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Challenges facing forest production value addition and implication on economic development

Razaq Ajibola Oke

Research Coordinating Unit, Forestry Research Institute of Nigeria, Jericho Ibadan, Nigeria

E-mail address: oke.ra@frin.gov.ng

ABSTRACT

There is need for forest policies to include value addition in the production and marketing of timber forest products, TFPs and non-timber forest products, as well as NTFPs to promote forest activities and to improve the livelihood of both, rural and urban people and further enhance the trade and marketability of these products. Processing of forest products is imperative to their marketability. This review identifies the challenges facing forest products production and their implications on the economy. It draws upon different case studies from around the world. The paper concludes that value addition will go a long way in enhancing its acceptability.

Keywords: Forest products, Forest Economics, Marketability, Value Addition

1. INTRODUCTION

Forest products comprise Timber and non-timber products. Timber forest products TFPs are those products derived from the forest for both, immediate and processed consumption for commercial purposes, such as woods, lumbers, paper or silage for livestock. Wood is a material produced by trees that is stored in the stem and branches just inside the cambial layer. Trees of course, produce bark, fruit leaves, leaves and oxygen that are available outside of the cambial layer and are useful in controlling such things as air temperature and soil erosion, and these too may be of value to society [1, 3]. Wood is the dominant TFPs and its uses also include wood fuel, such as charcoal and firewood, and as a raw material in different aspect of construction processes. According to the FAO 2018, survey on pulp and paper production from wood, most of the woods in the forest are largely used for varieties of wood products, such as furniture,

logs, lumbers, and so on [14, 25]. Meanwhile, Non-Timber Forest Products (NTFPs) play important roles in the livelihoods of millions of rural and urban people across the globe [1, 9, 11]. It is well established that NTFPs fulfill multiple functions in supporting human wellbeing. The NTFPs provide food, products for shelter, medicines, fibres, energy and cultural artifacts for many of the world's poorest people and a considerable proportion of the less poor [7, 9]. The contribution of these daily net resources to livelihoods typically ranges from 10-60% of total household income. The NTFPs also provide many households with a means of income generation, either as supplementary income to other livelihood activities, or as the primary means of cash generation [15].

Trade in non-timber forest products (NTFPs), such as fruits, nuts or fibers, were proposed in the 1990s as a strategy able to reconcile conservation and development goals in poor forest communities [17]. Proponents have stressed the low environmental impact of NTFP extraction, the ability to prevent the conversion of forests to other land uses, the cultural appropriateness of the strategy, the low entry barriers, and the safety net function of NTFPs. Encouraged by the possibility of a win-win scenario, many indigenous and conservation advocacy groups have promoted markets for NTFPs in tropical forests [20, 21].

Non-timber forest products (NTFPs) are goods of biological origin other than timber from natural, modified or managed forested landscapes. They include fruits and nuts, vegetables, medicinal plants, gum and resins, essences, bamboo, rattans and palms; fibres and flosses, grasses, leaves, seeds, mushrooms, honey, etc. The NTFPs can also be referred to as all the resources or products that may be extracted from forest ecosystem and are utilized within the household or are marketed or have social, cultural or religious significance [11, 15]. Majority of rural households in developing countries and a large proportion of urban households depend on the products to meet some part of their nutritional, health, house construction, or other needs [17, 27]. The NTFPs create high economic value and large-scale employment. The NTFPs have attracted global interest due to the increasing recognition of the fact that they can provide important community needs for improved rural livelihood [26]. The aforementioned on NTFPs therefore has largely caused lots of damages to timber forest product TFPs in the form of forest degradation and neglects. This is because of the longer time it takes for TFPs to mature for usage and also because of its tedious production processes. Some researchers also believe that it's owing to the conversion of many forest reserve into residential uses or for some other commercial activities, while some others believe it is owing to lack of technical know-how that made value addition difficult for it to be marketable and profitable [16, 28].

The focus of this paper, therefore, is to evaluate the state of TFPs and NTFPs value addition in the production processes, availability and the challenges.

2. FOREST PRODUCT AND ITS HUMAN AND ENVIRONMENTAL CAPABILITIES

Forest products resources are undervalued and mismanaged in many countries coupled with government wrong policy application. The role it plays in green economy development can never be over-emphasized. Forest resources have helped human in providing food, shelter, fiber, biomass, and other bio-products to meet the increasing world population's demand [24]. Apart from its ability to mitigate climate change, reduce carbon presence in the atmosphere and reduces greenhouse emission, it has also provided skilled and unskilled jobs for the people, especially those in rural communities of developing countries[38].

Table 1. Some Forest Tree Species and their Economic and health Importance

Species	Local Name	Landuse system [occurrence (+)/absence (-)]				Potential uses
		NF	FL	MCF	YRC	
<i>Alstonia boonei</i>	Nyamedua	+	+	+	-	Medicinal; wood carvings
<i>Blighia sapida</i>	Akye	+	+	-	-	Fruits edible
<i>Ceiba pentandra</i>	Onyina	+	+	-	+	Kapok for mattresses/pillows
<i>Dacryodes klaineana</i>	Adwea	+	+	-	-	Fruits edible
<i>Diospyros canaliculata</i>	Otwabere	+	+	-	-	Fruits edible
<i>Diospyros heudelotii</i>	Omenewabere	+	+	-	-	Fruits edible
<i>Diospyros kamerunensis</i>	Omenewa	-	+	-	-	Fruits edible
<i>Garcinia afzelii</i>	Nsoko	+	+	-	-	Chew sticks
<i>Irvingia gabonensis</i>	Abesebuo	-	-	+	-	Edible oil from fruits
<i>Khaya anthotheca</i>	Kruben	+	+	+	-	Bark for malaria
<i>Khaya grandifoliola</i>	Kruba	-	+	+	-	Bark for malaria
<i>Khaya ivorensis</i>	Dubini	+	+	+	-	Bark for malaria
<i>Klainedoxa gabonensis</i>	Kroma	+	-	+	-	Edible oil from fruits
<i>Lecaniodiscus cupanioides</i>	Dwindwera	+	-	-	-	Fruits edible
<i>Maesopsis eminii</i>	Onwamdua	+	+	+	-	Edible oil from fruits
<i>Monodora myristica</i>	Wedeba	+	-	+	-	Spice; medicinal
<i>Morinda lucida</i>	Konkroma	-	+	+	-	Fruits edible; medicinal value
<i>Myrianthus arboreus</i>	Nyankumabere	+	+	-	-	Fruits edible
<i>Newbouldia laevis</i>	Sesemasa	+	+	+	+	Bark, leaves, roots: medicinal
<i>Persea americana</i>	Pea	-	+	+	+	Fruits edible
<i>Raphia hookeri</i>	Adobe	+	+	+	-	Edible oil from fruits
<i>Rauvolfia vomitoria</i>	Kakapenpen	-	+	-	+	Medicinal
<i>Ricinodendron heudelotii</i>	Wama	+	+	+	-	Edible oil from fruits
<i>Spondias mombin</i>	Atoa	-	-	+	-	Fruits edible; medicinal
<i>Tetrapleura tetraptera</i>	Prekese	+	+	+	+	Fruits: spice; medicinal
<i>Tieghemella heckelii</i>	Baku	-	-	+	-	Edible oil from fruits
<i>Treculia africana</i>	Brebretim	+	+	-	-	Edible oil from fruits; fruits sold as food
<i>Trichilia monadelpha</i>	Tanuro	+	+	+	-	Medicinal
<i>Uacapa guineensis</i>	Kontan	+	+	-	-	Fruits edible
<i>Voacanga africana</i>	Ofuruma	-	-	+	-	Seeds & bark used as poison, stimulant, aphrodisiac & psychedelic
Totals		21	23	18	5	

Source: Anglaaere *et al.*, (2011).

Meanwhile, most of these jobs are private groups and/or individual's initiatives and are in small and medium scales. In the World Bank Group report, private investment in forestry businesses in most developing countries was estimated around USD 1.5 billion. This figure is seven times bigger than the official development assistants received within the same period, which means that government quick intervention is eminent (39).

Forest resources steered towards economic growth and development can end in Zero hunger, good health, clean energy, and climate action, thus:

- Zero hunger - capable of providing large varieties of foods, such as sugar, nuts, fruits, meats, mushrooms, honey, African Locus-beans, etc.
- Good health and well-being - it absorbs carbon dioxide that is harmful to human and replaces it with the much needed oxygen for human consumption while playing essential role in the avoidance of soil erosion, control of air pollutants and ecosystem balancing among others.
- Affordable and clean energy - forest products, like wood chips, saw dust and residues can be used in producing biofuel, biogas, bioethanol, bioenergy and even mushrooms with the use of modern technology through fermentation, gasification, and other techniques.
- Climate action - with the way it absorbs carbons that depletes the ozone layer, the action reduces the rate of global warming. Also, as a source of raw materials in construction or as a close substitute for bricks and concretes in building, its renewable status could aid reuse and/or be good for biodegradation [2, 31].

3. PRODUCTION AND FOREST ECOSYSTEM

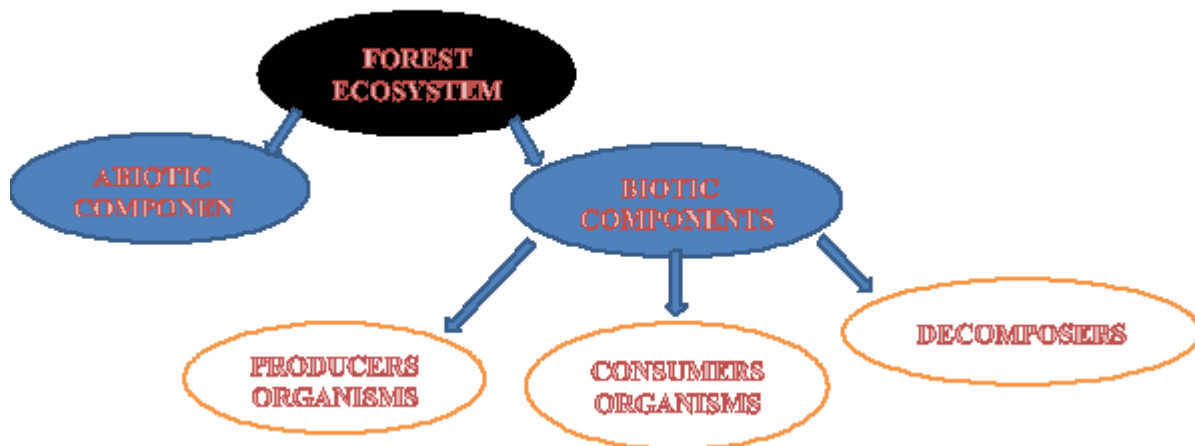


Fig. 1. Components of Forest Ecosystem

Trees are the main product of forest ecosystem and their production is a function of the establishment which depends on the type and size of the forest [7]. It's what determines the type of nursery setting up. Nursery setting up is the first stage in the tree planting forest establishment and whether it's going to be permanent or temporary nursery, will depend on the location and size of the forest. Nursery setting up includes the following activities, among others: seedling production, site preparation, planting, applying herbicides, thinning and logging. These activities also vary and depend on the species of the trees. Meanwhile, there are some other natural forest habitats aside from the trees that formed the component of forest ecosystem. They depend on the existence of forest trees while their presence is of a great importance to the formation of forest (interdependency) [16, 22, 31].

Forest ecosystem comprises abiotic (air, sunlight, moisture and Soil) and biotic components that are the producers, the consumers, and the decomposers. Producers serve as the source of food, especially for animals; these are the green plants of the forest. They comprise the tree stratum, shrub, herbs, and ground stratum [5]. Consumers, on the other hand, are the carnivores and herbivores habitats of the forest, such as monkeys, deers, birds, rabbits, grasshoppers, hawks, wolves, tigers, lions, elephants, and many others that take their food directly from the forest, while the decomposers are the micro organisms living within the forest, such as bacteria and fungi. They convert complex organic substance to simple inorganic one, and return to abiotic components, reutilized by producers [4, 5]. All these are interdependent of each other, and are the component of a forest.

4. FOREST PRODUCTS RAW USAGE AND IMPORTANCE TO LIVELIHOOD

Forest Products contribute highly to the income and welfare of household. These, among others, include gathering, collection and sale of leaves and medicinal herbs, food vending, and sale of fuel wood and honey. Others include goat, sheep, and rabbit, and poultry rearing, food processing, crafts and basket weaving, trapping, catching and processing of meat, also generating income to those engaged in it [2, 36].

World Health Organization estimate revealed that 80% of the people living in the developing countries use wild plants to meet some of their health and nutritional needs. Thus, billions of people, especially those living in rural areas in developing countries, make use of forest products on a daily basis. This involves thousands of plant and tree species, most of which are consumed within the household of the gatherers (35). Life would be virtually impossible for most people living in rural areas in developing countries without the availability of palm leaves for roofing, medicinal leaves and plants for health services, and natural fibres to construct baskets and fish traps. Although the majority of the products never reach a marketplace, a small percentage is sold in local and regional markets, offering an important source of cash income, as their commercial value is high but presented in a less attractive packages. The extraction, processing, and trading of these forest products are often the only employment available for the population in these remote rural areas and are mainly sold directly without adding any value, which limits the market value and acceptance [18, 32, 37].

5. WOOD PRODUCTS MARKETS

The three wood products industry sub-sectors, i.e., sawn wood, panels, and joinery, differ largely from each other in terms of production volume and value creation. The global wood products markets have been growing significantly in the 2000s, yet almost exclusively due to the growth in Asia. Asia's growth is the most evident in the wood-based panel sector, in which the share of Asia from the global production has increased from 25% to 60% during the past two decades [4]. In China alone, the production of plywood has increased from 11 million m³ in 2000 to 104 million m³ in 2014. The primary cause for the significant growth seems to be the rapidly increased construction activity in China, as the total investments in construction have increased in the twenty-first century by an annual rate of 20–30%. China has also become the world's largest producer, consumer and exporter of value-added wood

products worldwide [41], thus forcing the European panel and furniture producers to move the production eastward will the African market provides forest products, as raw materials.

Asia relies on finished product from China mainly [34, 41]. The markets in the most OECD countries have been severely affected by the economic downturn after 2007. For example, the EU sawn wood production has experienced an eight-year period of negative or slow growth since the peak level of 2007 [8, 13]. Despite the low level of capital intensity in sawn wood production, some of the lost capacity might not return, when the period of low construction activity ends, due to a possible shift towards the production of value added wood products [32, 33].

The few existing global long-term outlook studies for the wood products markets seem to be outdated, due to the combined effect of the decline in construction activity since 2007 in most OECD countries, and the rapidly increasing production in Asia. Moreover, in the absence of more systematic analysis of the wood products markets, the understanding of the factors affecting the outlook remains poor [12, 30].

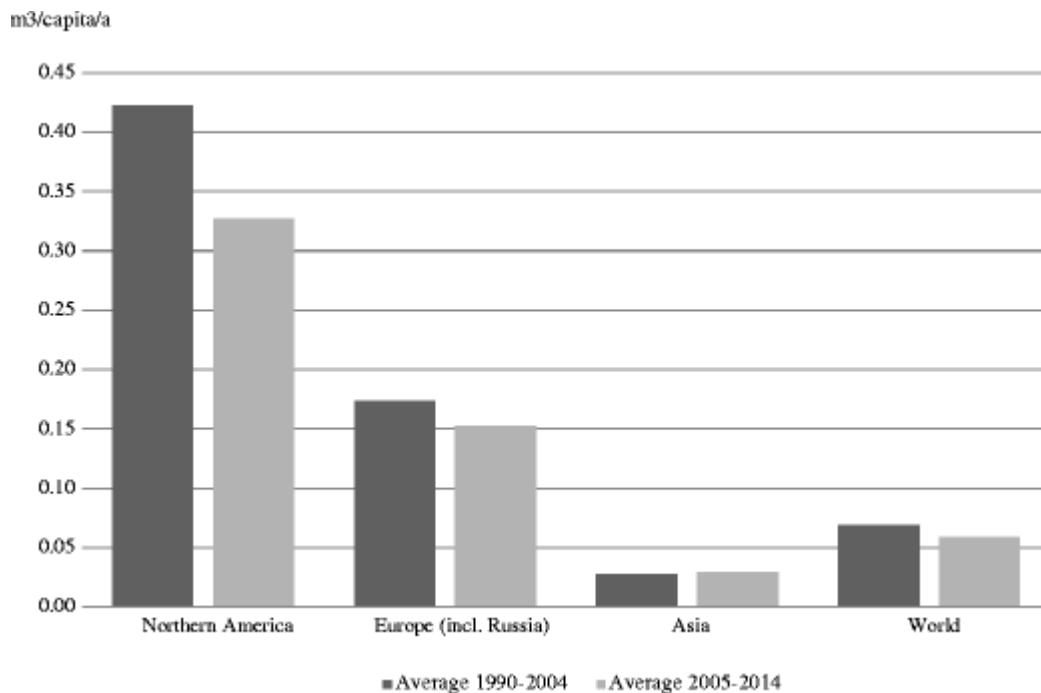


Fig. 2. Sawn wood consumption per capita

6. THE CHALLENGES FACING FOREST PRODUCT VALUE ADDITION

The forest product research field appears to be lacking the tools for formally assessing the significance and extent of the changing production and consumption patterns, especially in Africa and South America. A number of recent studies have indicated major structural changes taking place in the global forest products markets [5, 6]. Comprehensive market analyses related to the trends in the global forest products industry come in a surprisingly short supply [7]. Technological innovative inadequacy is one of the main challenges facing the process of value addition on forest products and this includes an array of operational

supply chain on forest products and shortage of industrial facility. Also, desertion on the government intervention to establish and implement favourable public policies that are capable of encouraging setting up of forest products production industries, capable of adding value to attain all round commercial level is another problem [10, 23].

The forest products markets can be defined in a number of ways, depending on to what extent the further processing (value added) industries are included or excluded (printing, furniture, carpentry, wood construction) or (agroforestry business developments) [19]. For example, the European Commission tends to use the more extensive definition, whereas FAO uses the more restricted one. According to the estimates based on FAOSTAT trade and production data, the value of global forest products production exceeded 800 billion USD in 2014 (**Table 2**). The global employment of these industries is estimated to have been almost 10 million employees in 2011 [27, 29, 30].

One was to include also the forest biomass based printing, carpentry, wood construction, bioenergy and chemicals industries [12, 18]. While in Sub-Sahara Africa lack of records does not allow proper account records for small and medium base enterprises, one should expect the scale of production value and employment to be at least doubled. There are no consistent statistics on this, but already the joinery and furniture sectors in the EU constitute another 120 billion € of production value (Eurostat), while small and medium scale enterprises without a record dominated in Sub-Sahara Africa. Furthermore, the industrial round wood utilization of the forest products industries was 1.8 billion cubic meters in 2014. Thus, the sector has also a major impact on the condition and structure of forests, forest owner revenues, and rural employment [10, 30, 33].

Table 2. Production volume and value and employment of the global forest products industries in 2014 (based on FAOSTAT)

	Paper and Paperboard	Wood Pulp	Sawnwood	Wood-Based Panels
Weighted average price	962 \$/ton	656 \$/ton	298 \$/m ³	453 \$/m ³
Production volume	400 tons	173 tons	439 m ³	388 m ³
Production value	385 billion \$	113 billion \$	131 billion \$	176 billion \$
Employment in 2011	4.3 million employees		5.4 million employees	

Source: Food and Agriculture Organization Statistics (2014)

The pulp and paper products markets and their end uses differ in many significant ways from wood products markets. Therefore, the major drivers for the operating environment of the product categories differ. Consequently, the markets are analyzed separately [19].

More so, competition has reduced the price of forest products especially in wood, pulp wood-cement board, paper product, and other non-timber products, like Shea-butter, honey, Briquette, African locust beans, and Mushroom productions [10, 40].

7. CONCLUSION

Acquiring the key composition and dynamism of the challenges facing value addition in forest products production processes, it's eminent to understand that the problems vary from region to region which means that different approaches are required to each peculiarity. Nevertheless, researches capable of improving the perspectives and narratives are needed to expand the market globally both, on TFPs and NTFPs. Also government's intervention in the policies application tailored towards the formalization of TFPs and NTFPs industries in developing countries will help increase their market value, global volume and uses.

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