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**Turkish Wood Based
Panels Industry: Future
Challenges and
Suggestions**

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1.INTRODUCTION

The forest industry has been an inevitable propelling power of the industry since olden times.

And thus, the industrial use of wood has continued from the past until today. Use of wood as an industrial material is perceived as a source of income for wood producers.

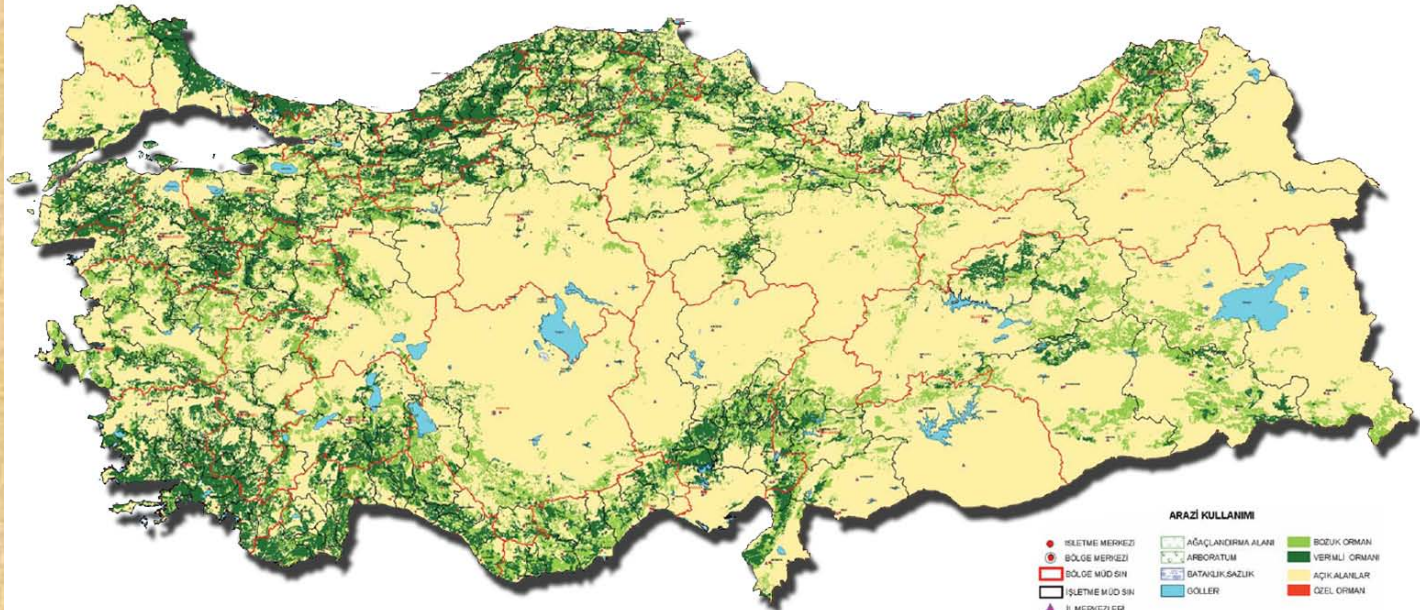
The fact that the wood demand is still being met via illegal methods today highlights the relevance of sustainable forest management and –as it naturally entails- that of certification in terms of industrial wood production.



Worldwide board production had a fluctuating course between 2005-2009. Wood production, which was 63.1 million m³ in 2005, increased to 75.5 million m³ as of 2009. The world's largest board producer is China, which fulfills 45% of worldwide board production alone. The USA, Germany and Turkey follow China, which produced 34.5 million m³ of boards in 2009. As the 4th largest board producer worldwide, Turkey is an important country for the sector.



As per the latest forest inventory research and management plans made by forestry organization, Turkey has total of 21.2 million ha (which corresponds to 25% of country's surface area). It is estimated that 10.1 million ha of the current forests has an economic function and 10.4 million ha has an ecologic function while 0.7 million ha has a social function.



According to OGM's data (2008), total growing stock of Turkey's forests is 1.2 billion m³ in normal forests and 0.8 billion m³ in degraded forests. Average growing stock per unit area is 112.5 m³/ha for normal forests and 8.28 m³/ha for degraded forests. On the other hand, while the growth of our forests was 36.3 million m³, the yearly allowable cut given in management plans was 16.3 million m³. Increase is 3.34 m³/ha total in normal forests in unit surface area and 0.23 m³/ha total in degraded forests.

For the purpose of meeting the total wood requirement, OGM supplies 12-13 million m³ wood out of their sales to the market. On the other hand, the private sector's production is 2-3 million m³ while 2.3 million m³ woods are supplied to the market by means of imports.



Raw Material Issue: Single biggest cost factor of the chip board and fiber board industry is wood material. Accordingly, raw material issues are among the most important problems for the industry. Considering the actual capacity of chip board industry, the requirement is approximately 7,824,000 stere raw materials. Considering 10,676,000 stere of raw material requirement of fiber board industry, calculated on basis of industry's actual capacity, overall raw material requirement of board sector is around 18,500,000 stere.

Purpose of Use Issues: The chip board and fiber board industry is able to use raw materials of both high and low quality. Raw material used in these sectors is close to raw material used in paper industry and firing wood and waste raw materials of other forest products can be used in board industry at certain proportions.

Transportation Issue: Transportation, namely freight transportation, causes two problems for board sector. First is the inability of transporting board raw materials and second is the fact that transportation is a cost factor that increases the overall cost of raw materials.

Technical Personnel Issue: The fact that forest industry engineers especially do not have a sufficient level of material knowledge by the time they graduate from their faculties' causes major problems in work environments in factories.

The basic purpose of this study is to project the future demand based on the board sector data from the past and thereby bringing solution recommendations to known issues. Two distinct scenarios were developed for the purpose of demand projection. While only the yearly change was considered in the first scenario, what the demand would be was calculated on the basis of socio-economic variables in the second scenario.



2.MATERIAL and METHOD

Cases where a dependent variable can be calculated using a single independent variable is very rare (Genceli, 2001). In particular, the planning and management of forest resources have a very multi-dimensional structure. Accordingly multidimensional decision taking methods are suitable for the structure of forest resources and more substantial decisions and solution propositions are possible when these methods are used (Daşdemir and Güngör, 2002).

From this perspective, a multidimensional linear regression model was used in this study. An attempt was made to determine the future demand for wood raw materials to be used in board production using multiple regression. Moreover, wood requirement was determined considering Turkey's current board production and predictions on the amount of raw materials to be needed in the future are listed.

Amount of industrial wood production used in board production between 1980-2010 (WP), population (PPL), Gross Domestic Product per capita in US dollars on basis of current producer prices (GDP\$) and number of completed buildings (COMPBLDG) factors were taken as socioeconomic variables and considered as the material in this study.

3.FINDINGS

Multiple regression method was used in order to determine the board production volume and future demand. Independent variables' ability in percentage in explaining dependent variable is given in Table 2.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,892 ^a	,796	,774	747539,142	,796	35,205	3	27	,000	1,471

We see that independent variables explain dependent variable by 79.6% in the model summary, which consists of the first results of regression analysis carried out for the purpose of determining the amount of industrial wood needed for board production. On the other hand, the model's significance level turned out to be 0.000, and it was ascertained that there is a significant correlation (at 0.001 level) between independent variables included in the model and dependent variable. The model for purpose of determining the industrial wood production volume was formulated in the light of the data given in Table 3.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9560592,005	1453407,338		6,578	,000
	NFS	-,053	,029	-,300	-1,853	,075
	GSMH	681,002	91,022	1,186	7,482	,000
	TAMINS	-11,885	7,875	-,154	-1,509	,143

In accordance with the data given in Table 3, industrial wood production model is formulated as follows.

$$Y = -0.053 * NFS + 681.002 * GSMH - 11.885 * TAMINS$$

With the help of this formula, it is understood that industrial wood production will change directly correlated to changes in population and Gross Domestic Product and inversely correlated to number of completed buildings. Independent variables' values for years between 2011-2010 have been calculated using simple regression and used in corresponding years in multiple regression analysis model. Industrial wood production volume was found on basis of these calculations and given in Table 4.

Years	Projection of industrial wood production
2011	11153206
2012	11463410
2013	11773614
2014	12083818
2015	12394022
2016	12704227
2017	13014431
2018	13324635
2019	13634839
2020	13945043

On the other hand, according to data of the Chip Board Industrialists Association (2012), Chip Board Factories in Turkey has 17,427 m³/day established capacity.

These factories have an actual daily production of 14,437 m³ (5,269,505 m³ per year). On the other hand, capacity of established and active fiber board factories is 13,645 m³/day (4,980,425 m³ per year).

The yearly wood requirement of active capacities (as opposed to that of the established capacities) are 15.6 million steres of wood for chip board. Likewise, wood needed for fiber board is 21 million steres.

Therefore, Turkey's wood requirement only for the board sector is approximately 37 million steres. Current production volume is 20-25 million steres in our calculations.

It is understood that this volume is insufficient today and a production of such limited volume will not meet future requirements.

4.CONCLUSION

- In order to meet the industrial wood demand, it is essential to carry out initial demand forecasts and to revisit forecasts each year.
- Industrial plantation operations for the purpose of meeting the needs of forest industry must be accelerated as the demand will increase in the future.
- Generalization of sustainable forest management and certification practices, and prediction of future certified wood demand are essential.

- New practices to increase the productivity of Turkey's forests must be accelerated. Silvicultural practices, which are of great relevance in meeting the quantitative wood demands of the forest industry in particular, must be prioritized. In this context, shortening the management periods, especially in relation to red pine, can be considered as an option.
- It is essential to identify areas to be used for wood production in the scope of functional planning, to carry out practices in accordance with such planning, and to review management plans.
- We shouldn't delay in fulfilling the requirements of sustainable forest management and BREED characteristics and international processes must be considered while deciding on wood production policies.

- Material knowledge, management and organization issues must have greater focus in education of Forest Industry Engineers.
- Allocations made for forest villagers must be reviewed with due consideration to the future of the forest industry.
- Because the raw material requirements of the sector will increase due to new initiatives in the future, both the private sector and state must launch afforestation practices, in particular using quick developing species, near by factories of large capacities. Red Pine and Poplar, which are able to adapt in Turkey's conditions, may be preferred as quick developing species.

Furthermore another important result presented that the content of legal arrangements is less comprehensive than national plans and programs.

While 18.4% of the total assessed expressions take place in legal based documents and the rests are observed in 9th Development Plan Forestry Expert Commission Report and National Forestry Program.

Then it could be suggested that the legal background of the forestry oriented rural development issues should be strengthened and enriched.



Thanks your interest