

Full Length Research Paper

Does legislation cause externalities in timber selling? A case from Turkish timber market

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This study aims to explain how legislation causes market failure by creating problems of externality in forest management in Turkey. In general, legislation is protective and regulatory, but in some cases it could be used in contradictory ways. This study investigates only timber sales to forest villagers and related subsidies concerning market failures and externalities. Subsidized timber sales to forest villagers cause an unfair competition for forest industries. This creates externalities arguable for 'state' and different stakeholders as negative or positive. As an introduction, general overview of market failure, externality and timber sales are summarized. Then, general characteristics of Turkish forestry and the legal reasons for subsidies were explained. Following that, structural differences between Turkish timber market and stochastic free market were summarized and illustrated. After that, materials and methodology of the research were explained. Then, this study was completed by giving results, detailed discussions and conclusions. Depending on computational assumptions, total economic loss in timber sales to forest villagers was computed to about 100 million USD annually. This amounts to approximately ten percent of the total economic value as computed by Turker et al. (2005) which is not negligible. Market structure in timber sales cannot be defined by considering only free market assumptions. Legislation should always be considered by forest managers. The outcomes of this analysis showed that externalities coexisted with legislative provisions.

Key words: Externality, legislation, market failure, timber sales, forest management.

INTRODUCTION

Forest resources play an important role in public well-being and rural development in many countries. Forest policy dealing with forest management must consider various interests of several stakeholders. As seen in the general declaration of the third ministerial conference on the protection of forests in Europe, "an effective partnership between society and the forest sector will be strengthened" (Anonymous, 1998). This requires recognition of such interests when implementing relevant forestry programs and certain forestry practices. If large numbers of people live within or adjacent to public forestlands, as in Turkey, this requirement is already a must.

On the other hand, the responsible authority, which is

the General Directorate of Forestry in Turkey, is generally assigned by its organic law to perform several duties. In this sense, legislative provisions lay down how to govern forest resources, rural development, etc. In this way, a broad policy framework is initially formulated and pursuant to such a policy is a series of implementation plans and programs that are executed by considering three essential criteria, which are economic efficiency, equity and sustainability of those resources (Daly and Townsend, 1993). Thus, equity and fair distribution of benefits and income transfers are other issues to be considered in policy implementation. Therefore, state forest policy aims to consider the above concerns and to make the best decision that satisfies all stakeholders. However, in some cases, the best economic decision for forest owners or responsible institute might not be taken. This may be because of legislative provisions, outdated management perception and public good characteristics

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of forest resources or its service.

Parallel to the above discussion, public forests are thought to be the source of market failure due to its public good nature and the impossibility of exclusion and rivalry. However, some public forestry practices, as timber sales due to the exclusion of others and rivalry, may fit well for free market economy and may not lead to market failure if well managed and has secure legislative basis. Criteria for the allocation of scarce resources, which are economic efficiency and equity, are other issues to be dealt with. Efficiency here means how to increase the size of economic output by a given input; whereas, economic equity means how the referred output is to be divided among members of society. Since equity is more relevant to a matter of political choice, efficiency is solely a concept of economy that can be explained within the context of economic principles and methods. The thing that is most efficient might not be fair and the thing that is fair and equal might not be efficient (Stevens, 1993). Efficiency is an important aspect of public policy, but equity also matters with reference to equal sharing of benefits (Niemann and Shapiro, 2008).

To understand efficiency and equity problems in resource policy, the concept of externality must also be understood very well. According to economists, externalities (sometimes known as spillover effects) refer to the side effects of an economic activity that arise when the production or consumption of a good affects others that are not in the market (Ragan and Thomas, 1993). On the other hand, the term can be defined such that externalities occur when the consumption or production activity of one person or firm affects another person's utility without being fully or directly reflected by market prices (Merlo and Croitoru, 2005) in current forestry literature.

When any price does not reflect the whole production cost and producers are not imposed on the referred cost, an externality problem arises. If the market price does not cover all production costs and some of them are put on the shoulders of the whole society or part of it, a negative externality problem arises for sellers; whereas, if a market price of any product does not cover the whole value of the referred product, a positive externality problem occurs for buyers (Castro, 1994).

However, efficiency is not the sole criterion for resource allocation in public forest management. Public forest authorities should also consider equity and sustainability. According to the 'organic law' of Ministry of Environment and Forestry, General Directorate of Forestry is, apart from efficient allocation of those resources, held responsible for rural development, income distribution among forest villagers and sustaining those resources. In fact, this does not necessarily mean that inefficient use of forest resources is tolerable and that no other mechanisms are available to meet equity, income distribution and wealth transfer.

The reasons for market failure are the nature of goods

and services, imperfect competition and externalities (Van Ireland, 1993). In addition to the common reasons for market failures in forest management, the interests of several stakeholders and legal provisions occupy a particular place. By their very nature, forest resources do not fit well into pricing mechanisms and schemes for market rules. When considering equity and rural development issues, timber sales are also put into statutory and regulatory management rules and thus, market failure occurs when timber sales in Turkish forestry is experienced.

The aim of this study, by considering the unique management, ownership, legal aspects, institutional, administrative and social structure of Turkish forestry, is to explain the legal reasons for the underlying causes of market failure in timber selling and to share potential outputs in international forestry literature. Specifically, the objectives of this study are:

1. To calculate the net economic loss of the General Directorate of Forestry due to subsidized timber selling to forest villagers;
2. To make an analysis of the above issues and recommend some sound solutions for correcting market failure.
- 3- To discuss the connection in between externalities, subsidies and economic loss.

In overall, this study aims to address the question: Is an efficient timber selling possible without market failure and net economic loss along with performing income distribution and transfer payments?

GENERAL CHARACTERISTICS OF TURKISH FORESTRY AND THE LEGAL REASONS FOR SUBSIDIES

Public ownership and public management have always dominated Turkish and Ottoman forestry. As discussed in Dolarslan and Ok (2006), such a structure makes Turkish forestry unique and differentiates it from European forestry. This has also dictated responsible forestry authority to work regarding special forest legislation. The origins of that legislation in Turkey date back to the Ottoman Empire. In 1870, the empire enacted the first forest decree. The Forest Decree of 1870 and free uses of the forests by the public were regulated for the first time. Between 1870 and 1937, many legislative changes were made. However, in 1937, two main activities were carried out in forestry: The first of them was enacting the first comprehensive forest law of 1937, No: 3116. The second was establishing the General Directorate of Forestry. The current situation of forest types and production capability are shown in Table 1.

Management objectives of Turkish forests vary from production to protection. The types of forests usage in

Table 1. Distributions of the forest areas in Turkey (Ogm, 2006).

Inventory periods	Forest types	Productive		Degraded		Total	
		Hectare	(%)	Hectare	(%)	Hectare	(%)
1963 - 1972	High forest	6.176.899	31	4.757.708	23	10.934.607	54
	Coppice	2.679.558	13	6.585.131	33	9.264.689	46
	Total	8.856.457	44	11.342.839	56	20.199.296	100
2005	High forest	8.940.215	42	6.499.380	31	15.439.595	73
	Coppice	1.681.006	8	4.068.146	19	5.749.152	27
	Total	10.621.221	50	10.567.526	50	21.188.747	100

Table 2. Management categories of forestlands in Turkey.

Management categories	Productive ha.	Degraded ha.	Total ha.
Industrial wood production	6 400 346,1	4 778 925,6	11 179 271,7
Fuel wood production	1 562 326,0	2 232 007,2	3 794 333,2
Total wood production	7 962 672,1	7 010 932,8	14 973 604,9
Protection	1 518 411,2	2 308 538,2	3 826 949,4
Different functional	602 884,9	1 033 557,9	1 636 442,8
Converted to high forests	141 271,4	36 019,0	177 290,4
Non wood forest products	29 403,4	17 816,5	47 219,9
Afforestation	354 824,3	121 262,2	476 086,5
Rehabilitation areas	11 753,2	39 399,3	51 152,5
Total other categories	2 658 548,4	3 556 593,1	6 215 141,5
Grand total	10 621 220,5	10 567 525,9	21 188 746,4

Source: Oriented from Ogm, 2006.

general are timber harvesting, collecting non-wood forest products, grazing, hunting, etc. Protection here means exclusion of some particular areas from all types of usage rights except for entering into forests for walking, collecting seeds, flowers, mushrooms for the purpose of household level consumption and spending leisure time or free recreation. Table 2 shows detailed figures of allocation of forestlands to management categories (Gunes and Coşkun, 2008).

With respect to institutional structure, all forests are under the care and supervision of the state. Relevant public authorities are General Directorate of Forestry, General Directorate of National Parks and Nature Conservation, General Directorate of Afforestation and General Directorate of Forest and Village Relations. All these institutions are managed by the Ministry of Environment and Forestry with regard to current legislation and more influential for policy making.

Forest villagers, which are about 8.5 million as of 2005, reflect other specific characteristics of Turkish forestry (Tuik, 2005). Those people live within or next to forests and obtain their supply of essential timber materials from those resources and the only source of cash flow for a great number of these people is the harvesting opportunity that the General Directorate of Forestry provides (Haan, 1998).

All forests are to be protected, by law, by both the public in a larger sense and by the state in a narrower sense. The General Directorate of Forestry manages and controls all forest resources in Turkey, undertaking forest protection works (against fire, illegal cutting, encroachment, insects and diseases, etc.), silvicultural works for forest regeneration and improvement, road construction and maintenance, land surveys, management planning, harvesting and marketing of wood and other forest products (Linn et al., 2001). Therefore, state management is essential by law and only to a limited extent are some of the forestry practices transferred to private entities like the local people, forest village development cooperatives and other private contractors. Harvesting and timber sales have a unique place and play an important role in the lives of the above forest villagers. Every year, the General Directorate of Forestry allocates specific areas to harvesting, depending upon management plans of the referred areas. The main mechanism for marketing of timber materials is auction by considering market conditions and price mechanisms. This method of timber sales is obliged to the General Directorate of Forestry by law.

On the other hand, social aspects of Turkish forestry have been reflected in forest legislation since 1937. In all the forest laws passed during the past seventy years,

there are some articles focusing on the rights or privileges of forest villagers. Policy and lawmakers believe that if some rights or privileges are given to forest villagers, illegal logging activities would decrease over time and public welfare would increase. Consequently, this kind of subsidies improves good public relations between the state and the forest villagers. Therefore, forest villagers are entitled by the Forest Code to carry out annual harvesting work in state forests. According to the current Forest Code of 1956, No: 6831 (Article 40), forest villagers, in preference to those who have established forest village development cooperatives, are privileged to be hired for timber concession (harvesting, transporting), collecting of forest products, production, amelioration, silvicultural practices, afforestation and road construction in all state forests.

According to paragraph 2 of the article 40 of the Forest Code, when the state makes a harvesting decision about particular tree stands, the local forestry branches, on behalf of the General Directorate of Forestry, are to sign a timber concession license with forest development cooperatives established by forest villagers. In other words, forest villagers and forest village development cooperatives have a statutory right to timber concession and licenses. It is a type of joint forest management with local people. With a signed contract between Local Forestry Districts of General Directorate of Forestry and forest village development cooperatives or local people as an individual, the latter entity is entitled to harvest a particular stand of trees and to transport harvested logs to the market at a particular price. Such a contract is valid for one year for a particular tree stand. If the workforce of those villagers is insufficient, the work needs a special expertise or they request higher labor wages. The forest authority is authorized to have such work done by a contractor other than the above coops and villagers under a special contract.

Articles 31 - 34 state that timber materials harvested from state forests may be subsidized to rural peoples to improve their well-being in a broader sense and to supply their wood requirements.

According to Article 31, forest villagers, whose villages are located in productive forests, are entitled to obtain industrial woods from Local Forestry Districts to construct houses, stables, haylofts, warehouses and hencoops, by paying only harvesting costs. Forest village entities are also privileged to obtain wood materials from the same forest branch to construct schools, mosques, health centers, bridges and village government buildings, by paying only harvesting costs (including felling, transporting and stacking costs). Fuel wood needs of those villagers are supplied by paying only harvesting costs including felling, transporting and stacking. Under this Article, every year, the General Directorate of Forestry through its local branches, allocates an average of 84.000 m³ of industrial wood and 3.995.000 sters of fuel wood per year between 2000 and 2006 for those

people (Ogm, 2009).

Article 32 has a parallel provision to the above article, with two exceptions: That forest villagers, whose villages are located in unproductive forestlands, and urban residents, whose towns are located in productive forestlands and whose population is less than 2500, are entitled to get industrial timber to construct houses, stables, haylofts, warehouses and hencoops, for the payment of only harvesting costs. Also, forest village entities are privileged to get wood materials from the same forest branch to construct buildings enumerated in Article 31, by paying only one third of the costs (including felling, transporting and stacking costs). Fuel wood needs of those villagers are supplied by paying only one third of the total costs including felling, transporting and stacking. Under this Article, every year, the General Directorate of Forestry through its local branches, allocates an average of 31.000 m³ of industrial wood and 220.000 sters of fuel wood between 2000 and 2006 for those people (Ogm, 2009).

Article 33 provides another subsidy for people, who migrated to the country or moved to another place within the country, whose houses were destroyed by earthquake, wild fire, land slide, flooding or avalanche, to construct houses, stables, haylofts and warehouses, by paying only felling, transporting and stacking costs. Under this Article, every year, the General Directorate of Forestry through its local branches allocates an average of 7.000 m³ of industrial wood in the same period for those people.

Paragraph 1 of Article 34 of the Forest Code authorizes the State forestry authority to sell up to 100% of annual harvested firewood to forest villagers or forest village development cooperatives who harvested timber at harvesting and transporting costs. Moreover, paragraph 3 of the above article authorizes the said forestry authority to sell up to 25% of annual harvested industrial wood to the above people and cooperatives at a 20% discount based on the last bid price.

STRUCTURAL DIFFERENCES BETWEEN TURKISH TIMBER MARKET AND STOCHASTIC FREE MARKET

In economy literature, four major assumptions needed for efficient allocation of goods and services (Stevens, 1993) are shown in the first column of Table 3. These assumptions may be accepted as the conditions to constitute a free market structure under full competition. If any of the four assumptions are not met, market failure occurs and some remedies are required to correct such a failure. Most of the time, government intervention is required. Since two of the four assumptions are (that all benefits are captured by consumers and reflected in the demand function and all costs are born by the producers and reflected in the supply function) not met, an unexpected and unwanted outcome results, which is

Table 3. Comparison of the assumptions and related situations in Turkish forestry.

	General assumptions on market and forestry	Reflections of the general assumptions in Turkish forestry
Free market assumptions	1. Goods and services are to be private goods. 2. All production costs are reflected in the supply function. 3. All utilities or benefits captured from any goods and services should be reflected in the demand curve. 4. Market should be competitive and market price is to be determined by all producers and consumers. 5. Forest resources should be managed in a sustainable manner	1. Goods and services are not private goods. It is almost impossible to exclude others from its use and the production is not divisible. 2. Not all production costs are reflected in the supply function. 3. Not all utilities or benefits captured from any goods and services are reflected in the demand curve. Subsidies are used especially for social purposes in timber sales. 4. In many cases, public monopoly exists in management and no competitive market is established. 5. Sustainability is accepted in the constitution of the Turkish Republic
Forestry assumptions	6. Forest resources should be managed for multiple use 7. The management should consider environmental protection and biodiversity conservation	6. Although there are some problems in forest planning concerning multiple uses, forest legislation is improving in this subject. 7. National biodiversity strategy and 'draft law' were prepared, but enforcement of the strategies and activities are very new and the 'bill' has not been enacted yet.

called "externalities".

Efficient use of resources must be followed by the process of how to allocate efficient outputs to make a fair distribution across society. In this sense, "allocation refers to the relative division of the resource flow among alternative product uses and how much goes to production of cars, shoes, ploughs, teapots, etc. A good allocation is the one that is efficient, that is, allocates resources among product uses in conformity with individual preferences as weighted by the ability of the individual to pay. However, if natural resources are considered, the market fails due to malfunctioning, distortion or total absence of markets (Castro, 1994).

The policy instrument that brings about an efficient allocation is relative prices determined by supply and demand in competitive markets (Daly and Townsend, 1993). Distribution refers to "... the relative division of the resource flow, as embodied in final goods and services, among alternative people: How much goes to you, to me, to others, to future generations and how much is reserved for other species with whom we share the planet. A good distribution is one that is just fair, or at least one, in which the degree of inequality is limited within some acceptable range (Daly and Townsend, 1993)". In brief, allocation and distribution of ultimate products and net benefits among society is as important as efficient use of scarce resources.

In addition to the assumptions of the free market mechanism in Table 3, forestry assumptions or principles should also be considered for efficient timber sales. A historical debate over forest resource exploitation and management worldwide has an increasing impact on management decisions concerning those resources

(Hermosilla and Fay, 2005). How to manage forest resources in a broader context is an issue in public policy. Moreover, when natural resource management in general and forest resources in particular are under consideration, sustainability of those resources is a crucial criterion to be considered for resource allocation.

Collective choice, over forest resource use, has a long history worldwide. Resource conservationists on one side and preservationist on the other have played a major role in such a decision making process. The early debate over forest resource management revolved around two pioneering foresters, Gifford Pinchot and John Muir. The former supported the idea that the purpose of forestry was to serve people, not trees (Zivnuska, 1971 in Cabbage et al., 1993), while the latter asserted that forest resources must be left for preservation for aesthetic values, wilderness and natural habitats. Natural resources preservation is considered reasonable and desirable by its supporters, whereas, it is seen by others as wasting resources (Cabbage et al., 1993). Both philosophies have a reasonable basis in forest resource management. Neither of them dominates entirely over the other. Each has a particular place in present day legislation and management practices, which means that some areas have been left as wilderness and others have been actively managed for commodities (Gunes, 2004). Beyond that, sustainability and multiple uses of those resources, environmental protection and biodiversity conservation concerns require consideration of the concept "scale", which is another characteristic of efficient resource allocation (Daly and Townsend, 1993) and limits the application of free market economy to forest resource management.

Table 4. Net economic loss and externalities due to subsidies.

Types of subsidy	Industrial wood	Fuel wood	Total
Article 31 of forest code	84.000 m ³	3.995.000 ster = 2.996.250 m ³	3.080.250 m ³
Article 32 of forest code	31.000 m ³	220.000 ster = 165.000 m ³	196.000 m ³
Article 33 of forest code	7.000 m ³	0 ster = 0 m ³	7.000 m ³
Article 34 of forest code	370.000 m ³	2.121.000 ster = 1.590.750 m ³	1.960.750 m ³
Total quantity	492.000 m ³	6.336.000 ster = 4.752.000 m ³	5.244.000 m ³
Subsidized monetary values	16.035.556 USD	98.560.000 USD	114.595.556 USD
Free market values	44.826.667 USD	168.960.000 USD	213.786.667 USD
Net economic loss	28.791.111 USD	70.400.000 USD	99.191.111 USD

Parallel to the referred assumptions on forestry, legislation of Turkish forestry has been improved for years by several amendments as explained in Table 3. In addition, these assumptions have been declared officially as; "if those forest resources are managed, contemporary principles or assumptions also are to be considered for efficient resource allocation" (Anonymus, 2003), but, reflections of free market assumptions in Turkish forestry are not met with them as a whole. The reason for such differences may be regarded as the referred legislative provisions. However, the underlying reasons for such legislative provisions are traditions, social structure and beliefs of forest villagers and their economic welfare consideration of the 'state'.

MATERIALS AND METHODOLOGY

To perform this research, current literature is reviewed and analyzed to determine the types of data and research process. Then, data on price and quantity are acquired from the General Directorate of Forestry and its local branches as of 2006. Following that, the quantity of wood materials sold is counted as a cubic meter and ster. By using 0.75 conversion constant of one ster to one cubic meter, units of fuel wood are converted to cubic meter units. Then, subsidized price was obtained from the same Directorate as Turkish Liras. Free market price was taken from the tables published by the General Directorate of Forestry on bid prices as well. However, the Turkish liras are converted to USD by using an exchange rate of 1.35 to make the issue better understood.

A three stage methodology is followed to conduct this study:

1. In the first stage, monetary values of subsidized timber are calculated by multiplying the quantity of timber sold with the discount price.
2. Then, free market values of the above quantity are computed by multiplying the same quantity by free market prices.
3. Following that, the above two outcomes are compared with each other to figure out the net economic loss.

To apply the aforementioned methodology, the following assumptions are made:

1. Timber materials sold by subsidized price may also be sold by auction. Total subsidized timber quantity does not affect the equilibrium price in free market.
2. Net economic loss is considered as the loss of General Directorate of Forestry. In here, positive benefits of subsidizing

timber sales are ignored.

3. All calculations are made with reference to the year 2006, because it has a regular season and represents all periods.

4. Externalities in timber sales, as one of the underlying reasons for market failure and net economic loss, due to not meeting the second and third assumptions (Table-3) of the efficient market, are selected for analysis.

RESULTS

As of the year 2006, 370 000 m³ industrial wood on average and 2.212.000 sters fuel wood were allocated annually to those forest villagers (Ogm, 2006). The source of the subsidies may be seen in Table 4. In total, 492.000 m³ industrial woods and 6.336.000 sters fuel woods are allocated to those people annually.

The total subsidy of both industrial and fuel wood are 5.244.000 m³. The unit price for industrial and fuel wood is 44 TL/m³ and 21 TL/ster, respectively, calculated by dividing the total production costs with an allocated amount of wood. While monetary values of those subsidies for industrial wood is 16.035.556 USD, 98.560.000 USD is computed for fuel wood.

When calculating the free market bid prices for those products, it is obvious that the total income generated would be much more than the amount calculated above. Bid price for industrial wood is 123 TL/m³. When calculating the net economic loss incurred due to such subsidies, it is seen that the amount is 44.826.667 USD for industrial wood. The net income loss is 28.791.111 USD.

Likewise, the bid price for fuel wood is 36 TL/ster and almost twice the subsidized price of 21 TL/ster. When calculating the net economic loss incurred due to such subsidies, it is seen that the amount is 168.960.000 USD and the net income loss is 70.400.000 USD. Summing up those two values, a figure of 99.191.111 USD is obtained, which equates to the total economic loss.

Outcomes in Table 4 can be explained based on free market assumptions in Figure 1. In Figure 1, S₂ shows supply function for some subsidized goods by the General Directorate of Forestry and it is constant, that is, it does not change in response to market conditions. It also reflects annual timber production costs. Since the

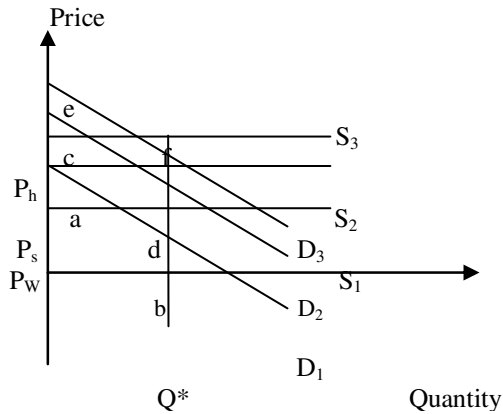


Figure 1. Structure of the timber market for Turkish forestry.

General Directorate of Forestry subsidizes the stakeholders by 20% of production costs of the amount delivered by article 34 of the Forest Code, the rectangle shows the amount of subsidy, which is represented by the area under $P_s P_w d b$. The quantity of subsidy reflects also positive externality of those people, which means that those people supply such an amount of timber at a 20% discounted price. The net income loss (negative externality) for the General Directorate of Forestry in such a subsidy is the area under the $P_s P_w d b$ rectangle, which accounts for 45.218.519 USD.

Likewise, since the General Directorate of Forestry subsidizes the stakeholders at the production costs of the amount delivered by Article 31, 32 and 33 of the Forest Code, the rectangle shows the amount of subsidy, which is represented by the area under $P_h P_s f d$. The quantity of subsidy reflects also positive externality, arising from another source, for those people. This means that, such an amount of woody materials is supplied at a production cost by the General Directorate of Forestry. The net income loss or negative externality for the General Directorate of Forestry in such a subsidy is the area under the $P_h P_s f d$ rectangle, which accounts for 53.972.593 USD.

Beyond that, if the General Directorate of Forestry were to sell the same amount of both fuel and industrial wood at the free market price, while supply function would shift from S_2 to S_3 and the demand function from D_2 to D_3 , the equilibrium price occurs as P_h . The area under $P_w P_h b f$ rectangle reflects net economic loss (negative externality) of total subsidy delivered by the General Directorate of Forestry under Articles 31, 32, 33 and 34 of the current Forest Code, which accounts for 99.191.111 USD.

On the other hand, using woody materials for fuel wood in primitive conditions is an old practice and causes extra waste of industrial wood. In other words, if total fuel wood could be used in industry, the free market price would be 123 TL/m³. Since 4.752.000 m³ have been allocated for fuel wood, the bid price could be 432.960.000 USD.

DISCUSSION

The implication of such a subsidy and economic loss from the 'state' perspective is that it is an inefficient resource allocation and poses a negative externality and social costs for society at first hand. In addition, it poses a positive externality for those villagers who get such unpaid benefits from public forests. Although, the 'state' has some negative externalities due to those subsidies, it also generates other positive benefits for it such as decreasing cost of combating illegal tree felling, encroachment and grazing. Those kinds of benefits might also be considered as positive externalities for General Directorate of Forestry. However, measuring such benefits or externalities is still difficult. When the potential values of those benefits could be measured accurately, it would be discounted from total net economic loss for General Directorate of Forestry.

In Turker et al. (2005), total annual production values of the Turkish forest was estimated as 977 480 000 USD. The computed value includes estimates of negative externalities. Negative externalities in this study consist of values generated from erosion, floods, landslides and losses due to forest fires. Total negative externalities of Turkish forests was computed as 133 607 000 USD (Turker et al., 2005). Besides such estimation, there are some findings on the values that deal with market price and direct uses. Similarly, several other studies, relevant to total economic values of forest resources and their contributions to national economy, prove that no particular method is available to calculate exact values of forest resources (Merlo and Croitoru, 2005). However, subsidies in timber sales were not clearly considered in those studies. They pursued a methodology that makes a rough approximation and thus results in insecure estimation. Moreover, all the Mediterranean Countries who contributed to the referred study did not consider subsidy prices and net economic loss due to such price mechanism. When the outcomes of this study are compared with the results of theirs, it proves that the subsidies are the sources of negative externalities for the 'state'.

Internalizing of externalities is another issue to be dealt with in this study. In the literature, several mechanisms to internalize externalities are proposed (Coase, 1960; Van Ireland, 1993; Castro, 1994; Kerr et al., 2006). Each of them could be applicable in various fields of the natural resources for internalizing external effects. Amongst these; regulatory limits and economic penalties, taxes on negative externalities, tradable environmental allowances (permits for negative externalities), investment subsidies, indirect incentives, payments for environmental services, changing and/or strengthening property rights and liability systems are the most prominent. Many of these approaches can be (and typically are) used in combination.

To address the above issue, several policy tools and

solutions can be recommended. According to Van Ireland, the instruments for market corrections can be classified further into economic instruments, legal instruments and instruments aiming at voluntary participation. According to Coase, assigning property rights might be a solution for market failure. Within the context of forest management, assigning tenure rights (like long term timber concession) and community management might be a solution for market failure. However, in some respects, the choice of instruments is not only a matter of economic, but also philosophical and political issue. The choice depends on political approach and ideas behind government bodies and philosophical thoughts about individual freedom and obligations (Van Ireland, 1993). According to Castro (1994), a series of regulatory provisions in legislation might be legal instruments for market corrections. Amongst these; quantity restrictions, standards and prohibitions are well known.

The tools for correcting market failure concerning subsidies are not limited to the ones referred to above. When regarding institutional structure of Turkish forestry, negative externalities for an institution might be internalized by another institution's budget. For example, while General Directorate of Forestry pays such subsidies to forest villagers and creating a negative externality for itself, such a payment decreases the amount budget that the General Directorate of Forest and Village Relations must allocate to those villagers. At this point, scale of internalization in forestry is affected by the scale of investigation.

An alternate management scenario to current understanding of timber sales may be considered. To this thought, if such an amount of wood were to be sold in the free market and the income generated by such trade were to be paid to the villagers, an efficient public policy may be achieved. In other words, total monetary values of such subsidy could be distributed to the villagers averaging about 300 USD per household by considering 1.750.000 households (Haan, 1998). Such an amount of money contributes up to 20% of total household income of those people, which is very important for their survival. In contrast, if a total 5.312.000 m³ of timber were to be shared among these households, each share would be about 2.5 m³ and the monetary value would be 65 USD, which means a net loss per household of 235 USD. Therefore, pursuing such a policy does not serve considerations of equity and income distribution, as well as the alternative of direct monetary payment of subsidy.

When looking at the issue in terms of sustainability, it is quite obvious that subsidizing forest villagers in such a way threatens sustainability of timber sales. However, this approach might be criticized as well. If market situations do not work well, the seller (General Directorate of Forestry) may not gain enough income from sales. Also, since those villagers have a long lasting tradition by free access to timbers, it might not be easy for them to quit from such beliefs and still attempt to

quasi free usage. Therefore, to compare this alternate to actual practice, sellers and stakeholders are obliged to better understand externalities within the positive, negative and differential scale.

It is evident from the foregoing analysis that the implementation of current timber sale policy results in market failure and net economic loss due to apparent current timber sale policy and needs a significant challenge. Since Anderson and Leal's (1991) free market structure does not seem realistic, multiple use principles and multi stakeholder characteristic of forest or timber management require a legislation which results to market intervention, failures and externalities. Blumm (1992) asserts that Anderson and Leal's free market mechanism fails to explain market implementation of social policy as superior to regulatory implementation and fails to recognize the inappropriateness of allowing markets to define environmental values.

In contrast to the above legal provisions, if those practices would be deregulated, the referred forest villagers would have a well being that is worse than their actual well being. Consequently, their potential illegal practices such as illegal logging, timber smuggling etc. on forest resources would have been increased. Thus, extensive usage on those resources might have increased resulting to more damage, destruction and overexploitation of Turkish forests.

Conclusions

Legal instruments are the ones that direct forest institutions about resource allocation. In addition, all the solutions recommended here require a series of legislative amendments to updating of current forest legislation.

In general, legislation is protective and regulatory, but it might be used in contradictory ways. In this study, only timber sales to forest villagers and related subsidies were investigated concerning market failures and externalities. Depending on assumptions for computations, economic loss in timber sale to forest villagers is approximately 100 million USD annually. It is approximately ten percent of the total economic value, which is not negligible.

On the other hand, the forest industry had imposed upon it an unfair timber price by allocating amounts of timber to forest villages through subsidies. This also implies that a negative externality has been created and the burden has been put on the shoulders of the entire society as a social cost.

Market structure in timber sales can not be defined by considering only free market assumptions concerning multi stakeholders and international principles of forestry. At this stage, legislation should always be considered by forest managers. Timber sales practices investigated here are simpler than forest resources management. The outcomes of this analysis prove that externalities coexist

with legislative provisions. When selecting optimal management policy among alternatives, it is difficult to specify and define externalities due to multi stakeholders' characteristics of forest management.

As opposed to legislative intervention to market structure in timber, deregulated forestry practices, as mentioned from the above, would have been more destructive and a threat to sustainable forestry.

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