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# Value Chain Analysis of the Wood Processing Industry in the Philippines

*Danilo C. Israel and David Feliks M. Bunao*

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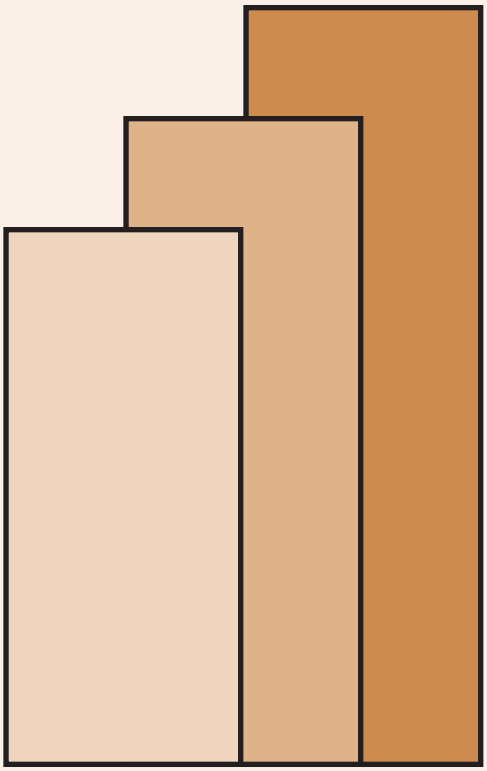

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For comments, suggestions or further inquiries please contact:
**The Research Information Staff,** Philippine Institute for Development Studies
18th Floor, Three Cyberpod Centris – North Tower, EDSA corner Quezon Avenue, 1100 Quezon City, Philippines
Tel Nos: (63-2) 3721291 and 3721292; E-mail: publications@mail.pids.gov.ph
Or visit our website at http://www.pids.gov.ph

# Value Chain Analysis of the Wood Processing Industry in the Philippines

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***Abstract***

Wood processing is an important downstream activity of the forestry sector of the Philippines because it adds economic value to log, diversifies the products that can be produced from it, and increases the incomes and employment of involved communities. Despite its many economic contributions, however, the wood processing industry has been on the decline for many years now. This study analyzed the wood processing industry concentrating on its value chain, the major issues and problems it is facing, and the recommend actions to address the problems and issues. Among others, the study found that the wood processing industry is constrained by various technical, financial, economic, marketing, environmental, institutional, and research-related problems and issues. To address these individually, specific recommendations were put forward. In terms of research, in particular, the study suggested the gathering of more detailed and complete data and information on the wood processing sector by relevant government agencies and the conduct on relevant studies not just the whole processing sector but also on specific wood processing activities.

Keywords: Philippines, CARAGA region, wood processing, value chain, problems and issues

# Value Chain Analysis of the Wood Processing Industry in the Philippines

*Danilo C. Israel and David Feliks M. Bunao*[1]

## I. Introduction

Wood processing[2] is an important downstream activity of the forestry sector because it adds economic value to log, diversifies the products that can be produced from it, and increases the incomes and employment of involved communities. The total national income and employment from wood processing are not known with certainty but in the log producing CARAGA Region (Region 13), alone, the wood processing industry directly employed close to 10,000 workers, mostly in the Agusan provinces (Paqueo and Silfverberg 2016). This employment does not include those in the upward and forward linkages of the industry such as the thousands of tree growers and workers in tree plantations and those involved in the marketing of wood products.

Despite its economic contributions, however, the wood processing industry of the Philippines has been on the decline for many years now. Of late, a perceived reason behind this is the imposition of Executive Order (EO) 23 or total log ban. Issued in February 2011, this order declared an indefinite moratorium on the cutting and harvesting of timber in the natural and residual forests. With the implementation of this EO, the number of wood processing firms in the country fell. In the case of the Caraga region, it went down from 119 firms in 2010 to only 27 firms in 2015.

There is no study that looked in detail into the value chain in the wood processing industry in the Philippines, identify the major and current issues and problems it is facing, and recommend specific actions to address them. In this light, this paper a) reviews the relevant foreign and domestic literature on wood processing; b) discusses the wood processing value chain in the Philippines; c) analyzes its economic performance in the last ten years; d) identifies the various issues and problems constraining its development; and e) recommends specific policies and other actions that can be undertaken to address them. This paper hopes to contribute to the sparse literature on the wood processing industry in the country and its more effective development in the coming years. The study uses primary data and information sourced through key informant interviews (KIIs) and focus group discussions (FGDs) with related private sector and government stakeholders and secondary data and information from published and unpublished records of private and government institutions.

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[1] The authors are Senior Research Fellow and Research Analyst II of the Philippine Institute for Development Studies (PIDS).

[2] Official Philippine statistics has no definition of wood processing. A wood processing plant is described as a mechanical device, machine, combination of machines or set-up used for the treatment of poles and piles or conversion of logs, and other wood raw materials into lumber, veneer, plywood, wallboard, blockboard, paperboard, pulp, paper or other finished wood products. (PFS 2014). The other available and official definitions relevant to wood processing are provided in the Appendix.

## II. Review of related literature

*International studies on wood processing*

There have been a number of country-specific studies conducted on wood processing in other countries[3]. Palus et al. (2015) studied the trade performance and competitiveness of the wood processing industry of the Slovak Republic vis-à-vis neighboring countries using 2003-2012 data from the Food and Agriculture Organization (FAO) Forest Products Statistics (FPS). Among others, the study found that the Slovak wood processing industry has a comparative advantage in coniferous and non-coniferous sawn wood, and paper and paperboard products and a comparative disadvantage in wood based panels and pulp wood. It also has an increasing trend in comparative advantage until 2008 when the trend started to decline due to an economic crisis.

FAO (2013) looked into the wood processing industry in the Congo Basin using data gathered from four workshops organized from September 2010 to June 2011 in Cameroon, Congo. Firstly, the study asserted that there should be a firm political will and favorable business environment for wood processing investors. Secondly, security of land tenure, clear guidelines on sustainable level of forest extraction, and access to financial services should exist to ensure that businesses will continue to invest in wood processing. Thirdly, there should be buildup of profitable formal markets through the promotion of wood. Lastly, a structured wood processing industry value chain should be created. The study further recommended that government, with the help of business organizations, should integrate various industries including big and small-scale businesses should be tied-up and the informal sector of the wood processing should be convened.

Putzel et al. (2012) assessed the wood processing industry in the province of Binh Dinh, Vietnam by interviewing 21 private companies and forestry department officials. The study suggested that the national government should provide attention to smallholders in Vietnam. Also, efforts should be made to promote the segmentation of the supply chains for woodchips and timbers for furniture at the plantation level. There should also be two separate plantation schemes, one focusing to supply woodchip and the other to supply the furniture industry. Furthermore, smallholders should be encouraged to collectively manage their tree plantations to be able to achieve better access to inputs thus improving the quality of their timber products.

Hieu et al. (2011) analyzed the national objectives for the forestry and wood processing industries of Vietnam using a spatial equilibrium modelling (SEM) analysis. For Vietnam to achieve an optimal production in forestry and wood processing, the study recommended that government should increase the design production capacity of existing larger-scale paper and engineered-wood factories. In addition, planned small-scale paper factories with design production capacities of less than 300,000 tons a year and engineered-wood factories with design

[3] This review may not be comprehensive as only the literature that were accessed within the timeframe of the study were included.

production capacities of less than 50,000 tons a year should not be built. Furthermore, existing those small-scale paper factories of less than 50,000 tons should also be shut down by 2015.

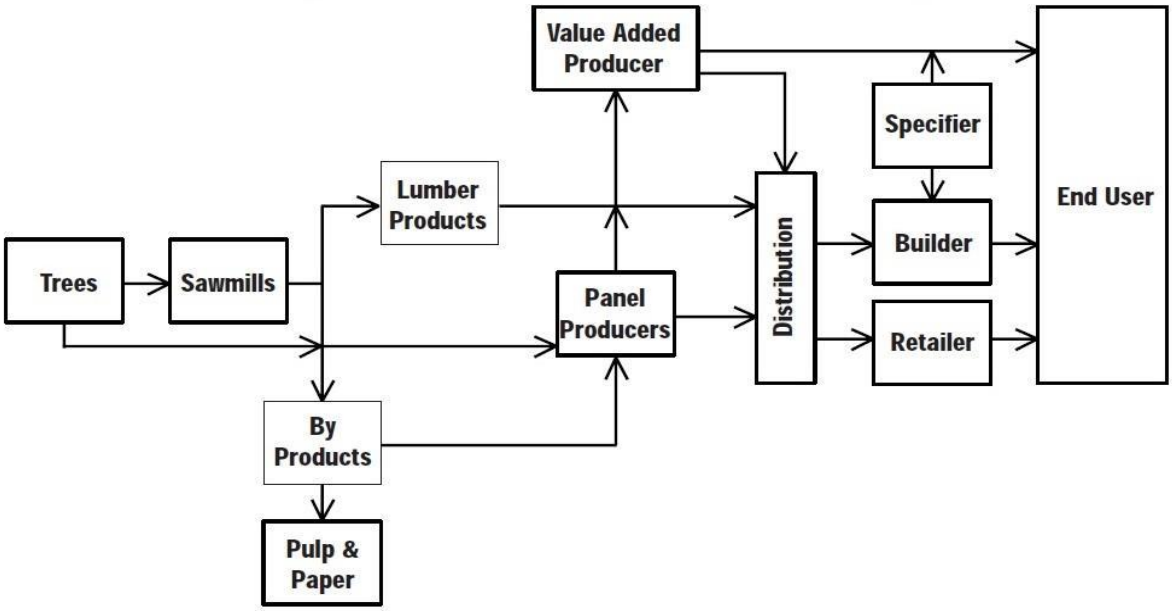
Berberet et al. (2010) examined sustainable forestry and sawmill operations in Northern Wisconsin, USA using data gathered through key informant interviews and from forestry statistics. The study identified three components for a sustainable forestry and sawmill operation, namely, source of timber supply, technology used in milling process, and the use of sawmill by-products. It recommended that sawmills should consider the tree components mentioned above if they want to improve their sawmill operation specifically highlighting the use of new technology. In addition to the use of fuel generated from byproducts, using solar, geothermal, or wind energy in a sawmill operation should be considered for a more sustainable approach.

Zhang et al. (2007) analyzed the development of the wood processing industry of China from 1979 to 2004 using the self-sufficiency rate (SSR) and other tools. The study found that the general trend for production, imports, and exports of wood in China increased through the years. The study also mentioned that among the wood processing industries, plywood has the highest self-sufficiency rate while sawn wood has the lowest. In general, the study asserted that the wood processing industry in China has a low international competitiveness, with the exception of plywood.

Harvey (2005) examined the result of the Wood Processing Strategy (WPS) implemented by the Government of New Zealand to develop the wood-processing industry using a case study approach. It identified several lessons from the result of the WPS. Firstly, there should be a significant incentive to get people involved and a clear unifying goal or vision to be presented first so that people will be motivated to invest their time and resources. Secondly, there should be a committed leadership from all the partners including government. For example, the active participation of high-ranking public officials would allow the timely release of funds and implementation of projects. Thirdly, there should be a means to assess the progress of the project vis-à-vis to the overall objective of the WPS and regular reviews and evaluations.

Cohen and Kozak (2006) examined the wood industry in Canada through a value chain analysis (Figure 1). In this study, the wood industry value chain starts with the trees which are the raw materials. These trees are then delivered to sawmills for processing. The sawmills produce processed lumber products and byproducts. The lumber products are channeled down to lower chain producers such as value-added producers and panel producers for their further use or sent directly for market distribution. On the other hand, the byproducts, usually in the form of chips, are used in production of pulp and paper. The lower chain value-added producers are usually small and medium enterprises which products to produce finished goods such as furniture, engineered wood products, and similar products. An interesting component of the distribution component of the value chain are the so-called specifiers including architects, engineers, and interior designers who influence product selection among the final users of wood products.

**Figure 1: Simplified value chain of wood industry**




Source: Cohen and Kozak (2006)

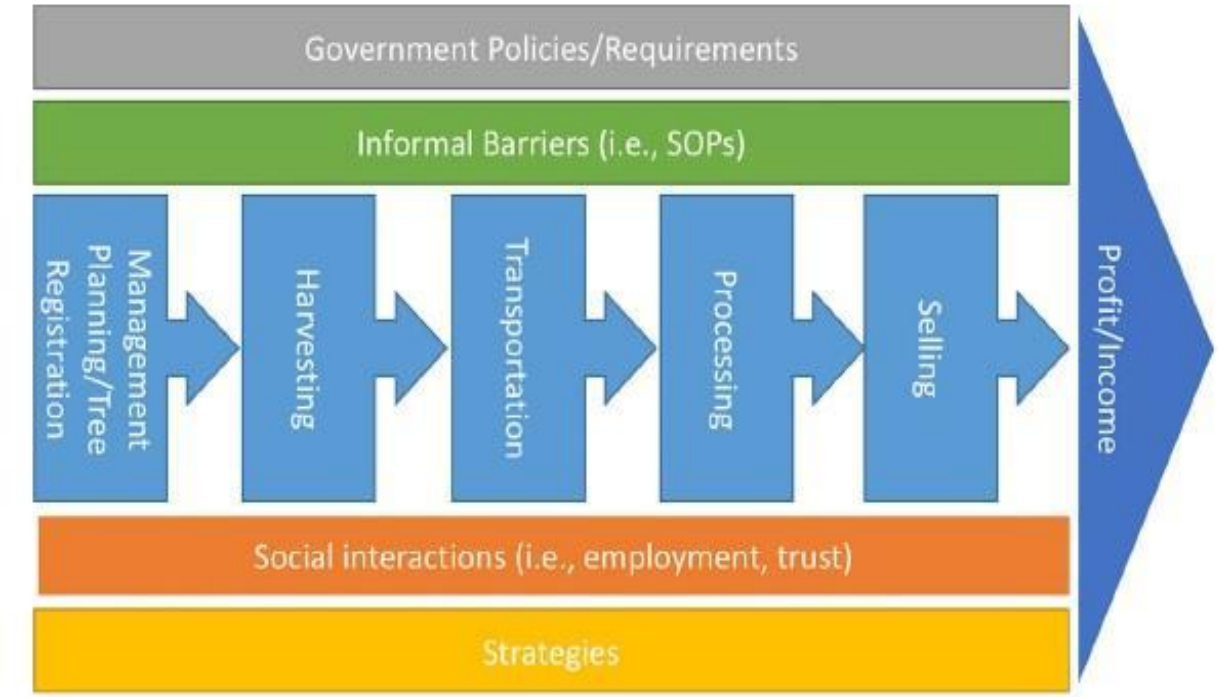
*Philippine studies on wood processing*

Pulhin and Ramirez (2016) examined the effect of timber regulation on community-based timber enterprise (CBTE) and smallholder forestry in the Philippines using a timber supply value chain. Data and information source were review of literature, KIIs and FGDs. The study found that the timber supply value chain consists of five phases, namely: 1) management planning, 2) harvesting, 3) transportation, 4) processing, and 5) selling of lumber (Figure 2). Based on its findings, the study concluded that overregulation and lack of administrative support hamper the potential of timber industry in reducing poverty and addressing sustainable wood supply. Instead, these strict regulations have perpetuated corruption within the various phases in the timber supply value chain thus increased the cost of doing business. The recommended that before implementing regulations in the timber industry, government should consider the capacities of communities and smallholders.

Paqueo and Silfverberg (2015) analyzed the wood industry in the CARAGA region using jobs value chain analysis (JVC) and data and information sourced through KIIs and FGDs conducted in selected cities and municipalities in the region. The study found that the value chain has four major segments, namely: 1) industrial tree plantation, 2) harvest, 3) transport and 4) wood processing (Figure 3). The study explained that there is a great potential for the wood industry in the CARAGA region as it was able to generate job opportunities for the regional population. However, despite this positive result, the study also asserted the full potential of the wood processing industry there is not fully utilized due to policy, regulatory, and production

issues. It recommended that the government should immediate conducyt stakeholder consultations with private sector and other groups in order to fix the current bottlenecks in the wood industry value chain.

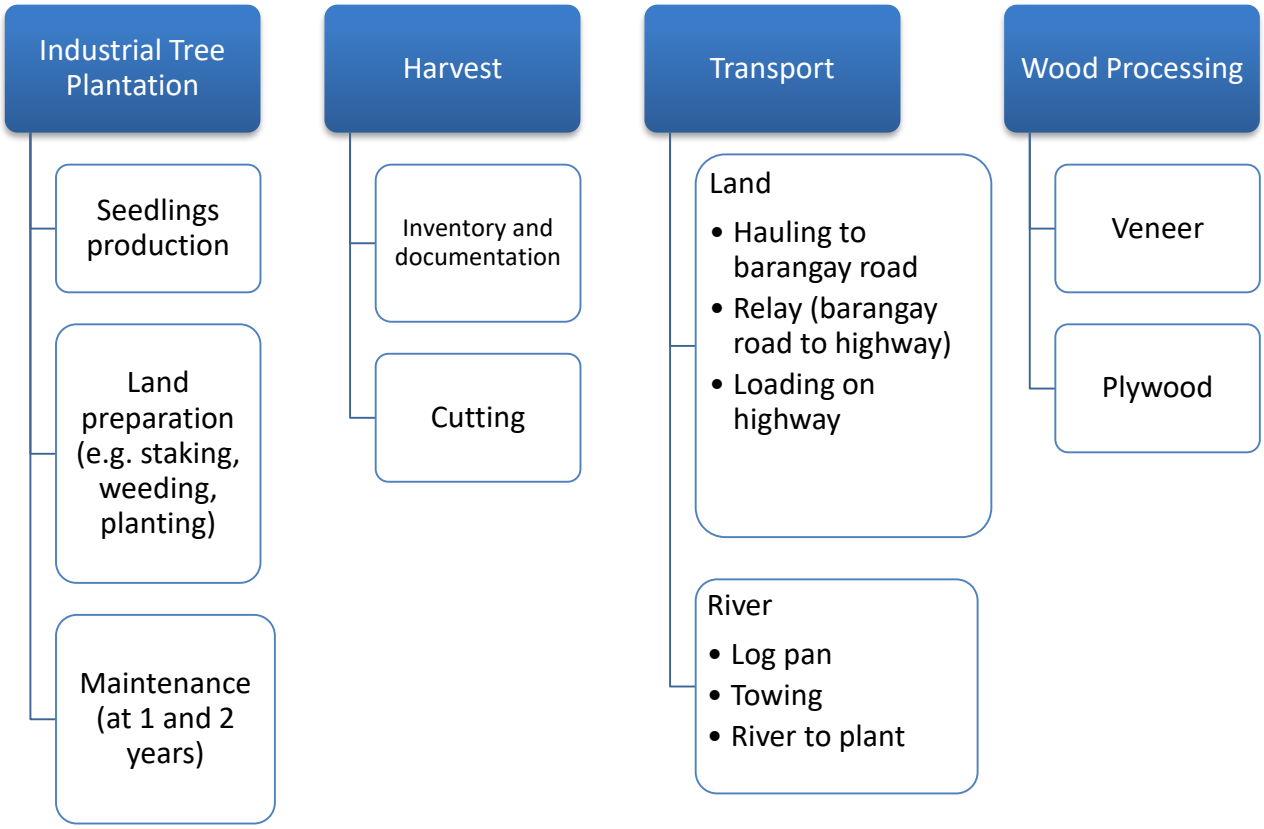
**Figure 2: Timber value chain framework on community-based timber enterprise and small-holder forestry**




Source: Pulhin and Ramirez (2016)

Aldaba (2014) examined the performance of the Philippine manufacturing industry with the purpose of developing a new industrial policy framework that will enable the industry to become a catalyst of sustained and inclusive growth of the country. Based on sectoral roadmaps of various manufacturing industries, the study came up with a Manufacturing Industry Roadmap (MIR). In relation to the wood industry value chain, in particular, the study found that high shipping and transportation costs have been the concern of the furniture industry as well as high cost and lack of raw materials. In the case of engineered bamboos, the study identified the shortage of bamboo poles as a major constraint preventing the industry from taking part in the global market for bamboo products. Furthermore, in the case of the paper industry, the study cited the lack of materials and high cost of power as major constraints as well. To develop these wood-related industries, the study recommended the establishment of supply hubs for raw and natural materials. It also argued that the government, in partnership with private sector, should develop and establish massive tree plantations where wood production and processing will together be carried out.

**Figure 3: Jobs value chain in CARAGA region, Philippines**




Source: Paqueo and Silfverberg (2015)

BOI (2014) prepared the 2014 Investment Priorities Plan of the Philippines which aims to upgrade and transform the manufacturing industry in the country partly building upon the study of Aldaba (2014). This work also provides a more detailed discussion on each sector in the manufacturing industry. For the furniture industry, the report recommended that the government should provide incentives for investment in industrial tree plantations and supply/trading hubs for raw materials. For paper industry, the strategies recommend to develop it include modernization, retooling and rehabilitation of old paper mills, improving and expanding fiber raw material base to include agricultural wastes, and developing massive tree plantations and commercial agro-forestry integrated with virgin wood pulp production to help meet the fiber requirements of local mills.

Abad (2008) looked into the Philippine furniture industry in particular with the aim of identifying how the local firms manage to mix design, local manufacturing capability, and global and local sourcing to become competitive in the high end, low volume markets. Using Porter's Five Force Analysis and Diamond Model Framework, the study found that the low-cost quality labor and innovative designs with the incorporation of mixed media were the two factors that

helped the industry compete globally. Despite these advantages, however, issues such as scarcity of raw materials, availability of cheap imported furniture, outdated technology and intense domestic rivalry have hindered the growth of the industry. The study recommended that government should build up a massive base or source of endemic Philippine raw materials utilized in the furniture industry. Also, it recommended provide funds for research on enhancing the currently used raw materials and for identifying other alternative materials the industry can utilize. Moreover, it should build a cluster of suppliers for the furniture industry in the different parts of the country.

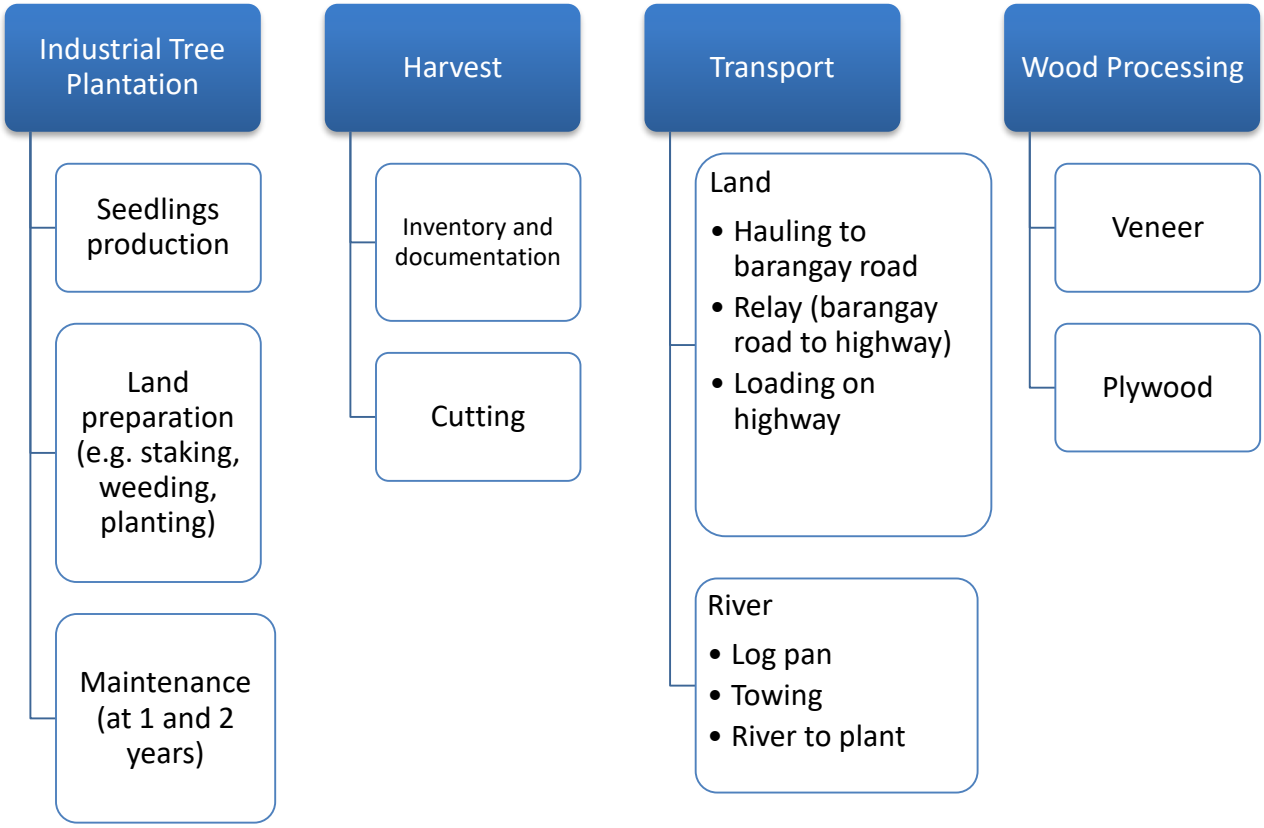
Poblador et al. (1983) examined the wood-based furniture, leather products and footwear manufacturing industries in the Philippines. The aim was to analyze the status of each industry and identify areas for future development. For data and information, the study surveyed several firms in Metro Manila, Bulacan, Rizal, Laguna, Cebu and Pampanga. Focusing on the wood-based industry, the major problems identified were the lack of capital, inadequate supply of raw materials and fluctuating domestic demand for furniture. To conclude, the study asserted the need for market research and development in order to push for exports of wood-based furniture. Identification of important products and markets was also seen to be critical, as well as the determination of the different technological requirements for the tapping such markets.

EDFI (1968) examined the status of the wood processing industry in the Philippines. One of its main objectives was to identify problems and recommend long-term measures for the over-all development of the wood industry. Among the issues mentioned was the lack of meaningful land use policy in the country which adversely affects forestry management. The paper recommended that the government should develop and enforce a meaningful land use policy. In addition, it proposed the development of a formal industry integration program to minimize the risk of overburdening the industry with excess capacity due to different integration centers which do not consider market constraints.

Research gaps

The above review of the relevant studies international and domestic studies on wood processing shows some important research gap. Firstly, many of these studies were not national in scope but were site-specific concentrating on particular areas of a country. Secondly, where the studies done were national in scope in the case of the Philippines, the studies did not always deal on specific wood processing industry subsectors but on the industry as a whole. Thirdly, the analyses conducted in the Philippines did not always deal on the value chain of the wood processing industry but on other forestry issues and concerns. Fourthly, where value chain analysis was conducted, the effort has been cursory in nature and not as detailed as one may hope for. Specifically, the flow of goods from the upstream phases to the downstream and final stages are not extensively. Lastly, and equally important, the value chain analysis conducted was not accompanied with an economic analysis of the performance of the individual stages of the wood processing industry. This current study attempts, to the extent possible, to fill in these research gaps and limitations in past literature.

**Figure 3: Jobs value chain in CARAGA region, Philippines**

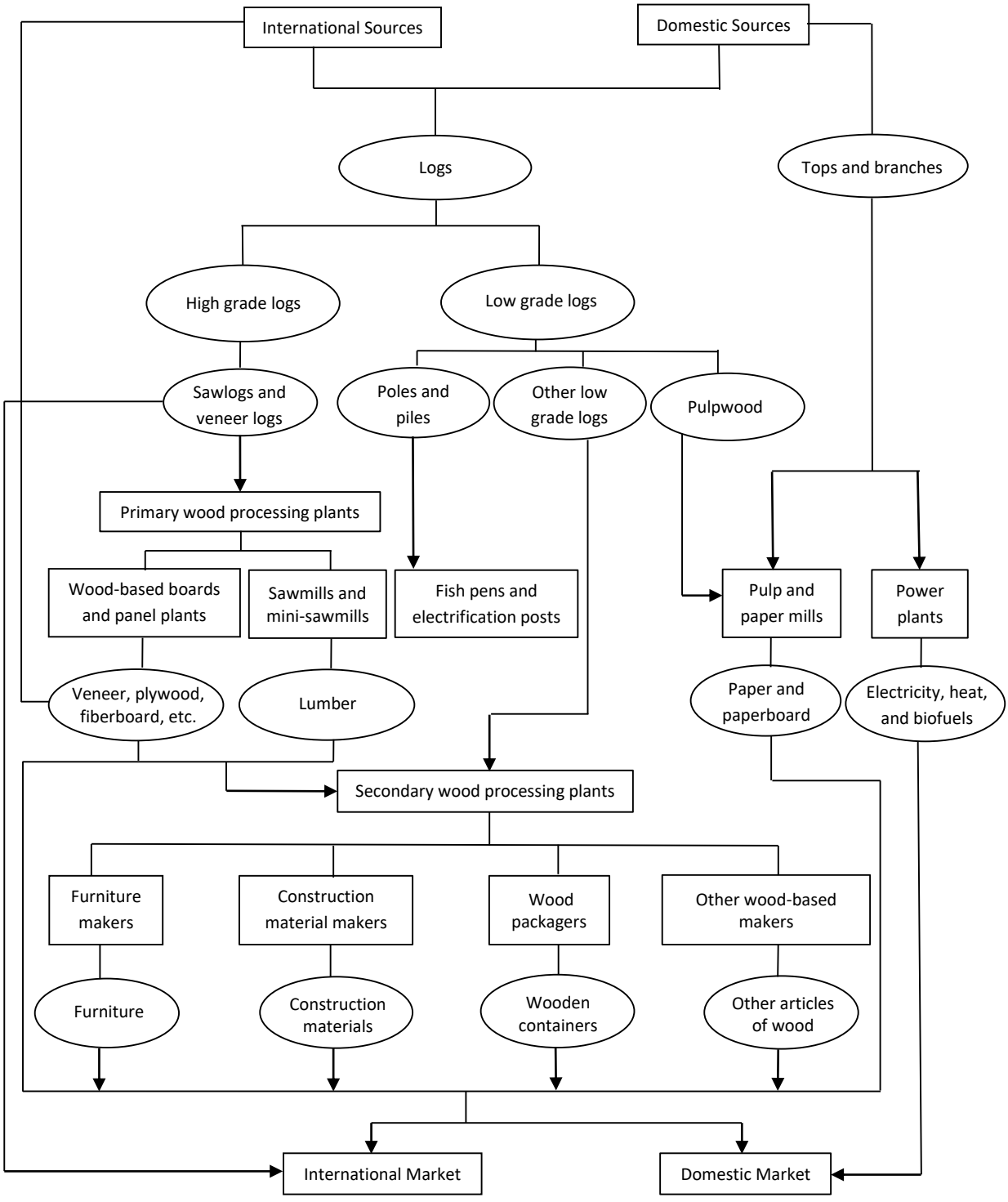



Source: Paqueo and Silfverberg (2015)

## III. Wood processing industry value chain

A more detailed illustration of the value chain of the wood processing industry of the Philippines is presented below (Figure 4). The chain involves the different wood processing firms at different stages of the chain, the kinds and sources of their inputs, and the kinds and destinations of their outputs and products. At the beginning of the value chain, the basic two raw material inputs of the wood processing industry of the Philippines are the logs and the tops and branches from harvested trees. The logs are either imported by wood processing firms from abroad and/or sourced from the domestic logging firms and/or tree growers sometimes through intermediaries such as log traders. The tops and branches of trees are the by-products of local logging operations and are locally purchased by local pulp and paper mills and power plants for their own operations.

**Figure 4: Wood processing Industry value chain in the Philippines**




Sources of data: KIIs and FGDs

*Logs*

The left side of Figure 4 above illustrates the downward flow of the wood processing value chain using log while the right side presents that using the tops and branches of trees. On the left side, the tree species generally used in wood processing in the Philippines include Mangium (Acacia mangium), Falcata (Paraserianthes falcataria), Mahogany (Swietenia macrophyllla), Yemane (Gmelina arborea), and Bagras (Eucalyptus deglupta). Different species have different characteristics and therefore have varying uses. For instance, Falcata is mainly used for plywood production while Mahogany and Yemane are generally utilized for furniture making. On the other hand, Mangium is used for flooring while Bagras is utilized in construction. In 2015, Falcata was the most produced log in the Philippines, sharing 67.58 percent of total national log production followed by Yemane and Mahogany. The least produced species were ipil-ipil and Acacia (Table 1).

Locally produced logs in the Philippine come from different geographical regions (Table 2). The bulk of the logs come from Visayas and Mindano, with the latter contributing the largest portion particularly the CARAGA Region which produced 70.4 percent of the national total in 2015. The non-producing regions, on the other hand, include the National Capital Region (NCR), Autonomous Region of Muslim Mindanao (ARMM) and MIMAROPA Region (Region 4-B). At present, most of the logs produced in the country are plantation species because as stated earlier, under EO 23 the cutting or harvesting of trees from natural forests has been prohibited. As a result, many wood processing firms also use logs produced in tree plantations and/or imported logs[4].

The logs available from tree plantations are either produced in private lands or degraded residual forests managed by private entities under contract with the Philippine government. On the other hand, the imported logs mostly come from various countries including Malaysia, Papau New Guinea, Canada, Solomon Islands, France, Germany and the United States. The logs coming from these source countries likely come from both their natural forests as well as tree plantations and with the growing environmental concern worldwide, more may have come from the latter.

From 2006 to 2015, in terms of volume, Philippine log production has been increasing but only at a low average annual growth rate (AAGR) of one percent (Table 3). Production was fluctuating from year to year and was highest in 2013 at about 1,616 thousand cubic meters and lowest in 2010 at approximately 557 thousand cubic meters. Production was higher than 1,000 thousand cubic meters in some years and lower in others. In general, log production was lower in the first half and higher in the second of the period. Percentage wise, production decreased the most from 2009 to 2010 and from 2014 to 2015 while it rebounded the quickest from 2010 to 2011 and from 2012 to 2013. The total and average annual production of logs in the Philippines during the whole period were 8,934 thousand cubic meters and 893.45 thousand cubic meters respectively.

[4] Although no definitive data from avilable sources can prove this, data in Table 5 below provides credence to this contention.

**Table 1: Log production in the Philippines, by species, 2015 (cubic meters)**

| Species | Quantity | Percent to total |
|---|---|---|
| | | |
| Falcata *(Paraserianthes falcataria)* | 568,929 | 67.58 |
| Yemane *(Gmelina arborea)* | 80,945 | 9.61 |
| Mahogany *(Swietenia macrophyllla)* | 66,618 | 7.91 |
| Mangium *(Acacia mangium)* | 47,290 | 5.62 |
| Para Rubber *(Hevea brasiliensis)* | 10,841 | 1.29 |
| Bagras *(Eucalyptus deglupta)* | 8,001 | 0.95 |
| Gubas *(Endospermum peltatum)* | 6,764 | 0.80 |
| Ipil-ipil *(Leucaena leucocephala)* | 2,396 | 0.28 |
| Acacia *(Samanea saman)* | 1,415 | 0.17 |
| Others | 48,680 | 5.78 |
| | | |
| Total | 841,880 | 100.00% |

Note: Data may not add due to rounding
Source of data: FMB (2015)

**Table 2: Log production in the Philippines, by region, 2015 (cubic meters)**

| Region | Quantity | Percent to total |
|---|---|---|
| | | |
| CAR | 1,228 | 0.1 |
| R1 | 2,094 | 0.2 |
| R2 | 1,113 | 0.1 |
| R3 | 2,813 | 0.3 |
| R4A | 36,260 | 4.3 |
| R4B | 920 | 0.1 |
| R5 | 641 | 0.1 |
| R6 | 21,261 | 2.5 |
| R7 | 1,693 | 0.2 |
| R8 | 990 | 0.1 |
| R9 | 76,824 | 9.1 |
| R10 | 39,883 | 4.7 |
| R11 | 28,946 | 3.4 |
| R12 | 34,394 | 4.1 |
| R13 | 592,821 | 70.4 |
| NCR | 0 | 0.0 |
| ARMM | 0 | 0.0 |
| | | |
| Total | 841,880 | 100.0% |

Note: Data may not add up due to rounding
Source of data: FMB (2015)

**Table 3: Production, exports, imports, and apparent demand for logs in the Philippines, 2006-2015 (cubic meters)**

| Year | Local log production (A) | Export (B) | Import (C) | Net Exports (B-C) | Apparent demand (A-B+C) |
|---|---|---|---|---|---|
| | | | | | |
| 2015 | 841,880 | 2,542 | 105,177 | -102,635 | 944,515 |
| 2014 | 1,102,365 | 3,196 | 50,903 | -47,707 | 1,150,072 |
| 2013 | 1,165,851 | 1,221 | 123,519 | -122,298 | 1,288,149 |
| 2012 | 862,429 | 2,143 | 107,872 | -105,729 | 968,158 |
| 2011 | 871,126 | 2,696 | 88,908 | -86,212 | 957,338 |
| 2010 | 557,345 | 5,461 | 41,589 | -36,128 | 593,473 |
| 2009 | 801,520 | 77 | 37,412 | -37,335 | 838,855 |
| 2008 | 815,225 | 642 | 77,557 | -76,915 | 892,140 |
| 2007 | 880,674 | 78 | 93,183 | -93,105 | 973,779 |
| 2006 | 1,036,033 | 273 | 65,185 | -64,912 | 1,100,945 |
| | | | | | |
| Total | 8,934,448 | 18,329 | 791,305 | -772,976 | 9,707,424 |
| Annual Average | 893,445 | 1,833 | 79,131 | -77,298 | 970,742 |
| AAGR | 1% | 843% | 20% | 22% | 1% |

Note: Log production data from FMB only has quantity. In the data sources, log differs from roundwood. The former does not include fuelwood/firewood.
Source of data: FMB (Various Years)

Some of the logs produced by the Philippines are sold domestically while others are exported, particularly the high grade logs. From 2006 to 2015, in terms of volume, Philippine log exports have been fluctuating but generally rising (Table 3). Due mainly to the very large percentage rise in exports in some years, particularly from 2009 to 2010, the computed AAGR was a very large 843 for the period. Exports were highest in 2010 at 5.46 thousand cubic meters and lowest in 2007 and 2009 at 78 thousand cubic meters and 77 thousand cubic meters respectively. Furthermore, exports were generally higher during the second half of the 2000s and lower in the first half. Percentage wise, there was a big decline in log exports from 2006 to 2007 and from 2008 to 2009. On the other hand, there was a significant increase in exports from 2007 to 2008 as well as from 2009 to 2010. The total exports and average annual exports of logs in the Philippines during the period were 18.3 thousand cubic meters and 1.8 thousand cubic meters respectively. The data indicate that over time, exports form only a small portion of logs produced in the country.

From 2006 to 2015, in terms of volume, Philippine log imports have been generally increasing with an AAGR of 20 percent (Table 3). Imports were highest in 2013 at about 123.90 thousand cubic meters and lowest in 2009 at approximately 37.41 thousand cubic meters. Like exports, imports were generally higher during the second half of the 2000s and lower in the first half. Percentage wise, there was a big decline in imports from 2008 to 2009 and from 2013 to 2014 and a substantial increase from 2010 to 2011 and from 2014 to 2015. The total imports and annual imports of logs in the Philippines during the period were 791.3 thousand cubic meters and 79.1 thousand cubic meters respectively. Imports of logs were more than exports in all years.

Since imports were consistently higher than imports, in terms of volume, Philippine log net exports have also been consistently negative in all years from 2006 to 2015 (Table 3). However, net exports were generally improving, manifested by decreasing negative net export figures at an AAGR of 22 percent. Net exports were highest in 2010 at -36.13 thousand cubic meters and lowest in 2001 at -122.30 thousand cubic meters. Net exports were generally higher during the first half of the 2000s than in the second half. There were improvements in net exports in 2008, 2009, 2010 and 2015 and worsening in the other years.

Apparent demand for logs, which is computed as production plus imports less exports, is an estimate of total demand and can be used in place of actual total demand in the absence of data (FMB 2009). From 2006 to 2015, the apparent demand for logs increased at an AAGR of one percent (Table 3). Apparent demand was less than 1,000 thousand cubic meters in all years except 2006, 2013 and 2014. It was highest in 2013 at 1,288.30 thousand cubic meters and lowest in 2010 at 593.47 thousand cubic meters. Apparent demand was generally lower in the first half of the 2000s than in the second half.

If the Philippine log performance from 2011 to 2016 can be used to help determine the effect of EO 23, it can be seen that this effect was negative. Log production has fallen during this 5-year sub-period when the order was in implementation except in 2013 (Table 3). Exports has also decreased in all except in 2014. On the other hand, imports which were replacements for locally produced logs, increased in all years except 2014. All these data suggest that indeed, EO 23 was generally inimical to the log production of the country in its years of implementation so far.

After harvest, the logs produced in the Philippines are first graded into two categories (Figure 4). The high grade logs which are the sawlogs and veneer logs are either exported or sent to the primary wood processing plants. On the other hand, there are three kinds of low grade logs: those which are categorized as poles and piles and used in local fish pens and electrification posts, those other low grade logs that are not processed by primary wood processing firms due to poor quality but are useful to secondary wood processing firms in the production of some wood articles, and those that are graded as pulpwood which are generally utilized in pulp and paper mills.

From 2006 to 2015, in terms of volume, Philippine log production of different types has been increasing except for pulpwood which registered an AAGR of -8 percent (Table 4). Sawlog and veneer logs formed the dominant share of the total with 610,588 cubic meters average annual production during the period followed by pulpwood with 276,122 cubic meters and poles and piles with 6,734 cubic meters. Eighty-nine percent of the sawlogs and veneer logs come from plantations while only 11 percent are generated from natural forests in the Philippines during the period (Table 5). The figures also show that the percent share of natural grown logs to the total production was lower in the second half of the decade when EO 23 has been in implementation. In a significant way, this finding strongly supports the contention that the implementation of EO 23 has indeed helped reduce the harvest of trees from the natural forests of the Philippines.

**Table 4: Log production in the Philippines, by type of log, 2006-2015 (cubic meters)**

| Year | Sawlog and Veneer log | Percent to total | Poles and Piles | Percent to total | Pulpwood | Percent to total | Total |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2015 | 442,598 | 52.6 | 4,366 | 0.5 | 394,917 | 46.9 | 841,880 |
| 2014 | 631,024 | 57.2 | 6,055 | 0.5 | 465,285 | 42.2 | 1,102,364 |
| 2013 | 641,122 | 55.0 | 6,657 | 0.6 | 518,071 | 44.4 | 1,165,851 |
| 2012 | 742,286 | 86.1 | 4,514 | 0.5 | 115,629 | 13.4 | 862,429 |
| 2011 | 780,405 | 89.6 | 3,888 | 0.4 | 86,833 | 10.0 | 871,126 |
| 2010 | 518,343 | 93.0 | 4,436 | 0.8 | 34,566 | 6.2 | 557,345 |
| 2009 | 689,163 | 86.0 | 3,267 | 0.4 | 109,090 | 13.6 | 801,520 |
| 2008 | 473,929 | 58.1 | 3,119 | 0.4 | 338,178 | 41.5 | 815,225 |
| 2007 | 648,126 | 73.6 | 5,882 | 0.7 | 226,667 | 25.7 | 880,674 |
| 2006 | 538,883 | 52.0 | 25,165 | 2.4 | 471,985 | 45.6 | 1,036,033 |
| | | | | | | | |
| Total | 6,105,879 | 68% | 2,761,221 | 31% | 67,349 | 1% | 8,934,448 |
| Annual Average | 610,588 | | 276,122 | | 6,735 | | 893,445 |
| AAGR | 2% | 3% | 41% | 25% | -8% | -4% | 1% |

Note: Data may not add up due to rounding. Also, data on other logs that are not processed in primary wood processing but used in secondary wood processing to produce some wood articles are not separately itemized in the data sources.
Source of data: FMB (Various Years)

**Table 5: Sawlog and veneer log production in the Philippines, by type of forest, 2006-2015 (cubic meters)**

| Year | Natural forest | Percent to total | Forest Plantation | Percent to total | Total |
|---|---|---|---|---|---|
| | | | | | |
| 2015 | 11,647 | 2.6 | 430,951 | 97.4 | 442,598 |
| 2014 | 3,201 | 0.5 | 627,823 | 99.5 | 631,024 |
| 2013 | 220 | 0.0 | 640,902 | 100.0 | 641,122 |
| 2012 | 3,541 | 0.5 | 738,745 | 99.5 | 742,286 |
| 2011 | 14,872 | 1.9 | 765,533 | 98.1 | 780,405 |
| 2010 | 121,769 | 23.5 | 396,574 | 76.5 | 518,343 |
| 2009 | 107,284 | 15.6 | 581,879 | 84.4 | 689,163 |
| 2008 | 103,135 | 21.8 | 370,794 | 78.2 | 473,929 |
| 2007 | 152,361 | 23.5 | 495,765 | 76.5 | 648,126 |
| 2006 | 171,071 | 31.7 | 367,812 | 68.3 | 538,883 |
| | | | | | |
| Total | 689,101 | 11.3% | 5,416,778 | 88.7% | 6,105,879 |
| Annual Average | 68,910 | | 581,678 | | 610,588 |
| AAGR | 148% | 169.6% | 9% | 4.5% | 2% |

Note: Data may not add up to total due to rounding
Source of data: FMB (Various Years)

*Primary processing*

The primary wood processing plants, called PWPPs here for convenience, to which the sawlogs and veneer logs are sent are composed of wood-based board and panel plants, sawmills and mini-sawmills (Figure 4). Wood-based board and panel plants include veneer plants, plywood plants, blockboard plants, fiberboard plants, and similar plants. These wood-based board and panel plants produce veneer, plywood, fiberboard, particleboard, blockboard and other engineered wood which are then sold domestically or abroad or sent to the secondary wood processing plant. On the other hand, sawmills and mini-sawmills produce lumber which are either marketed domestically and/or internationally and/or forwarded to secondary wood processing plants.

In 2015, there were 205 existing PWPPs in the Philippines (Table 6). Most of these processing plants were veneer plants (69), active-mini sawmills (67), and plywood plants (43). Others were active regular sawmills (16) and other WBPPs (12). Most of the PWPPs were in Mindanao while Luzon has 9 and Visayas has none. The regions with the most number of PWPPs were Regions 10, 11, and 13. Those with none were CAR and Regions 1, 2, 4B, 7, 8, and ARMM.

**Table 6: Number of primary wood processing plants in the Philippines, by region, 2015**

| Region | Active Regular Sawmill | Active Mini-sawmill | Veneer Plants | Plywood Plants | Others | Total |
|---|---|---|---|---|---|---|
| | | | | | | |
| CAR | 0 | 0 | 0 | 0 | 0 | 0 |
| R1 | 0 | 0 | 0 | 0 | 0 | 0 |
| R2 | 0 | 0 | 0 | 0 | 0 | 0 |
| R3 | 0 | 0 | 1 | 1 | 1 | 3 |
| R4A | 2 | 0 | 2 | 2 | 0 | 6 |
| R4B | 0 | 0 | 0 | 0 | 0 | 0 |
| R5 | 0 | 0 | 0 | 0 | 0 | 0 |
| R6 | 0 | 1 | 0 | 0 | 0 | 1 |
| R7 | 0 | 0 | 0 | 0 | 0 | 0 |
| R8 | 0 | 0 | 0 | 0 | 0 | 0 |
| R9 | 0 | 2 | 2 | 2 | 0 | 6 |
| R10 | 1 | 39 | 10 | 10 | 1 | 61 |
| R11 | 1 | 11 | 25 | 12 | 2 | 51 |
| R12 | 1 | 4 | 1 | 12 | 8 | 26 |
| R13 | 9 | 10 | 26 | 0 | 0 | 45 |
| NCR | 2 | 0 | 2 | 4 | 0 | 8 |
| ARMM | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | |
| Total | 16 | 67 | 69 | 43 | 12 | 207 |

Note: Others include those producing panels using low quality logs, lumber strips and logging/processing wastes.
Source of data: FMB (2015)

From 2006 to 2015, the number of PWPPs in the Philippines has been decreasing with an AAGR of –one percent (Table 7). By type, the number of veneer plants, plywood plants, and other plants has been rising with AAGRs of 13 percent, 1 percent, and 6 percent respectively while the number of active regular sawmills and active mini-sawmills has been falling with AAGRs of -5 percent and -3 percent, respectively.

From 2006 to 2015, in terms of volume, the total production of primary wood processing plants in the Philippines has been decreasing with an AAGR of –4 percent (Table 8). However, the production of all other types of primarily processed products had been increasing except plywood which had been decreasing with an AAGR of -7 percent.

**Table 7: Number of primary wood processing plants in the Philippines, by plant type, 2006-2015**

| Year | Active Regular Sawmill | Active Mini-sawmill | Veneer Plants | Plywood Plants | Others | Grand Total |
|---|---|---|---|---|---|---|
| | | | | | | |
| 2015 | 16 | 67 | 69 | 43 | 12 | 207 |
| 2014 | 22 | 62 | 67 | 37 | 10 | 198 |
| 2013 | 22 | 84 | 66 | 42 | 12 | 226 |
| 2012 | 31 | 60 | 65 | 48 | 10 | 214 |
| 2011 | 29 | 93 | 40 | 43 | 8 | 213 |
| 2010 | 27 | 119 | 40 | 43 | 8 | 237 |
| 2009 | 34 | 153 | 31 | 41 | 7 | 266 |
| 2008 | 35 | 116 | 34 | 41 | 7 | 233 |
| 2007 | 30 | 136 | 31 | 39 | 6 | 242 |
| 2006 | 28 | 124 | 27 | 40 | 8 | 227 |
| | | | | | | |
| Total | 274 | 1014 | 470 | 417 | 88 | 2263 |
| Annual Average | 27.4 | 101.4 | 47 | 41.7 | 8.8 | 226.3 |
| AAGR | -5% | -3% | 13% | 1% | 6% | -1% |

Source of data: FMB (Various Years)

**Table 8: Production of primarily processed wood products, 2005-2014 (thousand cubic meters)**

| Year | Lumber | Veneer | Plywood | Fiberboard | Blockboard | Total |
|---|---|---|---|---|---|---|
| | | | | | | |
| 2015 | 232 | 59 | 146 | 54 | 87 | 578 |
| 2014 | 496 | 40 | 164 | 22 | 49 | 771 |
| 2013 | 450 | 60 | 199 | 13 | 58 | 780 |
| 2012 | 218 | 129 | 297 | 5 | 22 | 671 |
| 2011 | 372 | 114 | 300 | 2 | 42 | 830 |
| 2010 | 377 | 136 | 276 | 5 | 37 | 831 |
| 2009 | 304 | 88 | 253 | 12 | 42 | 699 |
| 2008 | 358 | 101 | 235 | 10 | 42 | 746 |
| 2007 | 362 | 124 | 281 | 6 | 56 | 829 |
| 2006 | 432 | 95 | 317 | 5 | 62 | 911 |
| | | | | | | |
| Total | 3601 | 946 | 2468 | 134 | 497 | 7646 |
| Annual Average | 360.1 | 94.6 | 246.8 | 13.4 | 49.7 | 764.6 |
| AAGR | 1% | 1% | -7% | 57% | 16% | -4% |

Source of data: FMB (2015)

From 2006 to 2015, in terms of both volume and value, the total exports of selected products of primary wood processing plants in the Philippines have been increasing with AAGRs of 6 percent and 10 percent, respectively (Table 9). Of the different products, exports had been rising except for plywood which experienced falling exports with AAGRs of -15 percent in volume and -14 percent in value.

**Table 9: Export of selected primarily processed wood products, 2006-2015 (volume in cubic meters, value in thousand US $, FOB)**

| Year | Lumber | | Plywood | | Veneer | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Volume | Value | Volume | Value | Volume | Value | Volume | Value |
| | | | | | | | | |
| 2015 | 267,267 | 37,346 | 781 | 401 | 1,315 | 808 | 269,363 | 38,555 |
| 2014 | 310,070 | 69,420 | 2,057 | 1,819 | 3,681 | 3,269 | 315,808 | 74,508 |
| 2013 | 239,565 | 74,132 | 3,738 | 3,773 | 2,784 | 3,078 | 246,087 | 80,983 |
| 2012 | 391,663 | 28,046 | 12,951 | 10,986 | 32,048 | 13,475 | 436,662 | 52,507 |
| 2011 | 404,533 | 24,377 | 39,834 | 24,336 | 14,663 | 1,347 | 459,030 | 50,060 |
| 2010 | 376,596 | 10,587 | 23,737 | 14,963 | 3,108 | 2,057 | 403,441 | 27,607 |
| 2009 | 293,287 | 9,629 | 33,305 | 21,921 | 4,032 | 1,301 | 330,624 | 32,851 |
| 2008 | 214,534 | 11,602 | 38,931 | 19,237 | 3,764 | 2,003 | 257,229 | 32,842 |
| 2007 | 207,642 | 14,342 | 36,759 | 14,810 | 6,714 | 3,833 | 251,115 | 32,985 |
| 2006 | 184,386 | 13,198 | 19,952 | 9,619 | 5,856 | 4,018 | 210,194 | 26,835 |
| | | | | | | | | |
| Total | 2,889,543 | 292,679 | 212,045 | 121,865 | 77,965 | 35,189 | 3,179,553 | 449,733 |
| Annual Average | 288,954 | 29,268 | 21,205 | 12,187 | 7,797 | 3,519 | 317,955 | 44,973 |
| AAGR | 7% | 27% | -15% | -14% | 36% | 77% | 6% | 10% |

Note: Some of the processed wood products such as particleboard and fiberboard) were not included due to the difference in measurement used. Particleboard is measured in gross kilograms while fiberboard is measured in net kilograms.
Source of data: FMB (Various Years)

From 2006 to 2015, in terms of both volume and value, the total imports of selected products of primary wood processing plants in the Philippines has been increasing with AAGRs of 23 percent and 8 percent, respectively (Table 10). The imports of all types of primarily processed wood products has been increasing as well.

From 2006 to 2015, the net exports of selected primarily processed wood products in the Philippines has been mixed with AAGRs of -75 percent in volume and 10 percent in value (Table 11). For the different types of products, plywood and veneer registered positive AAGRs while lumber posted negative rates in both volume and value.

**Table 10: Imports of selected primarily processed wood products, 2006-2015 (volume in cubic meters, value in thousand US $, FOB)**

| Year | Lumber | | Plywood | | Veneer | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Volume | Value | Volume | Value | Volume | Value | Volume | Value |
| | | | | | | | | |
| 2015 | 1,144,691 | 75,291 | 292,126 | 140,667 | 23,726 | 8,328 | 1,460,543 | 224,286 |
| 2014 | 207,362 | 100,090 | 411,269 | 156,093 | 14,826 | 8,550 | 633,457 | 264,733 |
| 2013 | 240,197 | 114,362 | 195,037 | 99,760 | 30,642 | 10,722 | 465,876 | 224,844 |
| 2012 | 218,607 | 91,107 | 95,183 | 67,483 | 59,507 | 19,537 | 373,297 | 178,127 |
| 2011 | 159,974 | 70,200 | 94,231 | 69,617 | 38,011 | 11,333 | 292,216 | 151,150 |
| 2010 | 136,574 | 50,466 | 61,163 | 37,276 | 25,683 | 5,895 | 223,420 | 93,637 |
| 2009 | 128,754 | 43,441 | 51,549 | 27,664 | 22,875 | 5,032 | 203,178 | 76,137 |
| 2008 | 134,846 | 45,663 | 57,189 | 35,777 | 27,262 | 8,461 | 219,297 | 89,901 |
| 2007 | 174,456 | 84,368 | 58,517 | 38,826 | 24,892 | 8,183 | 257,865 | 131,377 |
| 2006 | 261,193 | 87,925 | 75,135 | 47,682 | 37,220 | 10,614 | 373,548 | 146,221 |
| | | | | | | | | |
| Total | 2,806,654 | 762,913 | 1,391,399 | 720,845 | 304,644 | 96,655 | 4,502,697 | 1,580,413 |
| Annual Average | 280,665 | 76,291 | 139,140 | 72,085 | 30,464 | 9,666 | 450,270 | 158,041 |
| AAGR | 50% | 2% | 25% | 18% | 4% | 6% | 23% | 8% |

Note: Some of the processed wood products such as particleboard and fiberboard) were not included due to the difference in measurement used. Particleboard is measured in gross kilograms while fiberboard is measured in net kilograms.
Source of data: FMB (Various Years)

**Table 11: Net Exports of selected primarily processed wood products, 2006-2015 (volume in cubic meters, value in thousand US $, FOB)**

| Year | Lumber | | Plywood | | Veneer | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Volume | Value | Volume | Value | Volume | Value | Volume | Value |
| | | | | | | | | |
| 2015 | -877,424 | -37,945 | -291,345 | -140,266 | -22,411 | -7,520 | -1,191,180 | -185,731 |
| 2014 | 102,708 | -30,670 | -409,212 | -154,274 | -11,145 | -5,281 | -317,649 | -190,225 |
| 2013 | -632 | -40,230 | -191,299 | -95,987 | -27,858 | -7,644 | -219,789 | -143,861 |
| 2012 | 173,056 | -63,061 | -82,232 | -56,497 | -27,459 | -6,062 | 63,365 | -125,620 |
| 2011 | 244,559 | -45,823 | -54,397 | -45,281 | -23,348 | -9,986 | 166,814 | -101,090 |
| 2010 | 240,022 | -39,879 | -37,426 | -22,313 | -22,575 | -3,838 | 180,021 | -66,030 |
| 2009 | 164,533 | -33,812 | -18,244 | -5,743 | -18,843 | -3,731 | 127,446 | -43,286 |
| 2008 | 79,688 | -34,061 | -18,258 | -16,540 | -23,498 | -6,458 | 37,932 | -57,059 |
| 2007 | 33,186 | -70,026 | -21,758 | -24,016 | -18,178 | -4,350 | -6,750 | -98,392 |
| 2006 | -76,807 | -74,727 | -55,183 | -38,063 | -31,364 | -6,596 | -163,354 | -119,386 |
| | | | | | | | | |
| Total | 82,889 | -470,234 | -1,179,354 | -598,980 | -226,679 | -61,466 | -1,323,144 | -1,130,680 |
| Annual Average | 8,289 | -47,023 | -117,935 | -59,898 | -22,668 | -6,147 | -132,314 | -113,068 |
| AAGR | -1920% | -3% | 38% | 45% | 6% | 15% | -75% | 10% |

Note: Some of the processed wood products such as particleboard and fiberboard) were not included due to the difference in measurement used. Particleboard is measured in gross kilograms while fiberboard is measured in net kilograms.
Source of data: FMB (Various Years)

*Secondary processing*

If not sold domestically or exported, the different products of PWPPs in the Philippines are then sent to secondary wood processing plants, called SWPPs here for brevity. The secondary wood processing firms consist of furniture makers, construction builders, wood packagers, and other secondary wood manufacturing firms. These firms generate their supply of lumber, veneer, plywood and other raw material inputs from the PWPPS and/or international sources (Figure 4).

Various wood-based manufactured articles and wood-based furniture are produced by these secondary wood processing firms in the Philippines. The furniture makers produce chairs, tables, beds, cabinets and drawers and other wood-based items. The makers of construction materials produce beams, doors, railings, mouldings, frames and flooring and other wood-based construction items. The wood packagers produce wooden containers such as crates, pallets, wooden boxes and wood cable-drums. Other wood-based makers produce various wood articles used in handicrafts, arts, musical instruments, toys, home decorations, kitchenware, and other similar items. The outputs from these secondary wood processing industries are then sold in the international and/or domestic markets (Figure 4).

The domestic market of secondary wood products in the Philippines is difficult to assess because of the absence of records of sales of SWPPs. Perhaps the best estimates one can get for the secondary wood products sold are from the Census of Philippine Business and Industry (CPBI). For 2012, it was estimated that the value of products sold to the domestic market by secondary wood processing firms was P38.98 billion with P23.73 billion coming from manufacturers of products of wood, cork, straw, and plaiting materials and P15.25 billion from the manufacturers of furniture (Table 12). This means that the total income of the wood processing industry of the country, when those from secondary wood processing firms is included, is indeed substantial.

From 2006 to 2015, in terms of both volume and value, the total exports of products of SWPPs in the Philippines has been decreasing with AAGRs of 19 percent and 17 percent, respectively (Table 13). The production of both wood-based manufactured articles and forest-based furniture had been increasing as well.

From 2006 to 2015, in terms of both volume and value, the total imports of products of SWPPs in the Philippines has been increasing with AAGRs of 69 percent and 26 percent, respectively Table 14). The production of individual SWPP products had been increasing as well.

From 2006 to 2015, in terms of both volume and value, the total net exports of products of SWPPs in the Philippines has been rising with AAGRs of 21 percent and 16 percent, respectively Table 15). The production of individual SWPP products has been rising as well except for the value of forest-based furniture whose AAGR fell by 21 percent.

**Table 12: Sale of products and by-products of secondary wood-based manufacturing establishments in the Philippines, by mode of sale, 2012 (thousand pesos)**

| Mode of Sale | Manufacture of Manufacture of products of wood, cork, straw, and plaiting materials | Percent to Total | Manufacture of furniture | Percent to Total | Total |
|---|---|---|---|---|---|
| Value of Products Sold to Domestic Market | 23,730,680 | 61% | 15,252,631 | 39% | 38,983,311 |
| Interplant Transfers | 36,086 | 6% | 565,657 | 94% | 601,743 |

Notes:
Value of products sold to domestic market refer to goods sold locally. Direct exports refer to goods sold outside the country. Value of products sold to exporters refer to goods sold locally to other exporters. The manufacture of furniture includes furniture of any kind, any material (except stone, concrete or ceramic) for any place and various purposes. There it is not exactly representative of wooden furniture.
Source: PSA (2012)

In the international market, the main buyers of the products of secondary wood processing firms in the Philippines include Japan, Australia, USA, France and United Arab Emirates. Most of the wood-based manufactured articles are sent to Japan, USA and France while most forest-based furniture are sold to USA, Japan and United Arab Emirates. Additionally, paper and paperboard products are sold to Australia, USA and Japan. In the domestic market, the products of secondary wood processing firms are sold all over the country but mainly in Luzon where many traders are based.

In the right side of the value chain, the tops and branches of trees which are byproducts of logging find their way into the pulp and paper mills and power plants as inputs in the production processes of these plants. Pulp and paper mills produce paper and paperboard products which are sold internationally and locally. On the other hand, power plants produce electricity, heat and biofuels which they supply to the local market. The estimated tops and branches produced in the Philippines in volume have been increasing with an AAGR of 6 percent (Table 16).

**Table 13: Exports of secondary processed wood products in the Philippines, 2006-2015 (quantity in gross kilograms, value in thousand US $, FOB)**

| Year | Wood-Based Manufactured Articles | | Forest-Based Furniture | | Total | |
|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value |
| | | | | | | |
| 2015 | 1,351,417,685 | 2,790,702 | 18,644,392 | 107,678 | 1,370,062,257 | 2,898,380 |
| 2014 | 990,261,566 | 2,965,043 | 27,018,539 | 155,098 | 1,017,280,105 | 3,120,141 |
| 2013 | 917,821,274 | 3,063,002 | 21,098,404 | 105,373 | 938,919,678 | 3,168,375 |
| 2012 | 592,305,366 | 2,158,947 | 20,794,122 | 100,023 | 613,099,488 | 2,258,970 |
| 2011 | 441,925,314 | 1,683,815 | 20,957,881 | 105,874 | 462,883,195 | 1,789,689 |
| 2010 | 303,610,772 | 1,028,736 | 21,326,764 | 94,111 | 324,937,536 | 1,122,847 |
| 2009 | 245,556,299 | 820,405 | 20,408,317 | 81,448 | 265,964,616 | 901,853 |
| 2008 | 294,068,065 | 918,241 | 42,538,608 | 154,754 | 336,606,673 | 1,072,995 |
| 2007 | 275,271,301 | 769,647 | 155,902,886 | 174,701 | 431,174,187 | 944,348 |
| 2006 | - | 650,283 | - | 205,869 | - | 856,152 |
| | | | | | | |
| Total | 5,412,237,822 | 16,848,821 | 348,689,913 | 1,284,929 | 5,760,927,735 | 18,133,750 |
| Annual Average | 601,359,758[1] | 1,684,882 | 38,743,324[1] | 128,493 | 640,103,082[1] | 1,813,375 |
| AAGR | 24%[1] | 20% | -16%[1] | -3% | 19%[1] | 17% |

Note: "-"indicates other unit of measurement (e.g. quantity in piece) were used in the data sources therefore corresponding figures cannot be added to the rest of the figures.

[1] Values used in the computation were only from 2007 to 2015.

Source of data: FMB (Various Years)

**Table 14: Imports of secondary processed wood products in the Philippines, 2006-2015 (quantity in gross kilograms, value in thousand US $, FOB)**

| Year | Wood-Based Manufactured Articles | | Forest-Based Furniture | | Total | |
|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value |
| | | | | | | |
| 2015 | 106,173,166 | 80,543 | 99,792,102 | 101,873 | 205,965,268 | 182,416 |
| 2014 | 36,746,186 | 36,337 | 94,060,627 | 110,995 | 130,806,813 | 147,332 |
| 2013 | 30,147,486 | 25,265 | 77,645,555 | 65,347 | 107,793,041 | 90,612 |
| 2012 | 56,074,963 | 25,888 | 70,855,989 | 47,177 | 126,930,952 | 73,065 |
| 2011 | 43,161,766 | 29,065 | 79,807,824 | 53,043 | 122,969,590 | 82,108 |
| 2010 | 25,138,647 | 16,661 | 91,577,944 | 40,685 | 116,716,591 | 57,346 |
| 2009 | 14,075,728 | 8,290 | 64,954,888 | 23,967 | 79,030,616 | 32,257 |
| 2008 | 15,817,515 | 12,030 | 65,609,493 | 29,609 | 81,427,008 | 41,639 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2007 | 14,815,457 | 10,338 | 58,896,201 | 24,646 | 73,711,658 | 34,984 |
| 2006 | 12,442,818 | 7,701 | - | 22,637 | 12,442,818[2] | 30,338 |
| | | | | | | |
| Total | 354,593,732 | 252,118 | 703,200,623 | 519,979 | 1,057,794,355[2] | 772,097 |
| Annual Average | 35,459,373 | 25,212 | 78,133,403[1] | 51,998 | 105,779,436[2] | 77,210 |
| AAGR | 40% | 39% | 8%[1] | 22% | 69%[2] | 26% |

Note: "-"indicates other unit of measurement (e.g. quantity in piece) was used in the data sources therefore corresponding figures cannot be added to the rest of the figures.

[1] Values used in the computation were only from 2007 to 2015.

[2] Value does not include 2006 data for forest-based furniture

Source of data: FMB (Various Years)

**Table 15: Net Exports of secondary processed wood products in the Philippines, 2006-2015 (quantity in gross kilograms, value in thousand US $, FOB)**

| Year | Wood-Based Manufactured Articles | | Forest-Based Furniture | | Total | |
|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value |
| | | | | | | |
| 2015 | 1,245,244,519 | 2,710,159 | -81,147,710 | 5,805 | 1,164,096,989 | 2,715,964 |
| 2014 | 953,515,380 | 2,928,706 | -67,042,088 | 44,103 | 886,473,292 | 2,972,809 |
| 2013 | 887,673,788 | 3,037,737 | -56,547,151 | 40,026 | 831,126,637 | 3,077,763 |
| 2012 | 536,230,403 | 2,133,059 | -50,061,867 | 52,846 | 486,168,536 | 2,185,905 |
| 2011 | 398,763,548 | 1,654,750 | -58,849,943 | 52,831 | 339,913,605 | 1,707,581 |
| 2010 | 278,472,125 | 1,012,075 | -70,251,180 | 53,426 | 208,220,945 | 1,065,501 |
| 2009 | 231,480,571 | 812,115 | -44,546,571 | 57,481 | 186,934,000 | 869,596 |
| 2008 | 278,250,550 | 906,211 | -23,070,885 | 125,145 | 255,179,665 | 1,031,356 |
| 2007 | 260,455,844 | 759,309 | 97,006,685 | 150,055 | 357,462,529 | 909,364 |
| 2006 | - | 642,582 | - | 183,232 | - | 825,814 |
| | | | | | | |
| Total | 5,070,086,728 | 16,596,703 | -354,510,710 | 764,950 | 4,715,576,198 | 17,361,653 |
| Annual Average | 563,342,970 | 1,659,670 | -39,390,079 | 76,495 | 523,952,911 | 1,736,165 |
| AAGR | 24%[1] | 20% | 6%[1] | -22% | 21%[1] | 16% |

Source of data: Tables 13 and 14

**Table 16: Estimated tops and branches produced in the Philippines, 2005-2014 (thousand cubic meters)**

| Year | Tops and Branches |
|---|---|
| | |
| 2014 | 73 |
| 2013 | 77 |
| 2012 | 57 |
| 2011 | 58 |
| 2010 | 37 |
| 2009 | 53 |
| 2008 | 54 |
| 2007 | 59 |
| 2006 | 69 |
| 2005 | 56 |
| | |
| Total | 593 |
| Annual Average | 59.3 |
| AAGR | 6% |

Source of data: FMB (2014)

The study was unable to find data on the production of paper and paperboard from the FMB. From 2006 to 2015, both exports and imports of paper and paperboard products had been increasing both in quantity and value (Table 17). For exports, it had an AAGR of 221 percent for quantity and 13 percent for value. On the other hand, the quantity and value of imports also increased by 5 percent and 8 percent, respectively. Net exports had been constantly negative because imports have exceeded exports over the years. Net exports were highest in 2015 in both quantity and value, with -934.30 million net kilograms and -778.20 million pesos. Net exports were lowest in quantity in 2014 with -149.60 million net kilograms and lowest in value in 2016 with -355.28 million pesos.

*Wood processing organizations*

The Philippine Wood Producers Association (PWPA) is a national association of firms involved in the forestry and wood industry sector in the country[5]. Its main objective was to promote the sustainable management of natural and plantation forests in the country which will consequently lead to the development of the wood industry in our country. Members of the association come from all over the country and are involved in various activities such as forest management, logging, forest plantation development, manufacture and sale of forest products.

[5] Another group identified is the Philippine Lumber Merchants Association but is not discussed here because it covers only the lumber subsector.

**Table 17: Exports, imports and net exports of paper and paperboard products in the Philippines, 2006-2015 (quantity in net kilograms, value in thousand US $, FOB)**

| Year | Exports | | Imports | | Net Exports | |
|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value |
| | | | | | | |
| 2015 | 35,137,649 | 107,678 | 969,442,084 | 885,873 | -934,304,435 | -778,195 |
| 2014 | 806,790,425 | 283,384 | 956,392,939 | 850,219 | -149,602,514 | -566,835 |
| 2013 | 35,012,082 | 94,098 | 907,011,603 | 784,765 | -871,999,521 | -690,667 |
| 2012 | 50,471,968 | 109,758 | 907,966,510 | 769,863 | -857,494,542 | -660,105 |
| 2011 | 135,575,892 | 179,940 | 895,160,682 | 770,601 | -759,584,790 | -590,661 |
| 2010 | 162,857,499 | 155,454 | 932,386,788 | 624,463 | -769,529,289 | -469,009 |
| 2009 | 128,154,307 | 121,658 | 713,058,604 | 495,103 | -584,904,297 | -373,445 |
| 2008 | 131,809,886 | 144,422 | 736,295,364 | 596,077 | -604,485,478 | -451,655 |
| 2007 | 184,795,060 | 142,692 | 889,133,553 | 675,032 | -704,338,493 | -532,340 |
| 2006 | 190,790,406 | 136,877 | 700,036,224 | 492,156 | -509,245,818 | -355,279 |
| | | | | | | |
| Total | 1,861,395,174 | 1,475,961 | 8,606,884,351 | 6,944,152 | -6,745,489,177 | -5,468,191 |
| Annual Average | 186,139,517 | 147,596 | 860,688,435 | 694,415 | -674,548,918 | -546,819 |
| AAGR | 221% | 13% | 5% | 8% | 56% | 12% |

Source of data: FMB (Various Years)

For 2016, it had a significant number of members with a total of 363 members, wherein 43 are regular members and 320 are associate members (Table 18). Regular members are firms involved in the upstream production process in the industry while the associate members are those involved in the downstream process. In general, majority of their members are importers (52%) followed by lumber dealers (38%). The composition of the 43 regular members are as follows: 4 tree farmer/loggers, 6 sawmill operators, 10 plywood manufacturers, 1 fiberboard manufacturer, 3 importers and 19 integrated firms. On the other hand, associate members are composed only of importers and lumber dealers. The large majority of members are located in Luzon of the association while only a small minority are situated in the Visayas and Mindanao (Table 19).

## IV. Issues and problems in the wood processing industry

The wood processing industry is currently saddled with numerous issues and problems constraining it at different stages of the chain. Due to time and resource constraints faced by the study, the issues and problems summarized below may not be exhaustive and are general to wood processing. They are not specific to individual activities except when these activities are used as examples. The information gathered and presented are based on the existing secondary literature and KIIs and FGDs conducted including with the participating members of the PWPA.

**Table 18: Philippine Wood Producers Association members, by region, as of January 13, 2017**

| Region | Regular | Associate | Total |
|---|---|---|---|
| | | | |
| CAR | 0 | 0 | 0 |
| R1 | 0 | 83 | 83 |
| R2 | 1 | 0 | 1 |
| R3 | 5 | 14 | 19 |
| R4A | 2 | 5 | 7 |
| R4B | 0 | 0 | 0 |
| R5 | 0 | 0 | 0 |
| R6 | 1 | 0 | 1 |
| R7 | 3 | 34 | 37 |
| R8 | 0 | 0 | 0 |
| R9 | 2 | 0 | 2 |
| R10 | 4 | 0 | 4 |
| R11 | 7 | 5 | 12 |
| R12 | 3 | 0 | 3 |
| R13 | 8 | 0 | 8 |
| NCR | 7 | 179 | 186 |
| ARMM | 0 | 0 | 0 |
| | | | |
| **Total** | **43** | **320** | **363** |

Notes:
Regular – usually primary wood processing firms and are large-scale.
Associate – usually secondary wood processing firms and SMEs.
Source of data: www.pwpa.org.ph

**Table 19: Philippine Wood Producers Association members, Luzon, Visayas and Mindanao, as of January 13, 2017**

| Major Region | Regular | Associate | Total |
|---|---|---|---|
| | | | |
| Luzon | 15 | 281 | 296 |
| Visayas | 4 | 34 | 38 |
| Mindanao | 24 | 5 | 29 |
| | | | |
| Total | 43 | 320 | 363 |

Source of data: Table 18

*Technical*

The production equipment and technology used by wood processing firms are generally outdated. For instance, existing sawmills were originally designed to process large diameter logs. With the implementation of EO 23, the bulk of logs harvested now come from tree plantations which produce smaller logs. Although, current sawmills can still process these logs, the operation is not efficient. Furthermore, these old technologies produce only limited types and numbers of processed products.

Even if wood processing firms can avail of new technologies, they face training constraints as they have to upgrade manpower to meet the skills needed to fully utilize them. Even if they can train people, firms would have to deal with the added problem of dealing with older employees who may not be comfortable working with new technologies, such as computerized machinery, but have to be maintained because of labor laws and regulations and they know the processing operations.

Wood processing firms find it costly to dispose the old technologies that will be replaced with new technologies. Old machinery can only be sold, if at all, at much reduced prices resulting in financial losses to the firms. Turning old but still productive machinery into scrap or selling them at very low prices may be more costly compared to just putting them into productive, albeit inefficient, use.

*Financial*

With relatively low prevailing borrowing rates at present, the cost of money is not considered a major problem at present. However, collateral is a critical hindrance particularly for micro, small, and medium enterprises (MSMEs) in applying for loans. This is problem exacerbated by the long and tedious application process for loans in banks and other formal financial institutions. If MSMEs, in particular, source money from informal sources, the borrowing rates could be prohibitive.

*Economic*

The supply of logs, both local and imported, is inconsistent and/or inadequate. With this, some wood processing firms have to operate at less than full capacity. With unreliable supply of logs, average costs are higher and processing firms cannot benefit from economies of scale in their operations.

Despite the above problem, the price of logs in the Philippines is seen at present as stable as there is not much demand coming from China which is one of the biggest log importers globally. However, if and when China decides to purchase a huge amount of logs in the international market in the future, the price of logs could drastically rise to the detriment of local processing firms.

For the secondary wood processing firms, the afore-cited problem of supply is not solely related to wood. The supply of non-wood inputs including rattan, bamboo and nipa which are used in processing together with wood are also in short supply further limiting production. Due to their limited supply, the prices of these materials are expectedly rising for some time already.

The costs of other inputs such as oil, electricity and transportation have also been stable over the past 12 months. But then again, they could quickly rise in the near future which can create problems for the wood processing industry. Just lately, the price of gasoline and associated products are starting to rise again.

Labor cost is not an issue for wood processing firms at present because they can always limit their hires based on their manpower needs. Also, workers are generally paid based on their output which means that labor cost is flexible However, it could be an area of concern in the future due to the proposal to abolish contractualization in the country. If it is indeed abolished, labor becomes a fixed cost which has to be paid whether or not processing firms operate at full capacity.

The participation of wood processing firms in the international markets for their inputs and outputs has made them significantly affected by the exchange rate. Now that the dollar is getting stronger relative to the peso, the prices of imported log and other materials also get higher increasing production costs.

*Marketing*

While a higher value of the dollar compared to the peso can stimulate exports, this potential advantage can be negated significantly by higher input prices brought about by the same exchange rate. As a result, some of the wood processing firms have stopped exporting wood products because they cannot compete with the lower-priced products of other Southeast Asian countries.

Among MSMEs, specifically, there is lack of capability to develop new markets due to limited market intelligence useful in improving their marketing strategies against foreign competitors. This constraint has forced them to refrain from or limit their exports to traditional products and markets.

The importation into the Philippines of substandard products, particularly plywood from China is another big headache for wood processing firms. This imported plywood is sold at lower prices in the country and creates an unfair competition to local manufacturers. As a result, some medium to big local plywood manufacturers have temporarily stopped its operations at certain times.

*Environmental*

Due to old technology, wood processing firms have low recovery rates and generate large volumes of wastes. To address this, boilers are usually employed in their disposal. This technique, however, may result in the emission of carbon monoxide, nitrogen oxide, and other dangerous gases which are very harmful to the workers and communities surrounding the plants (IFC 2007)

*Institutional*

The implementation of EO 23 affected not only the supply of wood products to the wood processing industry but also led increased unemployment in the rural areas. It also encourages the practice of illegal logging with the DENR unable to effectively monitor and enforce the order.

The unstable and inconsistent policies related to the wood processing industry has make problems worse. For instance, frequent policy changes related to the harvesting of logs have discouraged investment in wood processing. The policy changes were also done without proper consultations with stakeholders on the ground.

The wood processing industry in general has been neglected by the Philippine government partly because of the environmental lobby favoring the log ban is getting stronger. Yet, at no other time in its existence that the industry needs much attention and assistance in order to simply survive.

*Research-related*

Government data and information useful to study deeper the development of the wood processing industry have been limited. Thus, researches relevant to the industry have been few and sporadic. This forces MSMEs in particular who may not have funds to do individual research to get their data and information elsewhere, such as word of mouth which can be inaccurate.

## V. Summary and recommendations

This study concludes that the wood processing industry of the Philippines has significant economic contributions including in terms of income and employment. Because it is a participant in international trade, it is also potentially significant foreign exchange for the country. Despite these many contributions, however, the industry has been on the decline for many years now due to the numerous issues and problems it is facing some of which are cited above. These constraints have to be addressed in order for the industry to get out of its current state and move forward to better times.

The recommendations to address the issues and problems of the wood processing industry are presented below also in a generalized manner and not specific to particular subsectors. The recommendations are based on the existing secondary literature, KIIs, and FGDs conducted by the study.

*Technical*

Wood processing firms should be assisted by the government to retool. While large firms may be able to do it on their own, should tap he Department of Science and Technology-Small Enterprise Technology Upgrading Program (DOST-SETUP) which is a nationwide strategy to encourage and assist them to adopt technological innovations to improve their products, services, and operations.

The development of a Skills and Technology Roadmap (STRM) is also needed in the wood processing industry. Among others, this roadmap can be used to identify a set of high priority technical projects that will assist the industry to meet future market demands. It can also establish collaborative arrangements between industry members to together develop new technologies. Likewise,

Individually or together with their wood processing associations and relevant government agencies, wood processing firms can develop home grown technologies to produce wood products that are cheaper but of higher quality through intensive research and development (R&D). The use of other indigenous materials can ease the constraint of limited raw material supply.

Old equipment should be sold by processing firms so that some money can be generated to invest in new equipment. To get better prices, processing firms can sell to recycling firms that convert them for other uses. Otherwise, firms may just have to bear the cost of retooling because while this strategy may seem costly in the short-run, it will prove to be more efficient and productive in the long-run.

*Financial*

MSMEs that are individually or family-owned can open up their companies to outside investors, both local and foreign. They can also explore help from the government through the various incentive programs that it provides. The formal financial institutions should streamline their loan application process so as not to intimidate small borrowers. The government should impose relevant laws to actively clamp down on loan sharks and make informal borrowing less prohibitive.

*Economic*

To help increase the domestic supply of logs, the government should activity support non-government reforestation, particularly private reforestation. The issues and problems facing private forestation and recommendations to address them are discussed in Israel (2016). The increase in the supply of logs from this subsector will help stabilize log prices and ensure steady supply.

The wide use of contract tree farming should be considered. Under contract farming, wood processing firms can help farmers secure pasture leases for vacant government lands that they can be converted into tree plantations. The trees produced in these plantations can then be bought by the processing firms thus ensuring a stable log supply and increased farmer income.

The government should develop and implement an aggressive R&D program for non-wood inputs like rattan, bamboo and nipa. These raw materials will augment the supply of inputs to the wood processing industry and could be used in the development of new products. As reminder, the development of these inputs should take cognizance of their potential effects on the environment (Bowyer et al. 2014).

The increasing prices of other inputs of production like gasoline is a national concern which is not specific to the wood processing industry. Suffice it to say that firms must develop innovative approaches in the use of gasoline in their production processes which can reduce gasoline consumption and make their operations more energy efficient. For instance, whenever possible, gasoline-intensive activities can be run with labor power instead. This way, processing operations can reduce their gasoline consumption and at the same time, help address unemployment.

Contractualization is another national issue that is not specific to wood processing firms. Enough said that its final implementation must only be done after serious evaluation and consultation. A thorough benefit-cost analysis on the effects of contractualization on the economy and individual sectors coupled with extensive consultations among all stakeholders will greatly help.

Likewise, the exchange rate is beyond the full control of any single sector, much less the wood processing industry. Whenever possible, wood processing firms could stock on imported wood and other materials when the exchange rate is favorable to them. Otherwise, they may just have to ride with the punches.

*Marketing*

Wood processing firms should give product quality and certification foremost attention so it can compete both locally and internationally at any given price. For one, they can strive for Forest Stewardship Council - Chain of Custody (FSC – CoC) certification that allows companies to label their products and in enables consumers to identify those produced through responsible forest management.

The pertinent trade departments and agencies should aggressively assist wood processing firms in addressing marketing problems. The relevant trade associations should also assist their members in this regard. Exposures of processing firms individually or as an association to relevant trade publications, fora, fairs and similar activities will help. For one, government can help MSME firms and their representatives get involved in these activities by financial sponsorship and other means.

Strict implementation of the Philippine Standard of Imported Wood Products (PSIWP) should be done upfront at customs to prevent the entry of substandard wood in the country. Overall, customs administration should be improved so that it can perform its functions efficiently and effectively including guarding against substandard imports from countries like China.

*Environmental*

As part of R&D, efforts should be exerted to find ways on how the wastes wood processing firms can be utilized as an input in the production of new products. This could potentially reduce costs and promote the environment-friendly image of wood processing firms. Furthermore, the firms should be strictly monitored by the government in the management on their own wastes.

*Institutional*

Coming up with a definite stand on EO 23 is not an objective of this paper. It is argued, however, that the EO should be reviewed to make it more equitable to all stakeholders and subsectors. The government can also help provide employment options as well as safety nets to workers displaced by the log ban.

Stable policies should be in place to ensure a more stable business environment. After a policy has been decided through a fair and inclusive process, it must be implemented firmly across affected firms and over time. This will provide wood processing firms and potential investors a clear and positive message that will help them firm up their production and investment decisions.

The manufacturing roadmaps which have been prepared by the Philippine government should consider the expansion of their coverage in the case of wood processing beyond just a few subsectors, i.e. furniture and paper, to include other wood processing industries that have strong present performance but also future potential.

*Research-related*

The gathering of detailed and complete data and information on the wood processing sector and its subsectors should be conducted by relevant government agencies. Research on wood processing, e.g. value chain analysis, should trickle down from the sector as a whole to specific subsector activities.

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**Appendix**

**Definition of Terms:**

Blockboard - a board having a core of blocks, each not exceeding 2.54 cm. (1 inch) in width, connected or glued face to face to form a slab which is glued between two or more outer piles with the direction of the grain of the core block running at right angle to that of the adjacent outer veneers.

Fiberboard - a generic term for sheet materials of widely varying densities manufactured of refined or partially refined wood or lignocellulosic fibers with the primary bond derived from the interfelting of fibers.

Lumber - the product of the saw and plaining mill. Not further manufactured other than by sawing, re-sawing and passing lengthwise through standard planning machine, crosscutting to length and matching.

Mini-sawmill - a sawmill consisting of a headrig with a flywheel diameter not exceeding 106 cm. (42 inches), a bandsaw blade with thickness not exceeding 3 mm. a width of not more than 127 mm. (5 inches), with or without a carriage and a daily rated capacity of not more than 18 cu.m. or 8,000 log carriage or its equivalent, the carriage shall have a gross length of not more than 3.2 m. (10.5 ft.).

Other Wood Based Panel Plants (includes blockboard, fiberboard and particle board) - processing plants producing panels of 4 ft. by 8 ft./5 by 10 ft./2 by 4 ft. sizes from wood in the form of low-quality logs, lumber strips, logging and processing wastes using natural or chemical binders, pressure and heat.

Plywood plant - a primary wood processing plant used to convert logs into panels made of alternating cross veneer layers, held together by an adhesive. Basic machineries include peeling/slicing machinery, dryers, cold/hot press, and finishing machines.

Regular sawmill – a sawmill with a daily rated capacity of at least 10,000 board feet.

Sawmill - a wood processing plant used for the conversion of logs/timber into lumber, or the re-sizing/ ripping of lumber, slabs and other wood wastes into desired dimensions and forms.

Veneer plant – a primary wood processing plant used to convert logs into standardized sheets either by peeling or slicing.

Wood-based panel – a product category that is an aggregate representing the sum of veneer sheets, plywood, particleboard, and fiberboard.