much debate about how much tourism investments can be environmentally friendly. In fact, as the findings of this study suggest, it is a known fact that tourism leads to a shrink in both agricultural land and forests. It could also be said that tourism investments particularly increase construction activities.

• According to the plan, there was an annual average 0.6% growth in privatization income compared to the 9th Development Plan and that the sale of publically owned degraded forestland had commenced. In other words, it could be said that, the process of irreversibly losing these sites has commenced rather than reforestation.

Further examples could be provided. However, at this point, it would be more worthwhile to present information related to the recommended targets of development plans and legislative and institutional arrangements in connection with indicators discussed in this study. In this context, the first legal arrangement to be investigated will be the Forest Law (Nr. 6831) and associated regulations.

According to Article 2(b) of the Forest Law there is an arrangement to exclude degraded forest areas from within forest boundaries. Article 16 of the same law permits the construction of facilities necessary for mining activities within state-owned forests. Article 25 makes it possible to organise and operate forests including national parks and nature reserves for purposes of recreation and tourism. More so, Annex Article 8 of the law allows leasing national parks for a period of 29 years. Whereas Article 52 allows construction in compliance with existing land use plans inside privately owned forest areas on condition that the base area of the building does not exceed six percent (6%) of the total land. Annex Article 9 entitles state-owned institutions of higher education to construct facilities for education, research, accommodation etc. and the General Directorate of Youth and Sports to develop sports facilities within forests. With reference to the mentioned articles, the Forest Law opens forests to development for purposes of mining, tourism, housing, academic etc. This contradicts articles in the same law about protecting forest areas.

Similar to the Forest Law, Law Nr. 2873 on National Parks contains articles about the need to protect National Parks. However, similar contradicting articles exist due to such arrangements. According to Article 8 of the law, should superior public interest be justified and on condition activity is regulated by a plan, natural and private legal entities may be granted permission to construct touristic buildings and facilities inside National Parks, related institutions and companies may be granted a lease of 49 years to use these areas and that the lease might be extended at the end of the 49 year period. However, Article 9 makes it possible for individuals and companies to transfer these rights to third parties subject to the approval of the Ministry of Forestry and Water Works. Additionally, Article 12 contains a provision that entitles the Ministry of Forestry and Water Works to construct and operate any type of infrastructure, superstructure or other facility aimed at any type of service or activity foreseen by plans implemented inside national parks, natural parks, natural monuments and nature reserves, as well as services related to protection, management, operation, promotion, sports and recreation. Related articles of the law allow development inside forests with a National Park status, especially for touristic activities.

Consistent with the aim of enacting a law, Law Nr. 2634 on Encouraging Tourism does not mention any provisions regarding the protection of forest areas. Article 3 of the law introduces provisions about Culture and Tourism Protection and Development Zones. According to the definition, a certain area may be declared as a Culture and Tourism Protection and Development Zone in order to preserve and utilise areas with a concentration of historic and cul-

tural assets and/or places with high tourism potential; and achieve sector-based progress and planned development. According to Article 4, such areas are determined according to existing values like natural, historic, archaeological and socio-cultural tourism assets and potential for winter and water sports, hunting, medical tourism etc. According to another provision, the area allocated for tourism within these zones will be limited to five thousandths (0.005) of the total forest area within the province, while construction permit in the same area will not exceed 0.30 of total floor area ratio. Looking at related articles of the law, it would be right to predict that Turkey's forest reserve is destined to decline.

According to the Regulation on Environmental Impact Assessment (EIA), EIA is not required for facilities under certain limits (for example, facilities with more than 500 rooms require EIA, however touristic investments with 499 rooms are exempt from the regulation). Having said that, the provision in Article 5 of the regulation states that the Ministry of Environment and Urban Planning is authorised to decide whether EIA is required and whether the result is positive or negative. In other words, this regulation stands out as one of the legal arrangements associated with the decline of forest reserves.

The aim of the Recreation Areas Regulation is to regulate the methods and principles related to the allocation, approval, planning, implementation and development of plans; operating, leasing, managing and annulling new and existing recreational areas in order to fulfil society's recreational needs, contribute to the beauty of the country and allow touristic activity. According to Article 10 of the regulation, recreational areas can be leased for a period of 29 years. More so, it is possible to build for purposes of entertainment, daytime accommodation, food & beverage services etc. inside land classified as recreational areas. Additionally, recreational areas failing to reach projected visitor potential, or otherwise revenue, may be excluded from this status. Therefore, parts of forest area classified as recreational areas are becoming commoditised and open for development. This regulation can be considered as another arrangement threatening forest reserves.

Deforestation cannot only be attributed to contemporary or neoliberal policies. For example, there was a shortage of housing in large cities of Turkey like Istanbul during the 1950's, parallel to a surge in rural to urban migration as the country gradually adopted liberal economy. The new residents of cities were left to their own devices and expected to find their own solutions to this problem. As a consequence, illegal settlements started to appear on state-owned land containing natural resources (forests, drinking water basins, etc.), which in return brought about forest degradation. Parallel to these developments, a re-

vised version of the Forest Law (Nr. 6831) was enacted in 1956, which introduced the 2/b practice (excluding degraded forest area from forest boundaries) that ultimately magnified the extent of destruction. However the enactment of laws are dated back to the 1950's, several modification to existing laws occurred starting with 1980's parallel to acceptance of neoliberal policies in Turkey.

Whether on a global scale or the national scale, several studies have been carried out on deforestation. The first group of studies focuses on the assessment of scientific studies, the management of deforestation, creating awareness among state parties and enacting certain sanctions in context of global climate change through international organisations like the UN. The second group of studies are scientifically based. These are studies addressing the causes of deforestation, the transformation of forest reserves and management of the situation. Forest reserves are monitored via GIS and the relation between deforestation and its causes can be demonstrated with statistical analyses. This is evaluated particularly in scope of the Amazon Forests for being the world's largest carbon sink. The number of plantation owners is increasing each year and each plantation clears about 1 hectares of forest for agriculture and stockbreeding (Laurance et.al, 2001:305). There are some studies that monitor the change in forest reserves in Turkey using the GIS method. That said, it is evident that causes of deforestation tend to be examined through a descriptive approach dependent on a single factor. However there are some studies that have used statistical methods to investigate the impact of deforestation on carbon absorption capacity. However, based on the legal arrangements mentioned above, this study aims to examine the relation between the loss of forest reserves and the extent of development in housing, industry and tourism as well as mining operation capacities.

Material and Methodology

Based on the conceptual explanations and discussions summarised above, it could be said that man-made threats including population growth, urbanisation and economic activity are responsible for the majority of deforestation around the world and specifically in Turkey. Besides that, people are aware of the extent of disasters that might transpire from deforestation associated with human activity and are taking measures in response. However, these measures are ineffective in preventing the trend of deforestation.

Policies and legal arrangements are being implemented to counteract deforestation in Turkey. Fundamentally, this study seeks to find an answer to the question of how functional and/or successful policies and legal arrangements developed with the objective of preventing deforestation are in preserving forest reserves. An assessment of the ex-

tent of forest area preservation has been used to find the answer.

It is obvious that damage to forest areas cannot be explained by only associating the situation with legal legislation. However, as explained above, through laws and regulations, legal legislation acts to define the boundaries of exceptions about determining the use of forest areas for purposes other than forestry. In other words, legislation defines the type, extent and intensity of functions that can be permitted in forest areas. In this context, forest area loss in 81 provinces between the years 1991 and 2007 has been taken as a dependent variable to find an answer to the abovementioned question. Then, the nature of cause-effect relation between these losses and three independent groups of variables have been analysed on a provincial level. The mentioned independent groups of variables are: "built area indicators", "degraded forest area indicators" and "mining activity indicators". 9 indicators have been determined under these three groups. With the aim of defining a process, the numerically expressible independent indicators used for the analysis included "Total land surface covered by buildings without occupancy permit ", "Amount of buildings without occupancy permit", "Amount of unregistered buildings", "Total land surface covered by legal residential buildings", "Total land surface covered by legal industrial buildings" and "Total land surface covered by legal touristic buildings" in scope of "built

area indicators" (obtained from the online public database of the Turkish Statistical Institute/State Statistical Institute – TURKSTAT/SSI); the "Change in number of mining companies" and "number of people employed in mines" in scope of "Change of labour force working for mining companies" (obtained from the online database of TURKSTAT/SSI and Union of Chambers and Commodity Exchanges of Turkey - TOBB); and finally "change of forest area in provinces".

The mentioned indicators cover the period between 1992 and 2012 in order to describe a process. In this regard, illegality indicators are of an exceptional nature. The only accessible holistic data about "the amount of unregistered buildings" and "the amount of buildings without occupancy permit" is "The Study on Housing Demand in Turkey, 2000-2010) prepared by the Turkish Prime Ministry's Undersecretariat of Housing. In order to include the relation between illegal development and loss of forests in the assessment, this study assumes that the rates indicated in the report have remained unchanged since the year 2000. Total land surface covered by buildings without occupancy permit have been included in the data set in order to use a current parallel data on this topic. TURKSTAT Business Inventory (from 1992) and current online information released by TOBB has been used as indicators associated with mining activity in order to present the change in number of mining operations and people employed in mines between the years 1992 and 2014 (Table 1).

Table 1. Data sources and periods of data used in this study

Data		Source	Period
Change of forest area in provinces		State Institute of Statistics-1991 Database of Ministry of Environment and Forestry-2007	1991-2007
Legal Buildings	Total land surface covered by legal buildings (only including residential, industrial and touristic buildings)	State Institute of Statistics 1992-2000, Building Census. TURKSTAT (Turkish Statistical Institute) 2002-2012, Building Permit Statistics.	1992-2012
Illegal Buildings	Total land surface covered by buildings without occupancy permit Amount of buildings without occupancy permit Amount of unregistered buildings	TURKSTAT (Turkish Statistical Institute) Database Database of Prime ministry Undersecretaries for Housing Affairs-2000	1992-2012 2000
Change in number of mining companies Change of labour force working for mining companies		TURKSTAT (Turkish Statistical Institute)– General Census of Industry and Business Local Units-1992 Database of Union of Chambers and Commodity Exchanges of Turkey-2014	1992-2014
Amount of forest area which is ready for sale by the state in terms of Article 2(b) of the Forest Law Nr. 6831		Database of Ministry of Environment and Forestry	2012

Table 2. Pearson Correlation Analysis between independent variables along with dependent and independent variables

Correlations

Parameters		Change of forest area in provinces	Amount of forest area which is ready for sale by the state in terms of Article 2(b) of the Forest Law Nr. 6831	Total land surface covered by buildings without occupancy permit	Amount of buildings without occupancy permit	Amount of unregistered buildings	Total land surface covered by legal residential buildings	Total land surface covered by legal touristic buildings	Total land surface covered by legal industrial buildings	Change in number of mining companies	Change of labour force working for mining companies
Change of forest area in provinces	Pearson Correlation	1	,646(**)	0,154	0,139	0,086	,323(**)	,570(**)	0,171	,481(**)	0,03
	Sig. (2-tailed)		0	0,169	0,217	0,448	0,003	0	0,127	0	0,788
	N	81	80	81	81	81	81	81	81	81	81
Amount of forest area which is ready for sale by the state in terms of Article 2(b) of the Forest Law Nr. 6831	Pearson Correlation	,646(**)	1	,348(**)	,295(**)	,229(*)	,537(**)	,614(**)	,326(**)	,508(**)	0,044
	Sig. (2-tailed)	0		0,002	0,008	0,041	0	0	0,003	0	0,7
	N	80	80	80	80	80	80	80	80	80	80
Total land surface covered by buildings without occupancy permit	Pearson Correlation	0,154	,348(**)	1	,976(**)	,957(**)	,698(**)	,386(**)	,880(**)	,280(*)	0,129
	Sig. (2-tailed)	0,169	0,002		0	0	0	0	0	0,011	0,251
	N	81	80	81	81	81	81	81	81	81	81
Amount of buildings without occupancy permit	Pearson Correlation	0,139	,295(**)	,976(**)	1	,993(**)	,662(**)	,311(**)	,863(**)	,236(*)	0,134
	Sig. (2-tailed)	0,217	0,008	0		0	0	0,005	0	0,034	0,234
	N	81	80	81	81	81	81	81	81	81	81
Amount of unregistered buildings	Pearson Correlation	0,086	,229(*)	,957(**)	,993(**)	1	,587(**)	,263(*)	,815(**)	0,175	0,128
	Sig. (2-tailed)	0,448	0,041	0	0		0	0,018	0	0,119	0,255
	N	81	80	81	81	81	81	81	81	81	81
Total land surface covered by legal residential buildings	Pearson Correlation	,323(**)	,537(**)	,698(**)	,662(**)	,587(**)	1	,353(**)	,791(**)	,487(**)	0,116
	Sig. (2-tailed)	0,003	0	0	0	0		0,001	0	0	0,303
	N	81	80	81	81	81	81	81	81	81	81
Total land surface covered by legal touristic buildings	Pearson Correlation	,570(**)	,614(**)	,386(**)	,311(**)	,263(*)	,353(**)	1	,247(*)	,468(**)	0,136
	Sig. (2-tailed)	0	0	0	0,005	0,018	0,001		0,026	0	0,226
	N	81	80	81	81	81	81	81	81	81	81
Total land surface covered by legal industrial buildings	Pearson Correlation	0,171	,326(**)	,880(**)	,863(**)	,815(**)	,791(**)	,247(*)	1	,352(**)	0,15
	Sig. (2-tailed)	0,127	0,003	0	0	0	0	0,026		0,001	0,182
	N	81	80	81	81	81	81	81	81	81	81
Change in number of mining companies	Pearson Correlation	,481(**)	,508(**)	,280(*)	,236(*)	0,175	,487(**)	,468(**)	,352(**)	1	,280(*)
	Sig. (2-tailed)	0	0	0,011	0,034	0,119	0	0	0,001		0,011
	N	81	80	81	81	81	81	81	81	81	81
Change of labour force working for mining companies	Pearson Correlation	0,03	0,044	0,129	0,134	0,128	0,116	0,136	0,15	,280(*)	1
	Sig. (2-tailed)	0,788	0,7	0,251	0,234	0,255	0,303	0,226	0,182	0,011	
	N	81	80	81	81	81	81	81	81	81	81

* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed).

Table 3. Consequences of multiple regression analysis

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,741(a)	0,548	0,49	80490,813

(a) Predictors: (Constant),
(1) Amount of forest area which is ready for sale by the state in terms of Article 2(b) of the Forest Law Nr. 6831,
(2) Total land surface covered by buildings without occupancy permit,
(3) Amount of buildings without occupancy permit,
(4) Amount of unregistered buildings,
(5) Total land surface covered by legal residential buildings,
(6) Total land surface covered by legal touristic buildings,
(7) Total land surface covered by legal industrial buildings,
(8) Change in number of mining companies,
(9) Change of labour force working for mining companies.

To associate the loss of forest reserves with specified indicators, a multiple regression analysis is employed with the help of the SPSS software in order to interpret changes in conjunction with the aim of determining the extent correlation coefficients and independent variables are able to explain changes taking place in the dependent variable (loss of forests). The results presented here are for purposes of generalisation and the changes seen in certain provinces could be associated with singular explanatory reasons and factors excluded from the evaluation, but nonetheless equally as significant as the indicators used in this paper. However, the objective of this study is to obtain general inferences intended at providing insight into loss of forest reserves and the functionality of legal legislation that is expected to limit the loss of such areas.

Findings

This study investigates the relation between the dependent variable (loss of forest area) and other independent variables. On a national scale, it has been identified that 10,175,952 decares of forest area has been transformed into land use other than forests. Loss on a provincial basis was calculated to be approximately 125,629 decares on average.

Parallel to this transformation, the total amount of land covered by the base areas of legal buildings has been observed to rise by approximately 133% annually (total 2650% rise over a period of twenty years) for the housing function; approximately 170% annually (total 3400% rise over a period of twenty years) for industry; approximately 180% annually (total 3600% rise over a period of twenty years) for tourism (hotel). During the same period, the rise in the total base area of buildings without occupancy permit has been calculated to be approximately 112% annually (total 1200% rise over a period of twenty years) for the housing function; approximately 60% annually (total

3400% rise over a period of twenty years) for industry; approximately 9425% annually (total 188,500% rise over a period of twenty years) for tourism (hotel). According to Article 2(b) of the Forest Law Nr. 6831, the total area identified to have become degraded forest area in 2012 was 473,419 m².

It is possible to interpret the relation between loss of forest area and other independent variables and significant relations amongst specific independent variables with the help of correlation coefficients presented in Table 2. Although the nature of the analysis makes it impossible to define a direct causality relation, there is nonetheless a statistically significant relation / correlation at the level of p<0.01 (99% significance level) between the loss of forest area and applications executed according to Article 2(b) of the Forest Law Nr. 6831, the number of tourism facilities – housing and mining operations. Based on the result, it is possible to argue that loss of forest area has a positively moderate and high degree relation between development and mining activities (r=0.646; 0.323; 0.570; 0.481).

Another result that should be reemphasised based on Table 2 is that there is a significant relation at the level of p<0.01 between the total area excluded from forest reserves according to Article 2(b) of the Forest Law Nr. 6831 and almost all other variables. That is, it could be said that interpreting a forest area as "degraded" reveals correlation with the surge in housing – tourism – industrial facilities, illegal development and number of mining operations. In other words, provinces with extensive degraded forest areas also reveal a surge in such forms of development. Having said that, it is possible to observe a powerful correlation in the same direction between the parameters of surface (base) area of development for housing and hotels and the number of mining operation, and the extent of forest reserves considered to be degraded (r=0.537; 0.614; 0.508).

Performing a multiple regression analysis on the 9 independent variables identified in scope of the study reveals a R2 is value of 0.548. This finding demonstrates that approximately 55% of forest area loss occurring within provinces between 1991 and 2007 is caused by the variables mentioned in this study (Table 3).

Conclusion/Assessment

Based on the definitions discussed in this study it could be thought that there is a problem concerning the definition of forest areas. Classifying reforested areas as forests at the end of the process should be reconsidered with regard to the concepts of ecosystem and canopy density. Additionally, on the level of globalisation the REDD programme has set the concept of "acceptable deforestation" for developing countries in scope of economic activity and this could be regarded as a sign of declining global forest reserves. This remark could be interpreted as "the reality of deforestation is accepted and controlled deforestation could be witnessed". Therefore, it becomes evident that the system can be more lenient for developing countries in certain aspects. However it is possible to argue that we have and will come across two basic results. First is the decline of forest reserves (either quantitatively or qualitatively or both) and the second is the reality that in scope of global climate change, greenhouse gas emissions will continue to rise as an active cause of global warming.

Productive forest reserve contains a specific ecosystem within and such forest reserves have a dense canopy layer within this ecosystem. Productive forests are forests that play an important role in global climate change and absorb maximum levels of carbon. In other words, they are pieces of land that are classified as productive forests. Such forests have a carbon absorption capacity that is five times greater than forests created by reforestation inside and outside forest areas (Coşkun & Gençay, 2011:368).

Depending on these perspectives it could also be said that, the global system has found its own equivalent of the Turkish legal legislation and policies that includes exceptional conditions/closes causing forest degradation and losses.

The study has revealed a statistically significant relation between the loss of forest area and applications executed according to Article 2(b) of the Forest Law Nr. 6831, the number of tourism facilities – housing and mining operations. Based on the result, it is possible to argue that loss of forest area has a positively moderate and high degree relation between development and mining activities. The R2 calculation demonstrates that approximately 55% of forest area loss is caused by the variables mentioned in this study.

At this point it is worth-mentioning that both in the official statistics and some related studies (Coşkun & Gençay, 2011:368-369) total forest surface is enlarging in the whole country. On the other side forest area losses are also occurring due to the above-proved reasons. Here appears a unique side of the issue for forest areas where quantity is replacing with quality just as Coşkun & Gençay (2011) mentions. Depending on the same dilemma, as stated in the 2013-2017 Strategic Plan, the General Directorate of Forestry aims to reforest 500,000 hectares of area in order to improve the forest areas in the country in a quantitative manner. For a better and sustainable solution, besides improving forests quantitatively, existing forest areas should also be protected with legislative and administrative efforts.

It could be argued that legal legislation and policies have become a tool of legitimising loss of forest areas to the extent of affecting the future of humanity.

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