



## **Historical tendency of the timber production in contemporary Mexico**

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### **Abstract:**

Along thirty-five years (1953-1988), the annual mean of wood volume production per six-year period of each public administration, kept a steady growth. The highest mean, with a value of 9.37 million round cubic meters, was attained during the public administration of President Miguel de la Madrid Hurtado (1983-1988). After that time, the volume of wood production decreased progressively until the current administration, of President Enrique Peña Nieto. The annual mean production of wood for the first three years of the current presidential period is 5.85 million cubic meters. The production decline occurred during the presidency of Carlos Salinas de Gortari. Factors that have contributed are: a) Forests commercially diminished after decades of intense exploitation; b) Proliferation of illegal forest exploitation; c) Unstable, changeable and long-term lacking forest policies; d) Forest management fragmentation; e) The opening of international trade and f) Limited impact of subsidy policies for the forest sector. A new vision for the Mexican forest policy is

needed, such that, without neglecting the environment, may establish solid bases to promote the production and value chain of the forest sector.

**Key words:** Administration, open trade, illegal exploitation, legislation, forest policy, protectionism.

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## Introduction

The forests of Mexico constitute a valuable resource of the nation, as they play an irreplaceable role, with variations in their contribution through history, particularly in the last few decades. This strategic natural resource has led —especially during the XX<sup>th</sup> century— a battle between two perspectives and opposing views: a “preservationist” approach versus a “productivist” one. Both criteria have had a major influence on the course of the national forest sector, since they significantly determine the tendency of the nation’s timber crop. This has had two aspects: one attained through the official, legal mechanisms established by the various governmental systems, and another one derived from furtive exploitations, which are therefore outside the law and the applicable regulations.

The purpose of this contribution is to analyze tendencies of the official timber production of Mexico from the mid-XX<sup>th</sup> century to the present time, as well as to identify those factors and circumstances which in their time determined this historical tendency.

## **Development and Discussion**

### **The timber crop through time**

Although the forests of Mexico have contributed with many valuable goods and services to the population, through time, timber has been the most important from the economic point of view.

The present analysis begins with the report of the administration of President Adolfo Ruiz Cortines and concludes with that of the administration of President Enrique Peña Nieto (Table 1). The analysis takes into account the tendency exhibited by the timber production throughout the analyzed period, upon the basis of the annual volumes of timber production for each six-year term (Table 1).



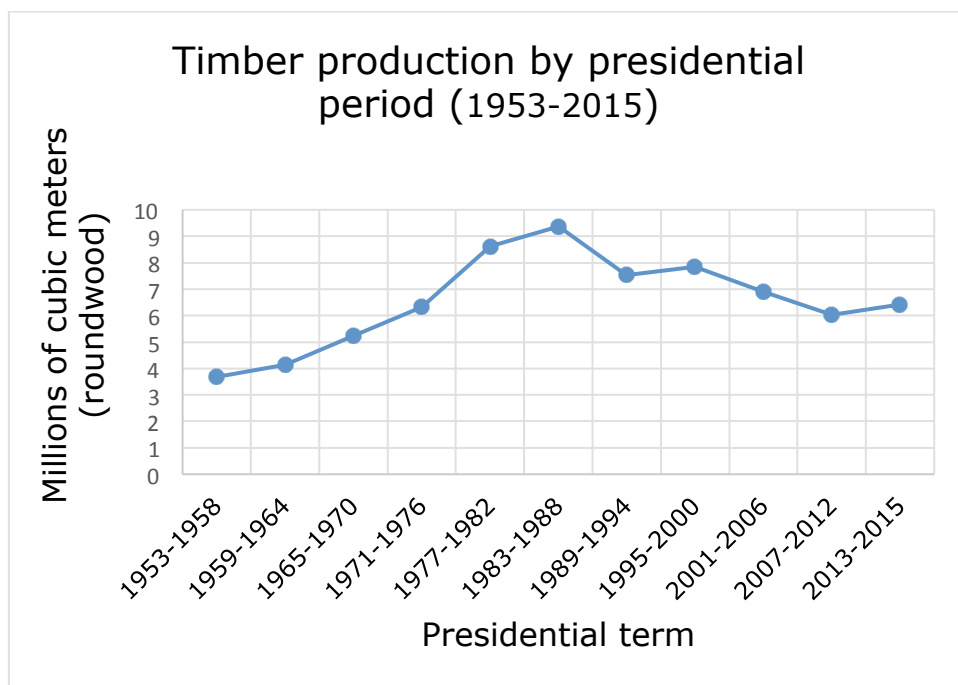
**Table 1.** Mean annual timber production (millions of cubic meters of roundwood) by public administration (1953-2015 period).

<b>President</b>	<b>Term</b>	<b>Mean annual timber production</b>
Adolfo Ruiz Cortines	1953-1958	3.68
Adolfo López Mateos	1959-1974	4.15
Gustavo Díaz Ordaz	1965-1970	5.22
Luis Echeverría Álvarez	1971-1976	6.33
José López Portillo	1977-1982	8.63
Miguel de la Madrid Hurtado	1983-1988	9.37
Carlos Salinas de Gortari	1989-1994	7.52
Ernesto Zedillo Ponce de León	1995-2000	7.85
Vicente Fox Quezada	2001-2006	6.90
Felipe Calderón Hinojosa	2007-2012	6.02
Enrique Peña Nieto	2013-2015	6.42*

\* Figure based on the Statistical Yearbook. 3<sup>rd</sup> Governmental Report. 2014-2018. Presidency of the Republic 2015.

Sources: Caballero, 2000; Dirección General de Gestión Forestal y de Suelos. 2014.

Two main tendencies were observed in the behavior of the timber production. The first exhibits, throughout the first six public administrations considered, a continuous growth in the production in the transition from one administration to the next. The second tendency evinces a reduction in the timber crop throughout the later period (Figure 1).



**Figure 1.** Mean annual timber production by public administration 1953-2015.

### **Analysis of the historical tendency**

Stage I. Continuous increase of the production. 1953-1982 period, comprising the six-year terms of Presidents: Adolfo Ruiz Cortines, Adolfo López Mateos, Gustavo Díaz Ordaz, Luis Echeverría Álvarez, José López Portillo and Miguel de la Madrid Hurtado. Since the second half of the XX<sup>th</sup> century, Mexico experienced significant changes that brought deep transformations to the nation. Once the revolutionary stage was past, population growth, on one hand, while the development of the country, on the other, exerted an impact on the growing demand of various raw materials of strategic importance for the industrial and urban growth. One of these was timber and its byproducts.

An important fact which exerted an impact in favor of a substantial growth of the forest production during this historical stage, and particularly during the period from the 1950s to the 1970s, was the support provided by the federal governments to

the Policy of Substitution of Imports, also known at that time as Stabilizing Development Policy. This policy fostered national industrialization in order to produce goods which, for lack of the necessary infrastructure, had to be imported. In order to ensure the consumption of the products made in the national territory, a “captive markets” strategy was put in place, based on a significant reduction and even cancellation of imports. The domestic commercialization and consumption of timber products made by the national industry (Cruz and Herrera, 2011).

The situation described above resulted in a progressive increase in the demand of timber, which in turn brought about an increase in the annual timber production that occurred in two intervals:

Interval 1. Increase of production at a growing rate. Period comprised between the public administration of Presidents A. Ruiz Cortines and that of J. López Portillo (1953-1982). An important precedent that had a particular effect on this stage occurred during the presidential period (1941-1946) of General Manuel Ávila Camacho, who was a prominent promoter of national industry—a strategy which in turn had an important repercussion on the forest industry.

President M. Ávila Camacho considered that the exploitation of the forests of the country could set the foundations for building a solid forest industry that might exert a significant impact on the national economy. Based on this premise, and on the Forest Law of 1943 (Civil Council for Sustainable Silviculture, n/d), he passed a series of presidential decrees in favor of forest franchises that were to promote and supply timber to a future forest industry, particularly for the production of cellulose and paper.

For each decreed concession, a particular wooded area was delimited and devoted to supplying the industrial enterprises. Thus, the Forest Exploitation Industrial Units (*UIEF*)—a mechanism that was to favor a remarkable exploitation of Mexican forests and promote the development of the national forest industry—were born.

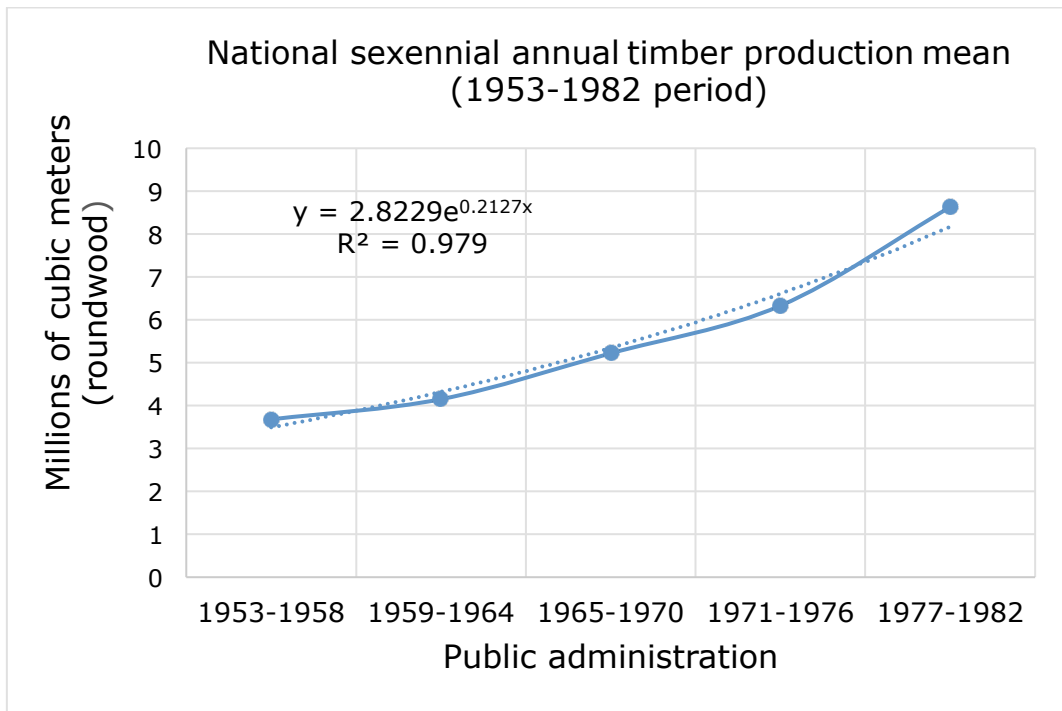
The *UIEFs* were legally formalized through Article 6 of the Forest Law of 1943 (Consejo Civil para la Silvicultura Sostenible, s/f), which specified:

"Article 6.- The creation of forest exploitation industrial units to supply the raw materials required by the mining, paper, construction, transformation, warfare industries, among others".

The forest concessions system was created under presidential decrees launched by President Manuel Ávila Camacho, who established foundations that provided order, technical foundation and continuity to the forest exploitation programs across the country. These were carried out in compliance with forest ordinances that allowed a continuous, sustained timber harvest from the franchised forested areas through several years. This made it possible to ensure the provision of this basic supply for the forest industry. Furthermore, infrastructure and work systems were created for certain activities that are essential for a good forest management —such as carrying out forest inventories; building forest roads; applying forestry practices; reforestation; controlling and fighting forest fires, pests and diseases—, as well as to promote a close interaction between the members of technical directorates of forest units and communal organizations.

The above results were decisive for making the presidents after M. Ávila Camacho validate and support the *UIEF* system. Within the framework for this strategy, the timber production in the country increased at a growing rate, until the term of President J. López Portillo (Figure 2).





**Figure 2.** National timber production (annual mean for the six-year term) during five public administrations in the 1953-1982 period.

The assay of regression models applied to the data for this period evinced the fact that an exponential model with an  $R^2$  value = 0.979 yields a better adjustment. The equation thus estimated was:  $Y = 2.8229e^{0.2127x}$ .

As part of the analysis, the Variation Percentage Rate of the timber production between two successive six-year terms was estimated using the difference between the means of the two periods and dividing it by the mean of the first, expressed as a percentage:

$$VPR = (Y_i - Y_{i-1})/Y_{i-1} * 100$$



Where:

$VPR$  = Variation Percentage Rate of the timber production between two successive six-year terms.

$Y_i$  = Annual Mean of the Timber Production during the six-year term  $i$

$Y_{i-1}$  = Annual Mean of the Timber Production during the six-year term immediately preceding the six-year term  $i$

The calculation shows that the highest rate (36.33 %) was registered during the transition between Presidents Luis Echeverría and José López Portillo, and the lowest (12.77 %), during the transition between Presidents A. Ruiz Cortines and A. López Mateos (Table 2).

**Table 2.** Value of the Variation Percentage Rate (VPR) in the timber production for four consecutive six-year terms corresponding to the 1953-1982 period.

<b>Successive six-year terms</b>	<b>Value of the Variation Percentage Rate in the timber production (VPR)</b>
A. Ruiz Cortines-A. López Mateos	12.77 %
A. López Mateos-G. Díaz Ordaz	25.78 %
G. Díaz Ordaz-L. Echeverría Álvarez	21.26 %
L. Echeverría Álvarez-J. López Portillo	36.33 %

Based on the above data, it may be concluded that the analyzed period (1953-1982) represents the historical interval that has registered the highest growth rate

for the formal timber production in Mexico. Some of the factors or circumstances that favored this situation are listed below:

a) The consolidation of the operation of the Forest Exploitation Industrial Units as a result of the support provided by the presidents of the Republic during this period to this forest exploitation system (Beltrán, 1964).

b) The cancellation of the forest bans decreed particularly during the 1940-1952 period, which had suppressed the formal forest exploitations in most states.

c) The significant interventionism of the government in the forest sector during the administrations of Presidents Luis Echeverría and José López Portillo, who enabled the creation and operation of a number of companies and public agencies in this sector. At the federal level, the creation of several decentralized public agencies — *Productos Forestales Mexicanos* (Mexican Forest Products, Proformex, Durango); *Productos Forestales de la Tarahumara* (Forest Products of the Tarahumara Mountain Range, Profortarah, Chihuahua), and *Forestal Vicente Guerrero* (Vicente Guerrero Forest Company, Fovigro, Guerrero)— played a prominent role. The following agencies operated at state level: *Productos Forestales del Estado de Michoacán* (Forest Products of the State of Michoacán, Proformich), *Protectora e Industrializadora de los Bosques* (Forest Protection and Industrialization Agency, Protinbos, State of Mexico), and *Aprovechamientos Forestales de Nayarit* (Forest Exploitations of Nayarit, Aprofon). The operation of these and other public agencies most certainly exerted an influence on the increase of the timber crop.

Interval 2. Growth at a diminishing rate. Period comprised between the public administration under the charge of President J. López Portillo and that of his successor, M. de la Madrid Hurtado (1983-1988 period). The above tendency to the growth of the timber production at an increasing rate declined toward the end of the six-year term of President de la Madrid Hurtado. Nevertheless, during that presidential term the timber production reached its highest historical peak, in the year 1985, with 9.95 million cubic meters of roundwood. Likewise, the mean annual

production reached its maximum value, of 9.37 million m<sup>3</sup>, compared to the annual measures reported for the rest of the public administrations.

The forest franchise system mentioned above, which promoted the exploitation of the forests and propitiated the development of the forest industry of the country, was born with an important limitation: it did not incorporate the owners or holders of the forests into the productive chain, and these were only remunerated with a low pay —known as “logging rights”— for the timber which they contributed from their forests as a supply for the industry. This inequitable situation led to the cancellation of franchises through the 1986 Forest Law passed during the presidential term of Miguel de la Madrid Hurtado.

With the cancellation of the *UIEFs*, the government promoted a policy of stepping up the social production in order to promote the active participation of the holders of communal forests in their exploitation and, in general, in the forest production chain. However, the response was insufficient to fill the gap in the forest production left by the disappearance of the said units. In this regard, we must take into account that the Forest Units’ system had operated across the entire production chain, within a context of economy of scale. This was lost when forest management was implemented at the level of communal plots. This change resulted in a reduction of the timber production which began in the second half of Miguel de la Madrid Hurtado’s presidential term and deepened significantly during the following term —that of President Carlos Salinas de Gortari. Although the annual timber crop still registered an increase during the transition between the terms of J. López Portillo and M. de la Madrid, the growth rate of the production was far below those achieved during Stage I. The VPR estimated for that transition was 8.57 %, far below the values estimated for the 1953-1982 period (Table 2).

If the growth pattern attained for the timber production during the term of Presidents A. Ruiz Cortines to J. López Portillo had continued until the term of President M. de la Madrid Hurtado, in accordance with the estimated regression model (Figure 2), the mean annual production of that six-year term would have

been nearly 10.11 million m<sup>3</sup> of roundwood, and a new historical maximum would have been registered. Nevertheless, the value actually attained was 9.37 million m<sup>3</sup>. The difference amounts to 7.9 % of the latter figure.

In addition to the cancellation of the forest units, other factors that contributed to the reduction of the growth pattern of the timber production since the administration of former President Miguel de la Madrid Hurtado were:

- The emergence of the environmentalist trend. The six-year term of President de la Madrid was a precursor in the formal process of incorporating environmental and ecological issues into the tasks of the public administration. It was during that period that the Federal Law of Protection of the Environment was enacted; in 1988 it was replaced by the General Act of Ecological Balance and Protection of the Environment. On the other hand, ecological issues were incorporated into the public administration through the Department of Urban Development and Ecology, within which the Undersecretariat of Ecology was established (Guevara, 2005). This situation introduced lack of definition, uncertainty and new requirements to obtain permits for forest exploitations, all of which were to have an impact on the size of the timber crop.
- The fragmentation of forest management. A favorable aspect which had contributed to the levels of timber exploitation attained by the extinct forest franchises was the use of large forested surfaces of the country to supply timber to the industries supported by the corresponding decree. This circumstance had made it possible to create and implement long-term forest management plans based on solid technical management programs.

The disappearance of the franchises mentioned above opened the option for those *ejidos* and communities that held forested stretches to be able to manage timber exploitations directly in their plots. However, because of the land tenure patterns, most of these plots have a limited size. Due to the absence of organizational schemes among their holders, not all the forest

plots are the object of exploitation, and many are excluded from it. The fragmentation of forest surfaces has limited the exploitations and often cancelled the application of bona fide forest management plans.

- The entry of Mexico into the General Agreement on Tariffs and Trade (GATT). The presidential term of Miguel de la Madrid marked the beginning of neoliberal governments in Mexico. In 1986, the country entered the General Agreement on Tariffs and Trade (GATT), which brought about a trade opening. This opening allowed the entry of timber and its byproducts from other nations into Mexico, often under more profitable conditions than those provided for the domestic supply of timber products.

Historical tendency II. Reduction of the production. 1989-2014 period. Six-year terms of Presidents Carlos Salinas de Gortari, Ernesto Zedillo Ponce de León, Vicente Fox Quezada, Felipe Calderón Hinojosa and Enrique Peña Nieto. The government of M. de la Madrid marked the end of the historical process characterized by a successive increase of the timber production across various six-year terms. The presidential term of Carlos Salinas de Gortari started a new process, with the decline of this production up to the present administration of E. Peña Nieto. This tendency is divided into three intervals:

Interval A. Abrupt decline of the production. 1989-1994 period (six-year term of President Carlos Salinas de Gortari). The annual mean of the timber production during the term of President Miguel de la Madrid (9.37 million m<sup>3</sup> of roundwood) experience a significant drop in the next administration (that of Carlos Salinas), decreasing by 7.52 million m<sup>3</sup>. The volume of the reduction —1.85 million m<sup>3</sup>— resulted in a Variation Percentage Rate of -19.74 %.

The North American Free Trade Agreement (NAFTA) was formalized during the term of President C. Salinas (Veruette, 2001). This transcendental fact had a major impact on the national economy, since it abruptly opened the country to international trade. Thus, the protectionist policy that had prevailed through decades was left behind. The opening to international trade had a significant impact

on the exclusively domestic commercialization that had characterized the forest sector. Thanks to it, the Mexican population now had the possibility to acquire forest products from abroad at a lower price and often with an equal quality. This situation resulted in the decline of the timber production and the collapse of the national forest industry.

Interval B. Slight recovery. 1995-200 period. (Six-year term of President Ernesto Zedillo Ponce de León). The government of President Ernesto Zedillo made a significant historical contribution to the Mexican forest sector by implementing, for the first time, a variety of subsidies to support the development of the sector. This very relevant measure was warranted in Article 33 of the 1997 modification to the 1992 Forest Law; this article established that:

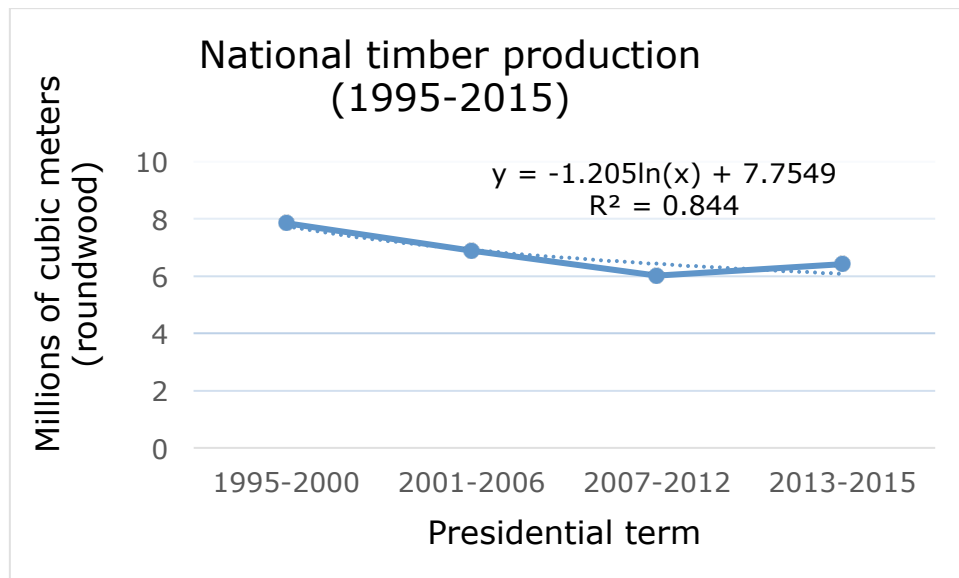
“The Department and other competent agencies of the Federal Public Administration —taking into consideration the value, potentialities and costs of the forest resources and activities— will establish measures, programs and economic instruments to foster, induce and promote the investment and participation of the social and private sectors in the preservation, protection, restoration, sustainable exploitation and multiple use of these resources, as well as in the promotion and development of forestations...”

Based on the above legal precedent, the first subsidy programs were created: the Program for Forest Development (Prodefor), the Project for the Conservation and Sustainable Management of Forest Resources (Procymaf) and the Program for the Development of Commercial Forest Plantations (Prodeplan). In addition, the National Reforestation Program (Pronare), created during the administration of President C. Salinas, acquired a subsidy program’s status during the administration of E. Zedillo.

Despite the implementation of the subsidy programs mentioned above, and certainly as a result of the commercial aperture, the mean annual national timber production in the term of President e. Zedillo registered only a slight increase —330

000 m<sup>3</sup> of roundwood— in relation to the annual mean attained during the term of C. Salinas. The VPR was 4.4 %.

Interval C. Decrease in the production. 2000-2014. (Six-year terms of Presidents Vicente Fox Quezada, Felipe Calderón Hinojosa and the first years of the term of President Enrique Peña Nieto). The annual volumes of timber production for the last three public administrations have shown a downward tendency, with a slight increase in production during the current administration of President E. Peña Nieto (Figure 3).



**Figure 3.** National timber production (annual mean for the six-year term) during four public administrations during the (1995-2015) period.

Some of the factors and circumstances that account for this behavior are:

- I) To the present day, and after the impact of the opening to international trade, the production chain of the national timber production and industrialization has not overcome its lack of competitiveness. In general, timber products imported from Chile, Canada and the United States of America continue to be cheaper than those produced in Mexico. The import

value of this type of products in the year 2014 was US \$1 524.50 million, which resulted in a deficit trade balance of -US \$ 1126.28 million (Dirección General de Gestión Forestal y de Suelos, 2014).

On the other hand, the devaluation of the Mexican peso since the year 2016 may have had an impact on the scenario described above; however, its effect on the national forest industry, if any, will probably occur in the medium and long terms.

II) For various reasons, in recent decades, illegal forest exploitation has increased significantly across the country. Profepa has been surpassed in its capacity to prevent and control this illegal activity. Therefore, and also due to its lower price, a significant volume of illegal timber enters the national market of forest products, reducing the options for the formal timber production.

III) Since the 1970s, several international summit conferences have been organized by the Food and Agriculture Organization of the United Nations (FAO) (UNEP, n/d), and several works on issues related to the environment and the natural resources of the planet have been published and widely disseminated (Meadows *et al.*, 1972; Ward and Dubos, 1972; Carson, 2010). The international dissemination and awareness-raising process led to a change in the national policies of a number of countries, where these were redirected toward Sustainable Development. Mexico was no exception; thus, the General Act for Sustainable Forestry Development, which steers the national forest policy toward the attainment of this paradigm, was enacted in 2003.

At a global level, the forests were broadly recognized and extolled for their crucial contribution in terms of environmental services, in several cases pushing the production of commodities to the background. This accounts for the priority interest of recent Mexican governments in the protection and preservation of the forests and in the production of services rather than of timber. In relation to this point, the Mexican Civil Council for



Sustainable Forestry (2014) emphasized: "The magnitude of the forest trade deficit and its growing tendency twenty years after the onset of the North American Free Trade Agreement evince the deep crisis into which the sector has sunken due to excessive regulations, neglect by the government, and a policy that prioritizes the protection of the forests over the sustainable productive development approach."

- IV) Through history, most of the national timber production has basically relied on the conifer forests. Thus, the states of *Chihuahua* and *Durango* have been the main producers. Other states, like *Michoacán*, *Jalisco*, *Estado de México*, *Oaxaca* and *Guerrero* have also contributed to the timber crop, although to a lesser extent. It is an acknowledged fact that the productive capacity of the main mountainous massifs with conifer forests, particularly in *Durango* and *Chihuahua*, has declined significantly due to the intense timber exploitation that has taken place for many years. Today, most of these forests contain young tree structures of small and medium dimensions.
- V) On the other hand, although the subsidy program to support commercial forest plantations (Prodeplan) was implemented since 1997, the timber production resulting from that production system has not yet met the expected goals, and its contribution to the annual timber production is still limited.
- VI) The subsidy programs for the forest sector put in place during the six-year term of President Ernesto Zedillo have not had, after two decades, sufficient impact to promote an increase in the timber production. This has been partly due to the absence of an integral medium- and long-term management plan. Instead, various uncoordinated, unconnected projects, each with a different purpose, have been applied in different years and in different regions of the country, within a fragmented context devoid of a long-term vision (Caballero, 2012).

## Conclusions

The volume of the timber crop of Mexico has exhibited an irregular historical tendency, as is evidenced by the forest policies issued and implemented by the various public administrations. The absence of a long-term vision gave rise to the changing application of short- and medium-term policies and strategies that clearly show a lack of direction in the management of the forest sector of the country.

Within this historical context, forest policies have varied within a framework of strategies ranging from a significant governmental control to approaches fundamentally based on the behavior of markets and with a limited governmental intervention (neoliberal policies).

The decree whereby the Forest Exploitation Industrial Units (*UIEF*) were created, issued by President Manuel Ávila Camacho and based on the 1943 Forest Law, set the foundations for a sustained increase of the timber crop across five public administrations. This scenario first became evident during the presidential term of Adolfo Ruiz Cortines and continued through the public administrations of Presidents Adolfo López Mateos, Gustavo Díaz Ordaz, Luis Echeverría Álvarez and José López Portillo, and it reached its culmination during the administration of President Miguel de la Madrid Hurtado.

While the government of Miguel de la Madrid brought the annual timber production to its maximum historical peak —9.95 million roundwood cubic meters in 1985—, the next six-year term, in the charge of Carlos Salinas, marked a significant decline in the production (the annual mean for the timber production during that six-year term was 7.52 million of m<sup>3</sup>; this amounts to a decrease by 19.74 % in relation to the 9.37 million cubic meters of timber that were produced during the previous six-year term. Ever since that time, the annual mean for the timber production during any six-year term has remained below 8.0 million cubic meters.

Several circumstances have probably had a complementary influence on the permanence of the timber production at the low level that has characterized the most recent public administrations:

- a) The current low productivity of commercial conifer forests, a large part of which evidence the effect of decades of overexploitation, as well as the damage caused by the constant change of land use for agricultural and livestock-breeding purposes.
- b) The fragmentation of the forest management, currently confined to small plots and limited forest areas.
- c) The unrestrained increase of illegal exploitation of the forests, and the illegal competition of forest products in the domestic market (Caballero, 2010).
- d) The trade opening which provides imported timber at a lower price than that which is domestically produced. In the year 2014, the value of forest product imports was US \$8 042 millions, a figure above that of the year 2010 (US \$ 7 043 millions) by 14 % (Dirección General de Gestión Forestal y de Suelos, 2014).
- e) The limited effectiveness and impact of the policies and programs for subsidizing the sector —such as Prodefor and Prodeplan— on the national forest production.

A change of perspective by decision makers and forest policy makers in the country is necessary for the forest sector to take off and become a veritable generator of economic development. In principle, it is important to create an attractive environment for investment that may arouse the interest of the private sector. This requires a change in forest legislation to promote a true commercial forest activity, as well as the creation of an agile, efficient and dynamic structure that will leave behind the overregulation that has been associated for decades to forest management and acted as a brake for the development of the forest industry (Fernández y Mendoza, n/d). Effective

information and communication, financing, industrial reconversion and training systems, among others, must also be put in place.

Although the forest policies of the last few decades in Mexico have been adjusted to the modern sustainable development paradigm, they have focused mainly on the environmental aspect and have neglected the productive approach. Without overlooking the basic, strategic role of forest ecosystems through their contribution to environmental services, policies oriented to increasing the effectiveness of the production chain and the value of the sector must be implemented. Otherwise, our nation will continue to lose the opportunity to turn its forests into a mechanism for well-being, development and progress.

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### **Conflict of interests**

The author declares no conflict of interests.