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SUPPLY AND DEMAND ASPECTS OF FORESTRY IN TURKEY: A GENERAL OVERVIEW

The paper summarizes demand and supply aspects of Turkish forestry and its link with the other sectors of the national economy. Stressing out the importance of industrial forestry in Turkey, we suggest that the forestry is a sector of not high backward linkages, but the forward linkages of which are significant as it gives inputs to a lot of other sectors. Although it does not have high share in the overall production in national economy, the importance of environmental and ecological services of the forestry sector increases significantly. Forestry sector supplies products used as inputs and final consumption both for the domestic demand and to a very limited degree for foreign demand. Nevertheless the external factors play important role of the development of this sector. The paper also suggests policies followed by identification of some factors that affect the competitiveness of forest wood and non-wood products chain indicating their links with the international cooperation and in particular with the on-going process of accession to the EU.
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Introduction

Forestry sector plays an important role in an economy as it supplies forest products to meet their increasing demand and is a source of significant positive externalities for the national economy. The supply of wood is based on natural and industrial forests with increasing importance of the latter. Indeed, supply of wood products for the national needs with the rising demand of wood on the national and international markets creates problems, as at present the wood production is not capable to compensate the rising demand for forest products.
Total forest area per capita in Turkey is not very high due to the increasing population when compared with the other countries total forest area per capita. Despite the big area of forests, it accounts for only 0.32 hectare per capita, while the same indicator is 1.13, 1.05, 0.92, 0.92, 0.40, for the USA, Kazakhstan, Turkmenistan, Greece, Bulgaria, respectively. The story becomes more dramatic when we compare per capita productive forests. For Turkey it is only 0.15 hectare

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per capita, while for Finland, Russia, Brazil, New Zealand, Europe, and for the world as a whole it is 4.53, 4.2, 3.76, 2.21, 0.26, and 0.64, respectively. This signals the need of rise of national industrial forestry as one of the paramount tasks of the national economy.

Demand Aspects of Forestry in Turkey

The demand of forestry products has long traditions in the Turkish history. Despite the fact that the sustainable use of the forests are not explicitly declared the national culture over the centuries, the modern visions of forestry extrapolate these traditions combining them with the up-to-date policy of sustainable development and its implementation for turning industrial forestry into an efficient and competitive sector. Thus, up-to-date consumption of forestry products is facing extended protection of forest reserves and creation of new ones, which strongly reduces unsustainable use of these resources.

An important feature is the increasing industrial plantation in non-productive land not suitable for other purposes. This is source of additional wood coming to meet the rising demand of wood and related products. However, systematic studies revealing the links within the technological chain wood-wood products are limited in number (Cakir 1986, Kayacan 2004).

Industrial forestry in Turkey introduced modern technology in cultivation and logging of trees, including genetic improvement of the structure of forestry. Therefore, although growth was slowed down in the sector, forestry as a whole increased in productivity in the state and private plantations. Moreover, active government policy for rational use of forests aimed at protecting natural forests and extending industrial forestry at the expense of extending plantations on new low productive lands with suitable provenances of species such as Turkish red pine (*Pinus brutia* Ten.), *Eucalyptus camaldulensis* D., *Pinus radiata* D. Don, *Pinus pinaster* Ait, *Pinus elderica* Med., etc. (Cengiz et al. 2002, Dağdaş 2002, Tulukçu et al. 1987, Tunçtaner et al. 1985).

Turkish forestry sector can be characterized as a sector that produces mainly intermediate goods and stimulate the rise of production of the sectors, requiring forestry product as input for providing outputs of the final demand. Although the share of forestry sector in the economy is not high, the input-output analysis indicates that it is strongly interrelated to a lot of the other sectors (Turker 2005).Thus, the forestry sector is a sector of not high backward linkages, but the forward linkages of which are significant as it gives inputs to a lot of other sectors. Consequently, despite its small share in the national economy the forestry sector can be defined as a sector with strategic importance (Geray 1993).

Turkish forests are also a source of a lot of non-forestry products (named also secondary forest products), which are substantial part of consumption of some households, especially for the local population.[6] The production of non-wood forest products in Turkey is realized in two ways: as planned and unplanned production (SPO 1995a, GDF 1995). The planned production has been realized according to the targets determined by the Five Years Development Plans, and depending on the demand of home and foreign markets. Its management and the preparation of

[6] These include medical shrubs, grass and herbs growing in forest and its open spaces, various crops obtained from their leaves, flowers, seeds, stems, roots, gum resins, etc.

the silvicultural plans in this area are based on the budget and the regulations related to logging, production and sale rules of secondary forests products.[7]

As a whole, the production of non-wood forest products in Turkey is strongly dependent on the home and foreign demands. As the production potential is, high tree products are used not only for home consumption, but also for export. Between 1990 and 1998, more than 300 million dollars value of forest products were exported. About 98 percent of total export revenues were obtained from the non-wood forest products, while the rest was received from round wood (Konukçu 1999, Turker 2005). Turkey also plays an important role in the aromatic and medical plants trade in the world. For instance, between 1990 and 1999 Turkey exported for 682.7 million dollar value of medicinal plants (Toksoy et.al. 2003, p.8).[8]

The analysis of the modern consumption of forestry products would be incomplete if we do not consider the non-use value of forestry. The non-use values are important source for estimation of demand of many forestry related goods as for example recreation in forestry. While most of the resorts are concentrated in the sea areas, the Turkish forests provide an excellent recitation capacity. This activity is highly developed in some areas but as a whole the usage of forest is far below its potential. Producing estimations of such non-use values as existence, bequest, etc. values can be used in planning the growth of recreation in forestry areas.

These kinds of estimations should also be included as a part of analysis of consumption of forestry products as they create long-run effect on consumption. Producing estimations of non-use value of forestry gives a powerful instrument to the decision-makers to assess the benefits (real and potential consumption) of such activities in the forestry sector as creating recreation zones, protected areas, national parks and reserves, tourist zones, etc.[9]

Evidently, there is sufficient evidence that the shadow consumption of forestry products is not small. Taking into account the features of national consumption especially in rural population we expect high shadow consumption of non-wood forestry products. This is very symptomatic for the whole region, where the collection of forestry products as mushrooms, medical herbs, etc. is a tradition from old times. Besides, the forest products are, as a rule, an object of shadow consumption especially in countries where the control over the property rights is slack. The shadow consumption of forestry products may increase, however, due to inefficient defining of property rights. Then, it results in consumption of forestry

[7] In particular, this is related to such products as resin, storax, laurel leaf, box-tree, garden stake, fat pine, etc. On the other hand, other non-wood forest products, which have high potential of exporting and which are cultivated in the forest areas such as pine nuts, chestnut, sage, mushrooms, sumac, lime etc. are supplied mainly without any plan and independently from the market demands.

[8] Another technological chain of primary and secondary products of forestry areas is animal breeding, which constitutes serious part of local consumption. The primary animal breeding results in secondary goods (milk, meat, wool, leather, manure, etc.) all of them part of the local consumption. Although we can expect that the animal breeding in the forests is big in the rural populated mountainous areas, there is not available information about its dimensions. No official statistics could be found for the quantities produced and the prices per unit. The collection of such information can be realized by means of a survey carried out in the villages adjacent to the forests.

[9] Our preliminary observations indicate that forestry sector in Turkey is a source of important non-use values, which are substantial part of the benefits from forestry and are closely related to potential consumption of benefits coming from forestry. Non-use value of forests in Turkey account for about 61.5% of the total benefits of forests in Turkey according to Bann and Clements (2001, p.55-56). Other estimates also indicate that the non-use values of forestry products per hectare exceed the total per hectare benefits (Toksoy et.al. 2003, p. 8).

products outside the existing in the economy price system, which includes consumption of forestry and non-forestry products freely collected from the forestry areas, illegal logging, consumption of non-forestry goods self-produced in forestry areas, etc.[10]

Supply Aspects of Forestry in Turkey

The supply of wood is based on natural and industrial forests with increasing importance of the latter. The basic cultures of industrial forestry are pine species with increasing share of poplar and eucalyptus plantations. The share of poplar increases very rapidly due to its high productivity and demand, making it attractable for the private sector due to its good profitability.

The supply of forest products depends strongly on the structure of forestry production, its efficiency and links with the other sectors of economy. Its role is multifarious: forestry production is a source not only of inputs for the other sectors, it also creates additional jobs especially in areas with high unemployment – a fact additionally increasing the economic importance of this sector. According to Özyurt (1982), the employment multiplier of forestry sector is 0.291, which puts it at 17th position with regard to the employment effect in 64 sectors in the Trabzon Sub-Region economy. This high ranking is results of the application of labor-intensive technologies in forestry sector.[11]

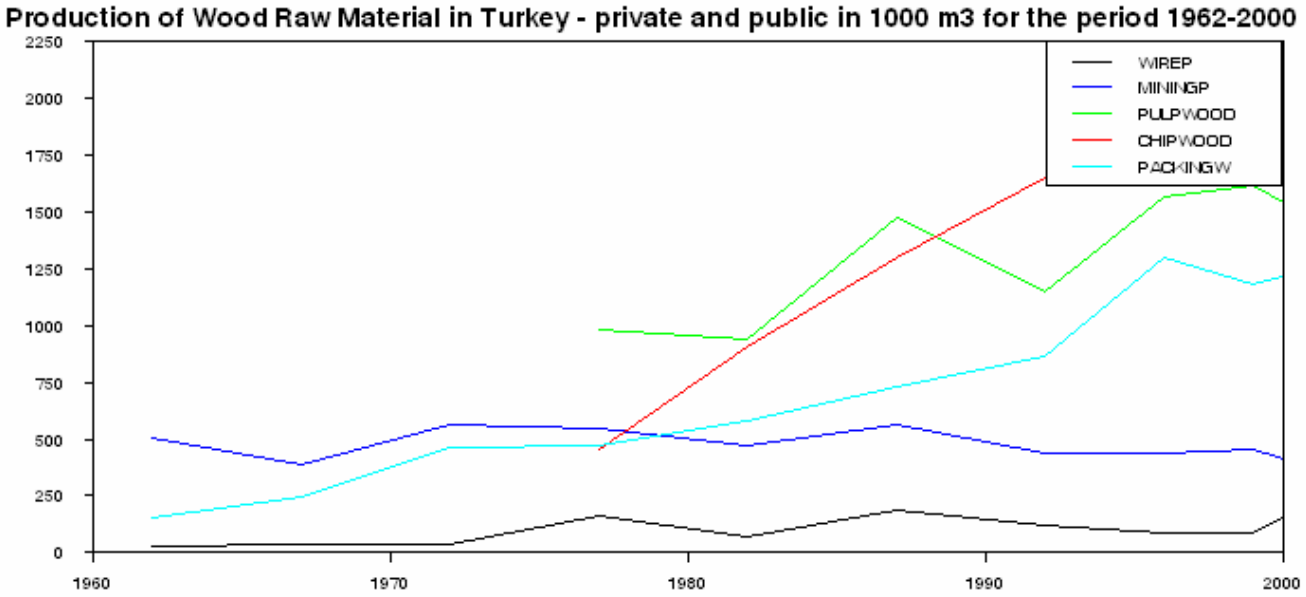
Belonging traditionally to the low-technology sectors forestry is not high profitable segment of national economy and the government support is of paramount importance for its growth and development. The production multiplier of forestry sector accounts for 1.222, the income multiplier is 1.377 in the 97 sectors input-output matrix of national economy. This puts the importance of forestry sector in the ranking of all the sectors on the 93rd place in production ranking, and on the 89th place in income ranking (Türker, 2005). From this point of view, the analysis of supply of forestry products requires to shed lights on many other problems influencing the further growth of forestry.

Despite its low place in the ranking due to its forward and backward linkages, this sector plays very important role in the national economy. Forestry sector was in a process of progressive structural changes during the last decades. The dynamics of production was increasing during the second half of the 20th century reaching its maximum in 1970s with slight fluctuation during the next decades around 4,800,000 m^3 (see Figure 1 for production of industrial wood types in Turkey from 1962 to 2000). In structural aspect the changes were toward increasing the share of goods based on modern for these sector technologies.

[10] Illegal loggings accounts for big part of the whole forestry in Turkey. The level of illegal cutting (7200 thous m^3) that is comparable with the production in the private sector is very high. However, the study of shadow consumption requires a lot of specific information as a rule not available in the traditional statistical sources. That is why we can express only some intuitive considerations on the subject.

[11] As employment is not included in the Inter-industries Treatments Tables prepared by Turkish Prime Ministry State Institute of Statistics (SIS) for the year 1996, the employment multiplier of the sectors related to the forestry could not be calculated.

Figure 1



Note: 1) About 80 % of the total industrial roundwood comes from coniferous species.
http://aks.iujp.dot

The investments in forestry sector were also dynamic during the last decades reaching its peak in 1977 and 1987 and although slowing down for the next decades as a whole they exceeded the investments in the previous decades. For the present decade, we can say they are relatively stable with expectations to rise due to the need of modernization of this sector. The basic sources for investment were the budget and after 1986 the Afforestation fund, which share in the total investment increased (Ormanlar, p. 85-86).

Since 1950`s there is a rise of plantations and forestry experiments carried out by various government institutions. At present the government policy in forestry sector includes a complicated institutional structure with great influence on decision-making in macro and micro levels. It directly and indirectly affects the supply of forestry products. The ownership in forestry is mainly public, but it changes from state to private in terms of increasing the role of private sector in industrial forestry. This rise was impressive during 1990s to reach the total amount of 28,476 hectares by 2000. To stimulate the modernization of the structure of forestry sector, the government is encouraging private initiatives within the publicly owned forestry land. By ownership, the private plantations are distributed as about the half belonging to the village legal entities and about a quarter to the real persons and others.

The institutional and legislative base of regulation supply of forestry products is in process of improvement and better codification aimed at facilitating the unification with the European standards and implementation of the basic aims of the policy of sustainable development. Afforestation Regulations and Afforestation Fund Regulations (1994) are example of such improvement. The National Reafforestation Mobilization Law (1995) although removed by 2004 nevertheless was assessed as “the most significant legal and financial arrangement, securing sustainable flow of sufficient amount of financial resources into the Afforestation Fund”. The government policy in forestry is improved also by further extending of forestry legislation, stimulating private plantations development, providing financial support to industrial forestry, etc.

The direct instruments of regulation are expressed mainly in the government initiatives of industrial forestry development. It starts with including this activity in the nation-wide planning process since 1956 as well as in supporting various initiatives of non-government institutions. It is facilitated by the fact that most of the forestry is public property.

Public investments in this sector are high and the ambitions are to further increase them. It is reflected in the Five-Years Development Plan (2001 – 2005) of the State Planning Organization aimed at increasing annual average growth of industrial forestry to 56,000 hectares for the planning period. The public planning is regarded as “the basic and the most important planning tool in Turkish forestry” (CP2002, p.32). On the other hand the dynamic of public investment (the basic source of productive investment) is uneven and not highly correlated with the revenues in this sector[12].

[12] The simple least squares estimation indicates that revenue = 240.1700 + 2.322786 investment.
(20.44228) (0.406221) $R^2 = 0.632$
The application of autoregressive conditional heteroskedasticity method reveals low convergence even after 100 iterations.

It is an indication of multifarious influences on the link between investment and revenues. Indeed, the results of the simple regression (linear and non-linear) are not sufficient for more profound conclusions; besides, this link has definite lag, which is rather long in forestry sector. However, the rise of revenues means higher logging and the need of higher investment for afforestation. The revenue movement in this sector demonstrates more fluctuations in comparison with production, and the difference between revenue and production is slowing down over time which can be regarded as some drop of profitability in forestry sector (Ormanlar, p. 93). To reveal better mechanism between revenue and investment, we need to analyze the structure of sales revenue that has been changing seriously during the last decades. We observe the share of general management cost in the total sale's revenue increasing from 10.6% to 35.4%, and investment share decreasing from 14.9% in 1985 to 4% in 2000. Similarly, we can see a slight rise of production costs from 27.0% in 1985 to 33.5% in 2000. The share of maintenance cost actually remains the same during the period – from 20% in 1985 to 19.4% in 2000 (Ormanlik, p. 94).

The economic instruments of the government policy include a broad spectrum of measures aimed at stimulating the private sector to participate in industrial forestry in sustainable manner. Among them we can indicate various grants, subsidies, favorable tax regimes, assistance for providing grants and low interest credits for private forestry plantation growth, guarantying risk, reshaping property rights to enhance industrial forestry, etc. Some authors (Diner and Koçar, 1999) recommend external funding of plantations, zero coupon bonds, mortgage certificates and annuity charge bonds as the most suitable financial instruments for the long term. Financing institutions involved in this process are various insurance companies, pension funds and development and investment banks

The stimulation of the private sector participation in the new plantations establishment is of a great significance as it helps not only to increase production of timber but also to create new jobs. It is especially important for the mountainous areas where unemployment is high. The government keeps on giving free allocation of the low productive lands for reforestation of the private sector. Among the other measures we can indicate also technical assistance, free access to a lot of information concerning reforestation, free seedlings. Good examples are the family run poplar plantations providing timber not only to the wood industry but also for other sectors and local needs.

Factors Affecting the Competitiveness of Forest Wood/Non-Wood Products Chain

The demand for forestry products is currently increasing faster than their supply, which widens the gap between supply and demand of wood in the country. It is expected that this tendency will increase during the present decade.

The comparative analysis of the consumption of industrial wood indicates that Turkey consumed 0.185 m^3 per capita industrial wood by 2000, while the world consumed 0.263 m^3 per capita, where as the amount is 1,293 per capita for North and Central America, 0.832 per capita for Oceania, and 0.541 per capita for Europe. On the other hand, capita fire-wood consumption per capita in Turkey is relatively high when compared with the other industrial countries. It accounts for 0.273 m3, while the same indicator is 0.693 m3, 0.595 m3, 0.473 m3 and 0.417 m3

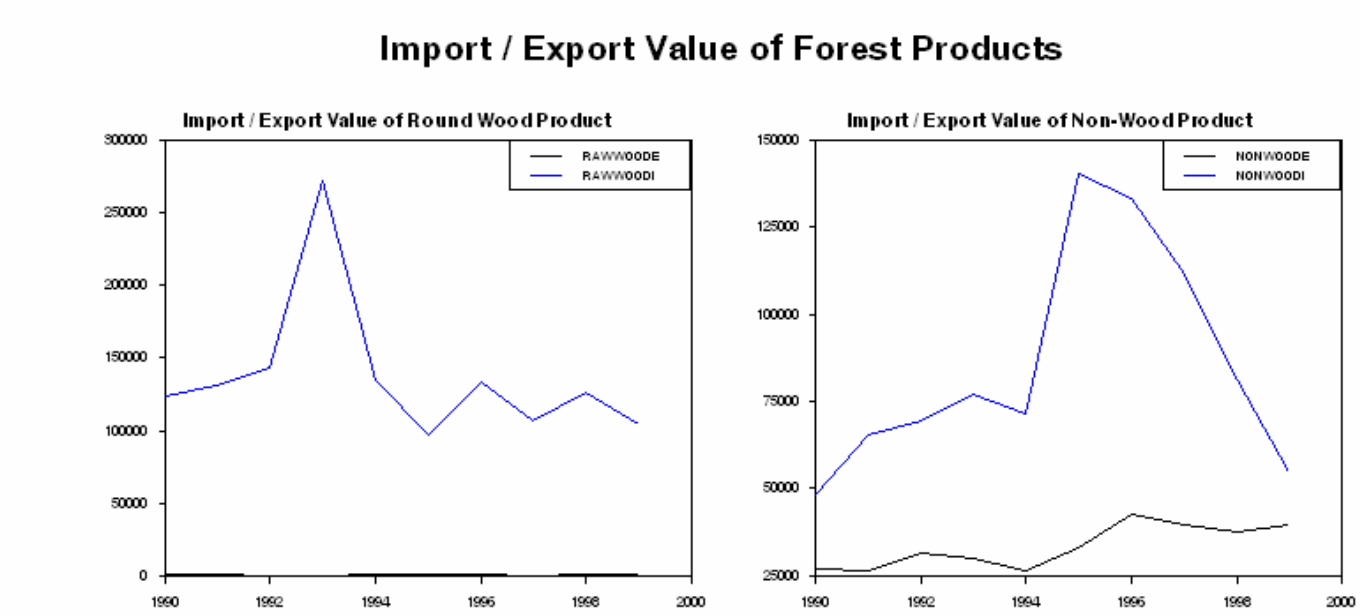
for Africa, North America, Sweden and the world as a whole, respectively (Ormancilik, 2001, p 175). Relatively high per capita consumption of fire wood can be explained with the high share of population living in mountainous areas and the high use of chalk wood for preparing a lot of national foods.

Turkey participates actively in the international trade of wood and non-wood forestry products. The export of forest wood and non-wood products is somewhat increasing, especially for non wood products as can be seen in Figure 2.[13] The import of forest product is more diversified than export. If we exclude import from Russia (35.2% of the total import) all the other country's import is rather small with exception for African states as Gabon (8.2%), Cameron (5.9%), and Liberia (3.1%). The total import of forest product form the EU countries by 1999 accounted for 14.9% of the total import of forestry products. The import of forestry product from Bulgaria accounts for 2.4% and from Romania 2.7%. Turkey imports forestry products even from the USA (0.6% from the total forestry import). (Konukcu 2001, p.133).

The application of input-output analysis to the national economy including export and import of forestry allows to shed light on the links between exporting/importing capacity of the country. While the export/import rate of 97 sectors in the national economy is 88 %, the export/import rate of forestry sector is 3 %. Similarly, the shares of forestry sector's export and import in the total export and import of the national economy are respectively 0.01 % and 0.3 % (Turker, 2005). According to Geray (1986), the fact that the sector's production is mostly devoted to home consumption, the export opportunities are very limited and this characteristics of the sector might be only changed in a long period. In other words, the products obtained from Turkish forests can not meet the home demand and this problem is expected to exist for a long period. For these reasons the supply needs are compensated by means of importing. Although forestry products exchange with the rest of the world is dynamic in comparison with the other sectors, forestry can not be included into the list of basic international trade sectors of Turkey (Geray, 1993). Extending bilateral agreements between Turkish forestry sectors and similar sectors in other countries, especially countries with developed forestry sector, result in extended exchange of scientists, ideas and other forms of knowledge from joint projects. Turkish-Finnish Forestry Project is a good example of successful bilateral cooperation. Intensive links are carried out with New Zealand and Chile, regarded as leaders in industrial plantations and providing experience indicative in many aspects to the other countries.

[13] The geographical orientation of the export is to Holland (24.6% of the total export of forestry products by 1999), Germany (23.1%) and England 912.9%). Totally the countries of the EU occupy 77.5% of the total export of forest products (Ormanlik, p. 133).

Figure 2



RAWWOODE stands for round wood products exported, RAWWOODI stands for round wood products imported, NONWOODE stands for non wood products exported, NONWOODI stands for non wood products imported. All the values are in thousands.
RAWWOODE does not appear in the table due it's low values. For instance, the highest export on raw wood products happens in 2000 and the value is 1305 thousand dollars.
Source: Forest Products Export in FOB prices (Ormanlik p.132, htpp://aks.iujp.dot); Forest Products Import in current prices (Konukcu, p.132, htpp://aks.iujp.dot)

Turkey creates a good base for international cooperation by signing and adopting important international documents as the resolutions taken at Strasbourg, Helsinki and Lisbon Ministerial Conferences on the Protection of Forests in Europe, and establishing a National Follow-up Committee consisting of experts responsible for technical coordination of each resolution (CP2002, p.37), which directly affects industrial forestry sector.
One of the biggest challenges to Turkish forestry is the on-going process of accession to the European Union (EU), which actually started since the membership application of Turkey to the EU in 1987. Since then there is a process of harmonization of Turkish with EU forestry legislation.[14] It is expected to influence industrial forestry in terms of improved competitiveness and more efficient cooperation with the industrial forestry sectors of the other European countries.

Conclusion

Our analysis clearly indicates that the present industrial forestry in Turkey is facing many challenges. The biggest challenge for the forests - the ever-increasing world demand of wood facing shrinking supply of timber - is a tendency, which affects also Turkey. With forests reserves and biodiversity close and in some aspects richer than the European ones, Turkey tries to give adequate responses to these challenges. Industrial forests in Turkey are growing to meet the modern economic and social challenges.
The rising industrial forestry and import try to complement the gap between demand and supply of wood for the industries and the local population. The most important challenges Turkey faces today are effective restoration of forests after logging, creation of new high productive forests and improvement of existing wood producing cultures. Significant research is carried out in direction of extending high productive forestry cultures including adapting of new forestry monocultures[15].
The need to foster further the structural improvement of industrial forestry is obvious. It started already with the genetic improvement of existing forests. According to the forestry experts to meet the challenges of the present and future industrial forestry there is a need to create a structure, which is close to the natural forests. This task can be solved by means of plantations formation combining the local and exported sorts of forests, which could adjust to the local climate allowing rapidly growing forests with reduced rotation period. This task is facilitated by the climate conditions of the country permitting to adapt high productive trees from the adjacent or more remote territories. It will require modernization of the technical base with introducing new methods of transportation of logged wood in a way, which will minimize the disturbance of biodiversity.

[14] For instance, The National Program for Adaptation to European Union Legislation and Regulations (2001) includes revision of Forest Law 6831, harmonization of legislation on manufactured forest products, establishment of adequate land cadastral information system, completing forests cadastral works, development of rural development strategies in harmony with EU policy, and development of institutional structures for this purpose, establishment of Farmer's registration system including forest villagers, etc.
[15] Among the whole lot of example we could indicate the Program of Improvement of Poplar Plantation carried out by the Poplar and Fast Growing Forest Tree Research Institute in Izmit. It includes tree selection, hybridization, commercial cloning, provenance selection, etc. The aim is to create cultures suitable for the concrete climatic conditions of the country starting with irrigated areas and ending up with the dry regions.

There are problems concerning the implementation deficit in providing government policy of stimulating the structural changes in forestry. Among the basic reasons reducing efficiency of the government policy we can indicate high share of low productive long period rotation of industrial forestry plantations. Additionally, increasing migration out of the mountainous areas reduces supply of adequate labor force for forestry. Moreover, support of private initiatives of forestry plantation extension does not take place since there is insufficient confidence between state and private sectors.

The first thing needed for the successful completion of such a collection is to organize dynamic accounting of the natural resources (wood and non-wood resources creating actual and potential consumption) of the forests. It means to organize systematic collection of information of the volume of natural resources of the forests and their change over time. This accounting can be implemented by the local forest administration, although the methodology and the start up of the initial data base collection are to be steered by a competent research institution. Needless to say it has to be computer processed and accessible to the society.

The basic information that does not exist to estimate more precisely the consumption of forestry wood and non-wood products is the representative data of the demand of these goods. Nevertheless, a big part of the information necessary to estimate the supply aspects of forestry products (cost, prices, revenues) is not accessible. Some information which is privately owned is not provided for public access and its collection requires an explicit permission by the owners. Most of the private forestry industry firms prefer to hide high part of this information to avoid taxation. There are cases when such firms even export medicine herbs and other forestry wood and non-wood products without presenting information about the volume of their export.

The presented hitherto analysis is the first step in summarizing the experience and preparing practical surveys for the need of the decision makers both in demand and supply sectors of forestry products. It was indicated that although the forestry sector does not have high share in the overall production in national economy, the environmental and ecological services of the forestry sector increase significantly its importance. Forestry sector supplies products used as inputs and final consumption both for the domestic demand and to a very limited degree for foreign demand. A significant part of the forestry sector's total output goes into intermediate demand, which means that forestry supplies inputs to other industries. Meanwhile, particularly the foreword linkages of the forestry sector underline its strategic importance for the national economy.

Despite a number of studies on various aspects of the growth and development of forestry sector, its real effect on the national economy still remains hidden. There are many reasons for it, including the difficulties due to lack of understanding, information and suitable methodology to expose its real potential in national economic records. According to some studies only 42% of the values of wood forest products are reflected into forestry sector and national balance sheets. For the non-wood forest products it accounts for 8%, for hunting 3.4% and for recreation 0.2%. In other words, the values of the such components of total economic values of forestry sector in Turkey as grazing (21%), carbon storage (14.8%), pharmaceuticals (10.5%) and biodiversity conservation (0.1%) are not transferred into the sectoral and national balance sheets (Türker et.al. (2002).

In short, while only 53.46% of forestry sector outputs can be calculated as positive externalities in national balance sheets, the rest of the positive externalities with a share of 46.4 % are not included. These figures, albeit arguable, indicate that the share of forestry sector in national economy indicated in the official statistics is lower than its real value. If the real effects of forestry sector can be calculated and reflected into national economic sheets, it is clear that all of the figures of forestry sector related to production, income, employment, sectoral linkages, etc. would be higher.

Such a revision of the general vision of the importance of forestry sector would allow to outline its real share and to demonstrate its vital role as supplier of a lot of valuable natural resources for the national and international economies. Producing more precise monetary valuation of the role of forestry sector would support the need for more intensive investments allocated in forestry sector. It would allow including in an adequate way the demand and supply of forestry products in the national strategy and policy of sustainable development of the country.

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