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A global overview of NWFP value chains & general challenges and opportunities for NWFP commercialization

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Overview

1. What are NWFPs
2. NWFP commercialization - overview
3. FAO's work on NWFPs
4. Future prospects for NWFPs?

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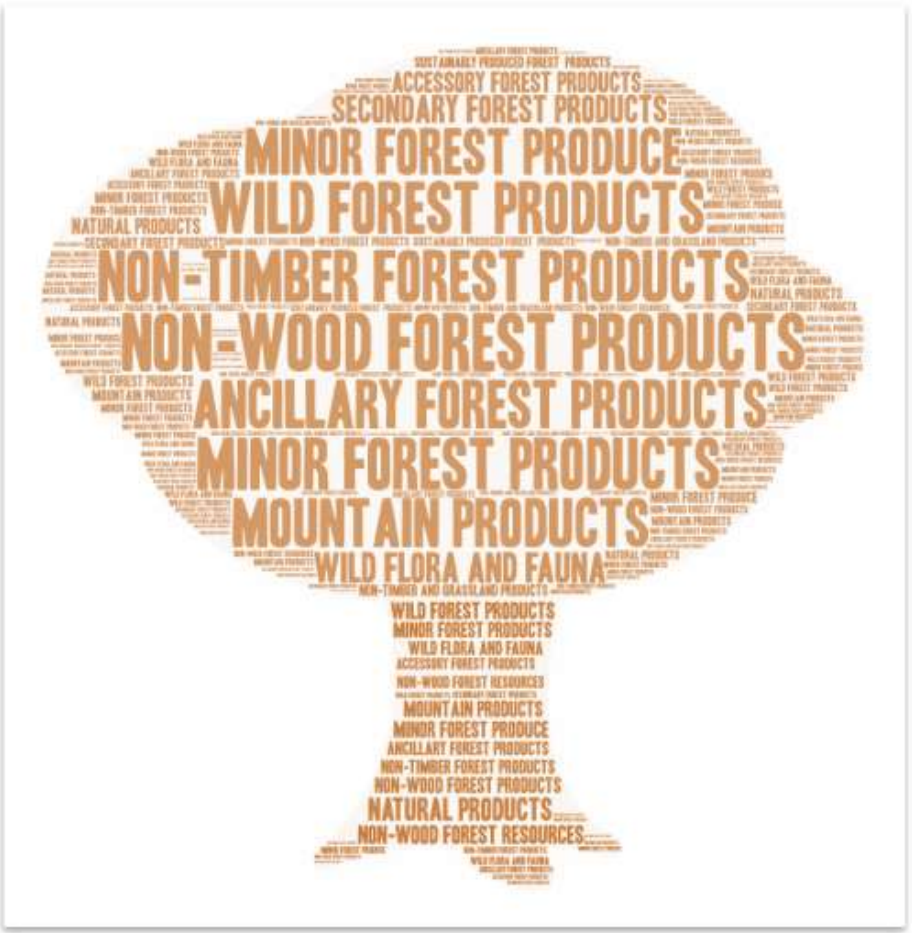

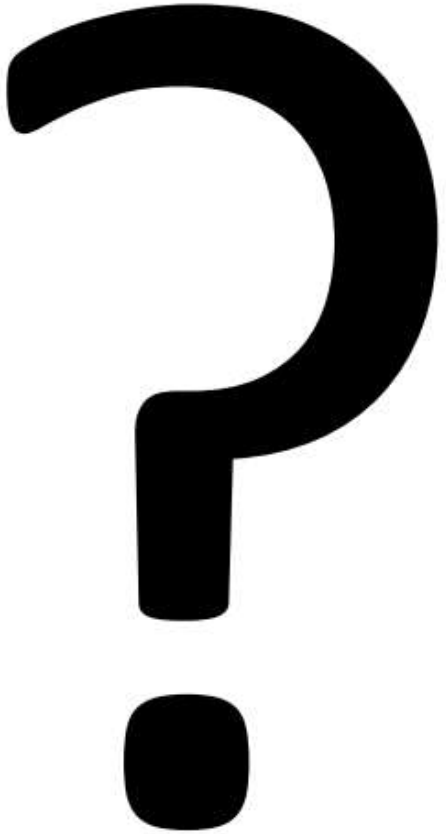

1. What are NWFPs?

NWFPs and correlate terms

Non-wood forest products	***NWFPs consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests. (FAO, 1999)***
Non-timber Forest Products	*The term NTFP encompasses all biological materials other than timber which are extracted from forests for human use (DeBeer & McDermott. 1989)*
Wild forest products	*"wild product" results from the "collection of edible plants and parts thereof, growing naturally in natural areas, forests and agricultural areas" (EU Art. 12, comma 2, Reg. 834/07 "organic law")*
Minor forest produce	*All non-timber forest produce of plant origin including bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, or kendu leaves, medicinal plants, and herbs, roots, tubers and the like. (Government of India)*
Secondary or side use of forests	*All kinds of use in forests and forest lands not covered by forest, except for timber and minor forest materials, including: animal breeding, beekeeping, farming, processing of wood and wild fruits and berries, medicinal plants; placement of apiaries, collection of wild food resources, medicinal plants, technical raw materials and other; procurement of secondary forest resources (stumps, bark, etc.) Kyrgyzstan Forest Law*
Forest byproducts	E.g. berries, mushrooms, herbs, decorative plants as well as hunting, bee-keeping and the grazing of cattle. Categories of forest use: wood production, resin production, secondary forest materials and technological raw materials, the use of forest by-products, scientific research, cultural and social purposes, hunting economy, recreation (including tourism) and other forest uses not prohibited by law. *Estonia Forest Law*
Natural forest produce	*Refers to wild or semi-cultivated plants or mushrooms which can be used as such or with some processing. This also includes the by-products of trees and soil materials. (Finland's National Forest Programme 2015)*
Wild food	*Wild food is defined as anything edible that requires no human input to increase its production (ACF, USA, 2008; ACF, 2012; FAO, 2004; FAO, 1999.)*
Wild meat (bushmeat)/game meat	*All meat from animals hunted or trapped for meat that is available for consumption; meat from game that roams in farms (a farm has an enclosed space) is excluded (UNECE, 2017).*

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What are NWFPs?

- "Non-wood Forest Products consist of **goods of biological origin other than wood**, derived from forests, other wooded land [and trees outside forests]." (FAO, 1999)
- NWFPs **cover** (1) wild products; (2) managed products; (3) cultivated products.
- **Includes:** mushrooms, fruits, nuts, herbs, aromatic plants, game, fibres (used in construction, clothing or handcrafts), resins, gums, saps, and products used for medicinal, cosmetic or cultural scopes.

TABLE 3 *Positioning NWFPs in agricultural statistics*

Product	Wild products	Non-wood forest products			Agricultural products			Fishery products		
		Goods derived from forests and other wooded land that are tangible and physical objects of biological origin other than wood.			Any product, raw or processed, marketed for human consumption or animal feed.			Fish, molluscs, crustaceans and other aquatic animals, residues and aquatic plants.		
		Wild forest products	Semi-wild forest products	Managed forest products	Agroforestry products	Crop products	Livestock products	Fish catch	Enhanced capture	Aquaculture
Definition	Products of biological origin other than wood collected outside forests and other wooded land.	Biological resources other than wood picked/gathered/ harvested/caught in forests and other wooded land.	Biological resources other than wood picked/gathered/ harvested/caught in forests and other wooded land subject to some form of human intervention to increase productivity.	Biological resources other than wood picked/ gathered/ harvested in managed tree production systems where primary designated land use is forest.	Products collected in in agroforestry systems when crops are grown under tree cover where primary designated land use is agriculture.	Actual harvested production from the field or orchards.	Products from live and slaughtered animals.	Fishery products taken for all purposes – commercial, industrial, recreational, subsistence – and by all types of fishing units (fisherman, vessels, gear, etc.).	Fishery products raised in open spaces (e.g. oceans, lakes) where they grow using natural food supplies and released for instance by national authorities and re-captured by fisherman as wild animals.	Farming of aquatic organisms through a form of intervention in the natural rearing processes such as regular stocking or feeding.

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Into the wild: disentangling non-wood terms and definitions for improved forest statistics

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SUMMARY

As scientists strive to make nature's value visible, a large portion of forests and wild biodiversity known as non-wood forest products (NWFPs) continues to remain largely invisible and unaccounted for. At the core of the problem is wide disaccord over what is a NWFP (and correlate terms), a debate which has been running in circles for nearly three decades. This paper reviews existing terms and definitions, with the aim of improving forest statistics and the visibility of NWFPs. The paper starts by (1) clarifying boundaries between agricultural and forest products, so forest products currently under agriculture can be "reclaimed"; (2) drawing on lessons from fisheries to distinguish between wild and farmed products, and associated activities; (3) moving beyond *product* towards *activity* classifications to capture gathering that may not be accounted for under crops or forest products because it takes place across landscapes and outside of these sectoral boundaries.

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2. NWFP commercialization - overview

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Historically important commodities

- For most of human history forest products other than timber were more valuable for **nourishing, clothing, healing and for providing shelter**
- **E.g. Frankincense, (Boswellia); Rubber (Hevea brasilensis); shea (Vitellaria paradoxa); Argan *Argania spinosa)***
- Species like rubber, quinine, oil palm, and cocoa were brought into **cultivation** around the world, and NWFP species like brazil nuts, gum arabic and rattan were harvested on an industrial scale.
- Most high value NWFPs became **agricultural crops**

Sources: [Shanley et al. 2016.]

Today's value

- FAO estimates that globally, NWFPs generated **US$88** billion in 2011
- **76 million tonnes** of food from the forest were consumed on average in 2011
- **1 billion** people are thought to depend on wild foods
- **80 percent** of the population of developing countries rely on traditional medicines, mostly plant drugs, for primary health care

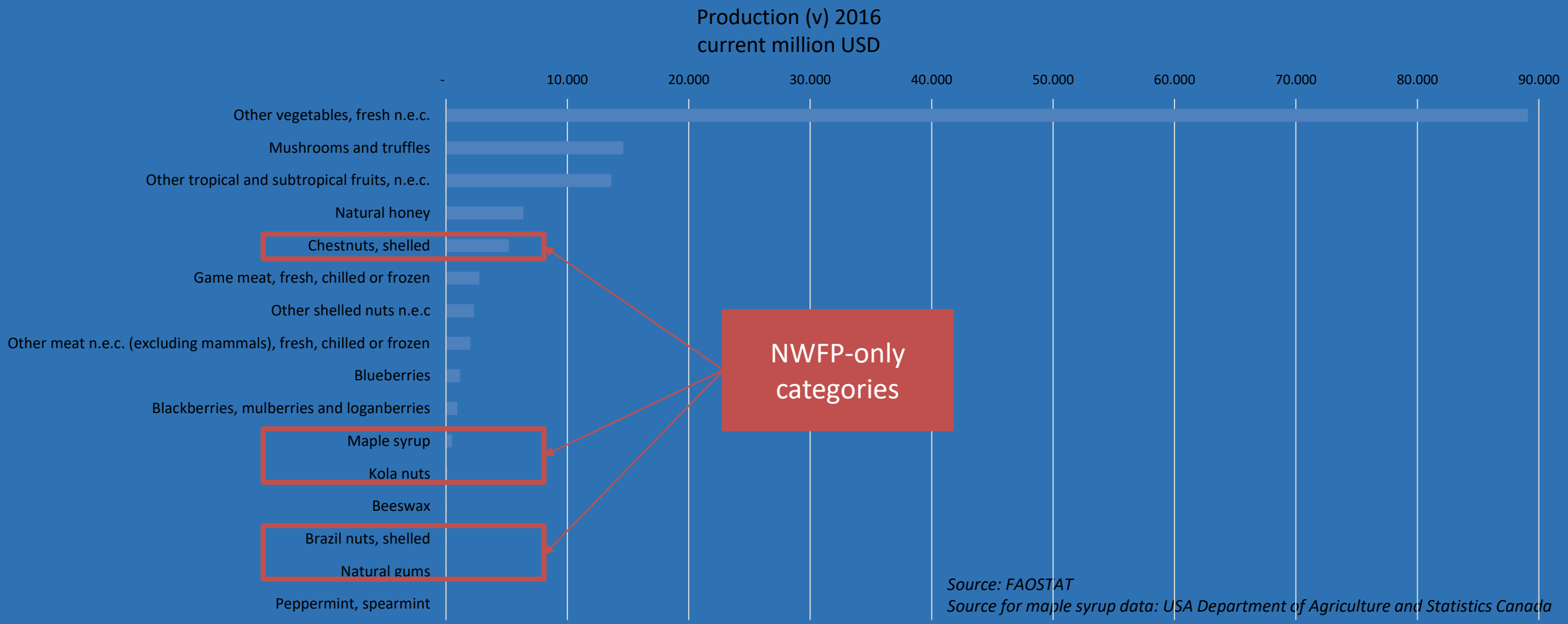
Sources: SOFO, 2014; Burlingame, 2000

Table 4 Estimated income from the informal forest sector in 2011 (in billion USD at 2011 prices)

Region	Woodfuel and construction	NWFPs	Total
Africa	14.4	5.3	**19.7**
Asia and Oceania	9.9	67.4	**77.3**
Europe	–	8	**8**
North America	-	3.6	**3.6**
Latin America and Caribbean	9	3.6	**12.6**
World	***33.3***	***88***	***121.3***

Source: FAO (2014a), based on various sources.

Production – (available) value of production, mixed categories



Source: FAOSTAT
Source for maple syrup data: USA Department of Agriculture and Statistics Canada

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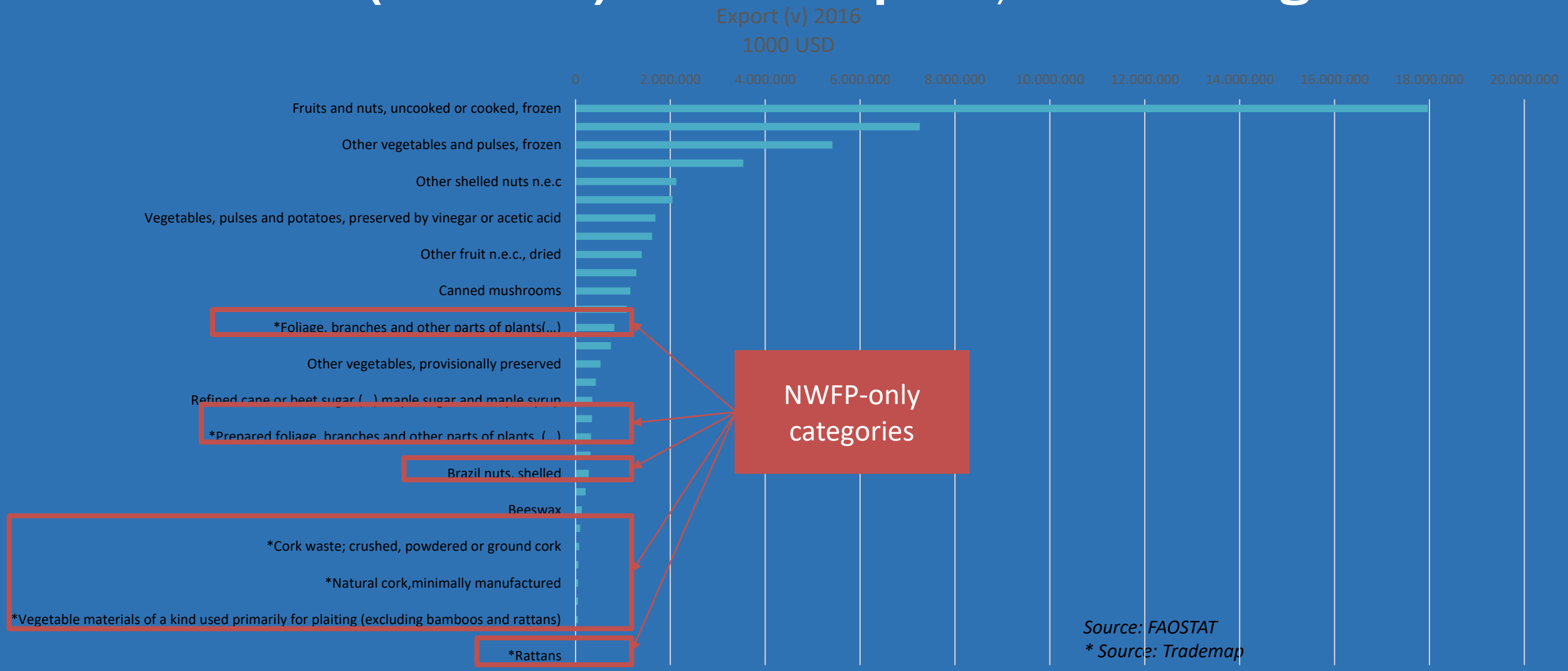
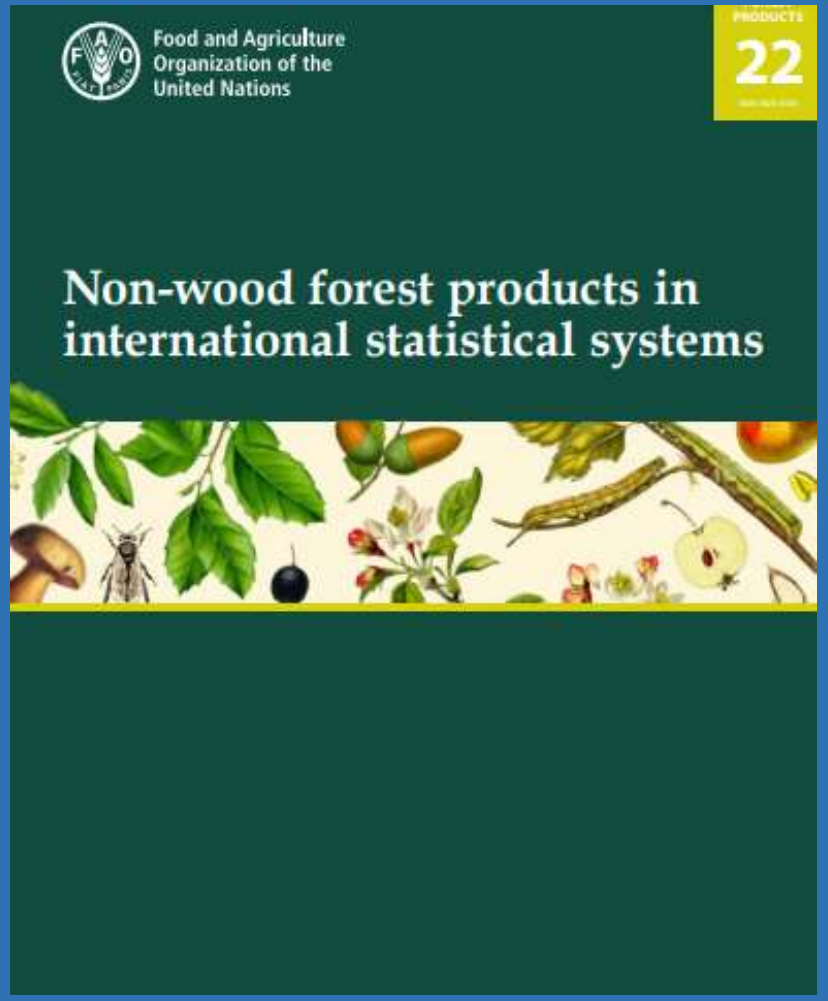
Trade – (available) value of exports, mixed categories



Source: FAOSTAT
** Source: Trademap*

Global data incomplete

- At global level, production and trade data is incomplete for some of the identified categories
- Hard to get a clear picture, due to impossibility to isolate NWFP from other products



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Cork

- Cork is produced exclusively in **south west Europe and northern Africa**
- In 2010, **Portugal was the largest producer**, followed by Spain, Morocco, Tunisia, Algeria, Italy and France
- In the **European Union**, production data is collected only for **processed cork**, but not for raw natural cork. The total value of production in 2018 was **2307 million EUR.**
- In 2018, the combined **total value of exports** amounted to **2126 million USD**
- Three out of the seven world producers (Portugal, Spain and France) are also the three largest importers of raw cork, indicating **a large cork transformation industry in these countries**

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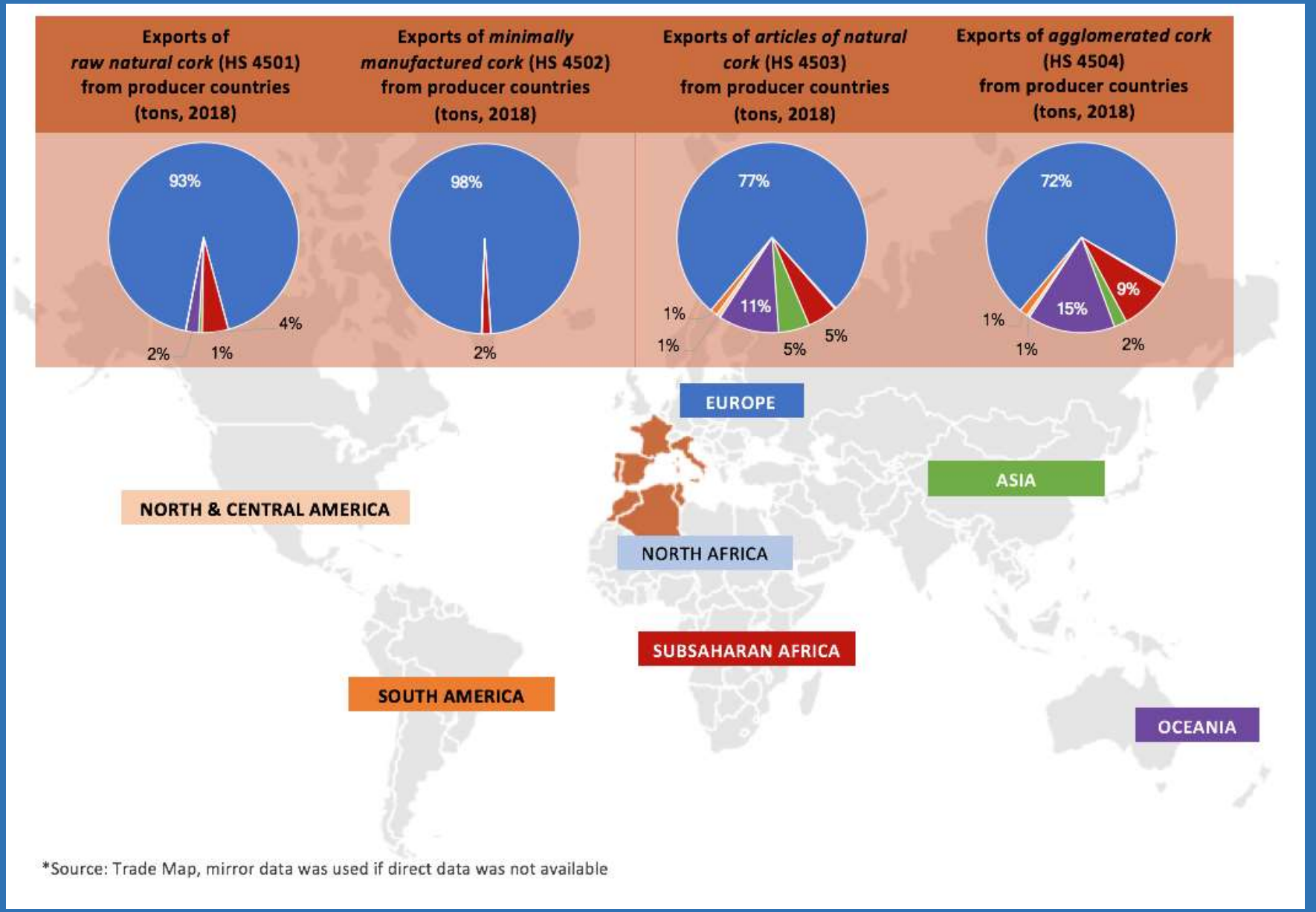

*Source: Trade Map, mirror data was used if direct data was not available

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Chestnuts

- Results
  - Chestnut trees are mostly found in **Europe and Asia**
  - **China** is by far **the largest producer of chestnuts** (87% of global production)
  - Chestnuts are the **second most harvested tree nut in temperate areas**
  - In 2018, the combined **total value of exports** of chestnuts in shell and shelled reached almost **356,4 million USD**
  - **Most** of internationally **traded chestnuts** are traded still **in their shell**
  - **9 out of the 10 largest exporters** in 2018 were **European and Asian countries,** and the **10th** largest was **Chile**

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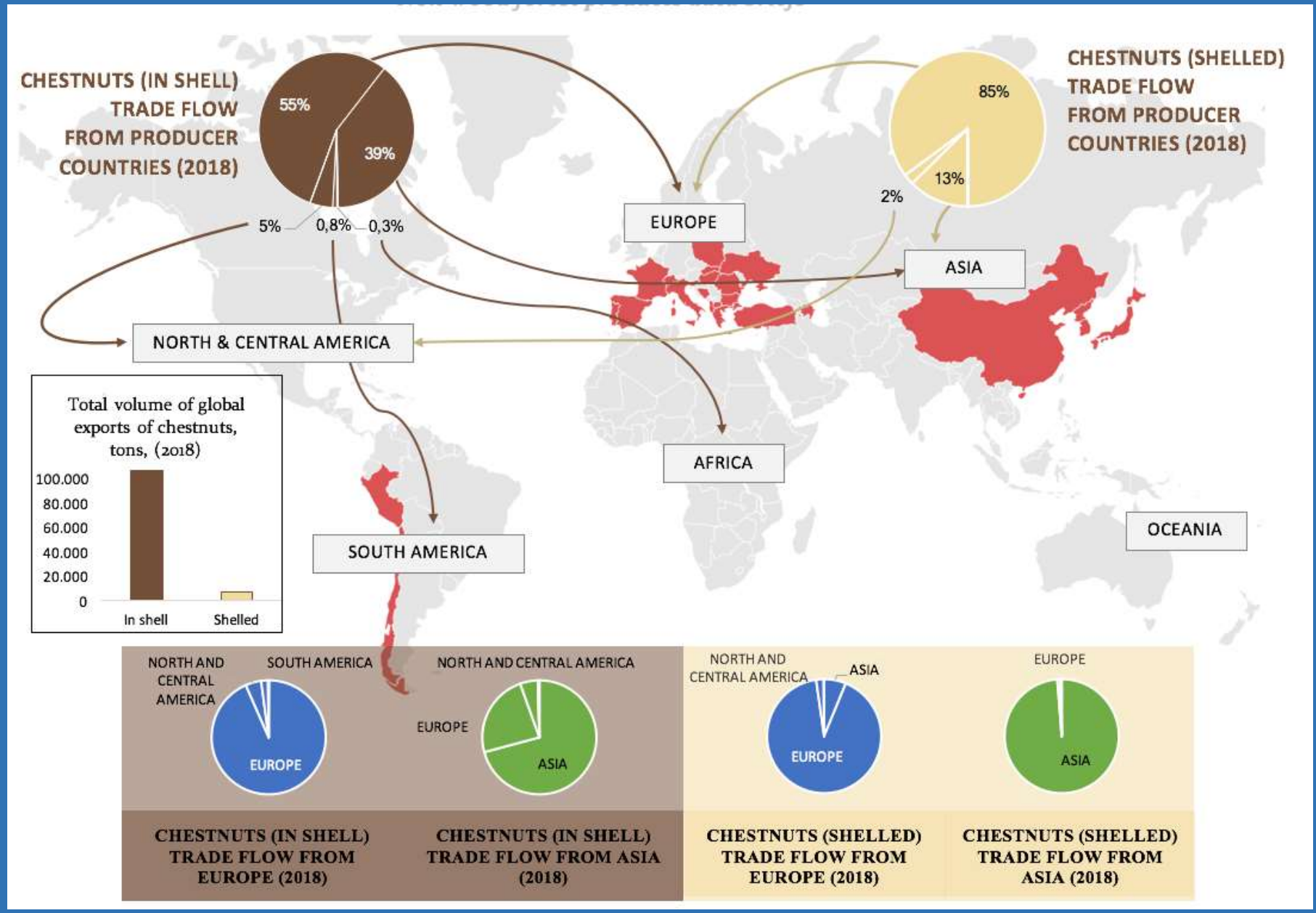

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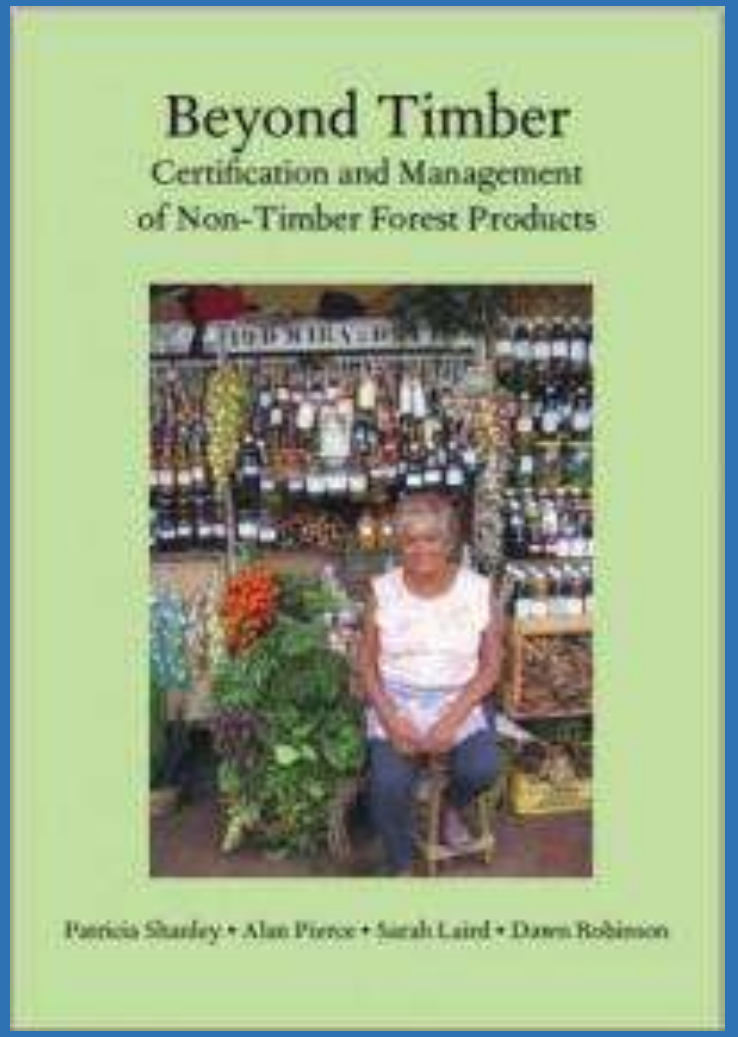
NWFPs: Win-win for conservation and development?

- RIO 1992: NWFP Commercialization viewed as a simple solution for conservation and improved livelihoods
- Beyond Timber/"Rainforest Crunch"



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Challenges emerged..

- Dispersed, poorly developed, “faddish” markets
- Long product development
- Limited scope and value of markets
- High barriers to entry (sophisticated technology, market/certification requirements, intellectual property rights issues, intensive harvesting & resource depletion
- “Trades away important traditions”
- Lack of resource access (finance, skills, technologies), market information, basic infrastructure
- Adds value much higher in the supply chain (processing stage) thus excluding smallholders, especially women

Sources: Shanley et al. 2002, Belcher & Schrekenberg, 2007; Lynberg 2012

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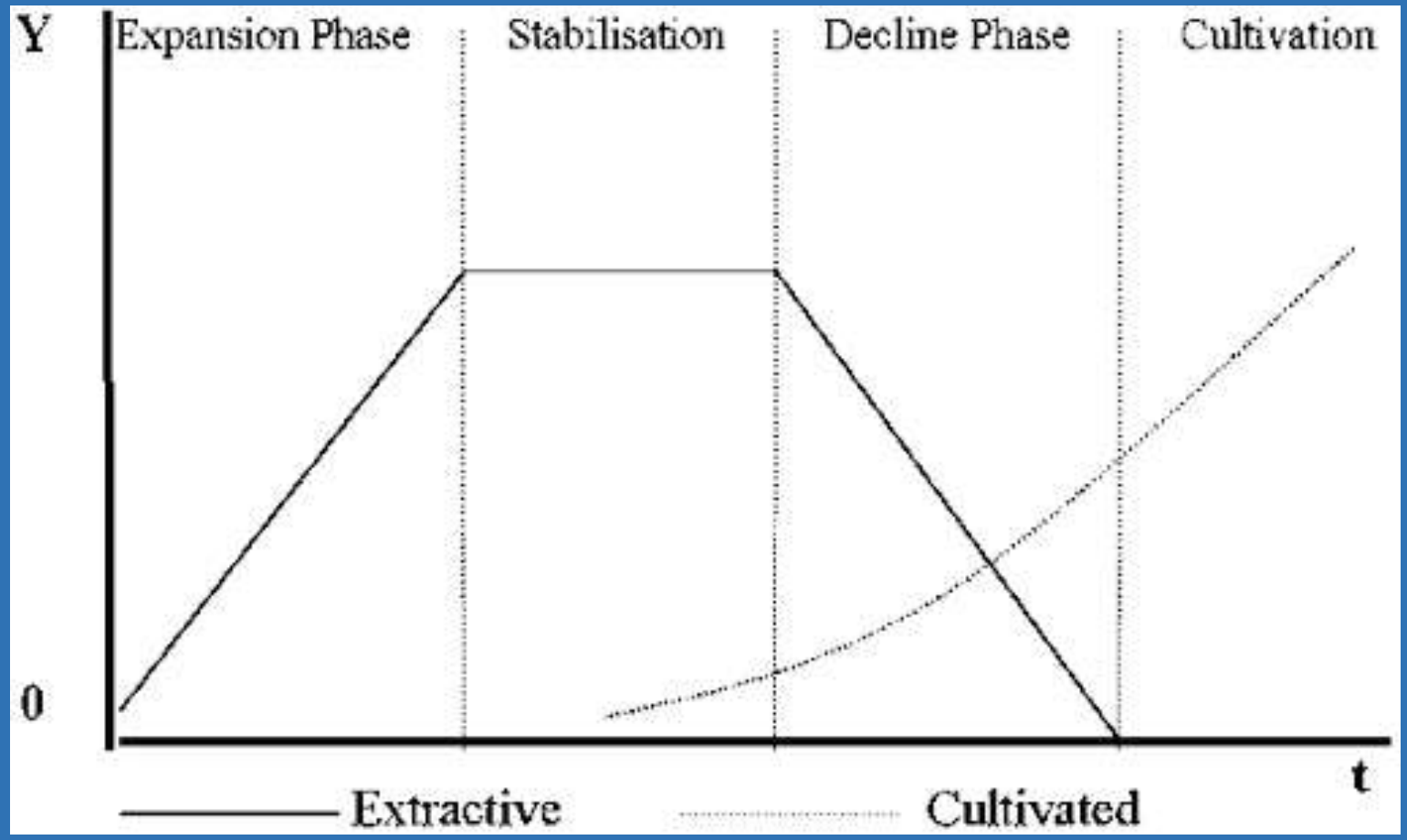
Homma's "boom and bust cycles" theory

- Extractive resources are susceptible to "boom and bust cycles"
- Steady increase in demand, harvest, depletion of resource base & replacement by altneratives/synthetic substitutes



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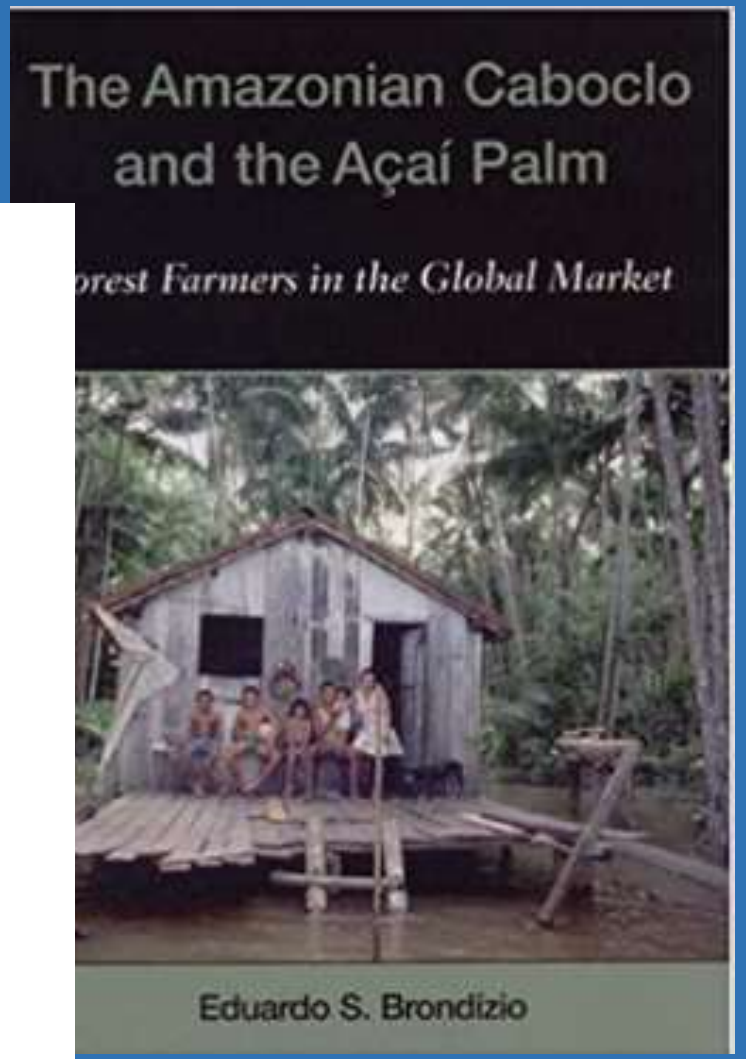
Forest farmed NWFPs

- Shitaake mushrooms (United States)
- Ramps (*Allium triccocum*)
- Acai berry (Amazon)



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Governance of NWFPs: mixed results

"In most countries the governance of this important but broad category of products has been ineffective or counter-productive to the objectives of sustainability and livelihood improvement. The problem begins with the definition of species and products covered by regulations, and continues to encompass an absence of strategies, clarity of objectives, poorly formulated laws, and flawed implementation."

Source: **Governance of NTFPs: ensuring effective laws and policies in practice. 2010. Sarah A. Laird, Rachel P. Wynberg & Rebecca J. McLain**

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Not all bad news!

- Conducive national policies
- Product differentiation
- Better understanding of and access to markets
- Improvements in product quality
- Cooperation across value chain (producers) and institutional support

Sources: Belcher et al. 2003; Meinhold & Darr 2019

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NWFP economic successes

- **Brazil nuts:** traded both in their in-shell and shelled form, globally, their combined **value of exports in 2018** amounted to **452 million USD**
- **Bamboo**: The **total value of exports of bamboo in 2018** amounted to **2865,8 million USD** (The top 5 bamboo exporters in terms of value in 2018 were China (over 2000 million USD), Canada (over 150 million), the Netherlands (over 80 million), Viet Nam (over 70 million) and India (over 60 million)
- Caterpillar fungus (*Cordyceps sinensis*)contributing at least USD 1.8 billion to the Tibetan economy; between 70–90 percent of household income where it grows
- Countless other mushrooms ("porcino", truffles), nuts (e.g. pine, shea, argan), fruits (e.g. acai, blueberries), MAPS and wild vegetables (e.g. licorice, *Prunus Africana)* sustaining livelihoods at different scales

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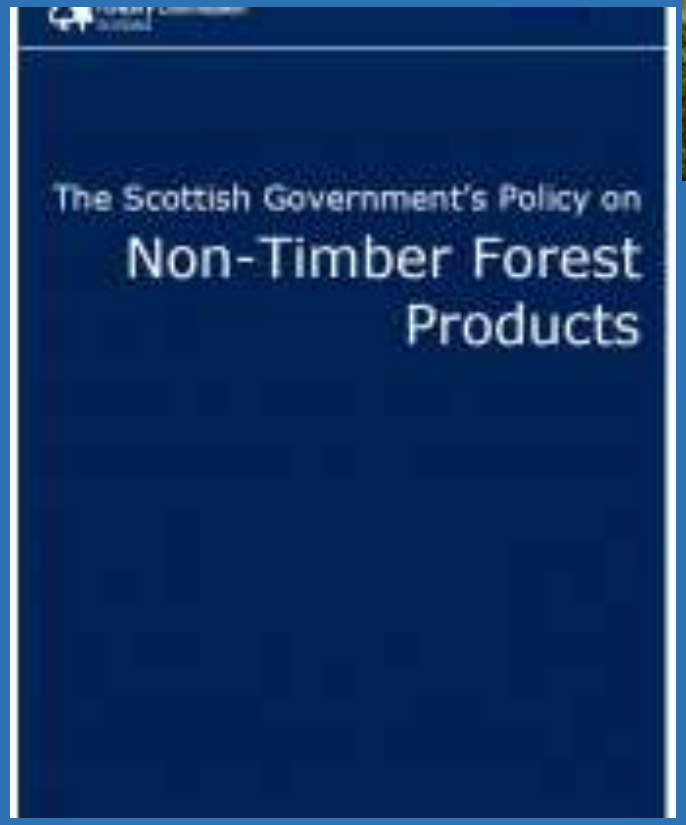
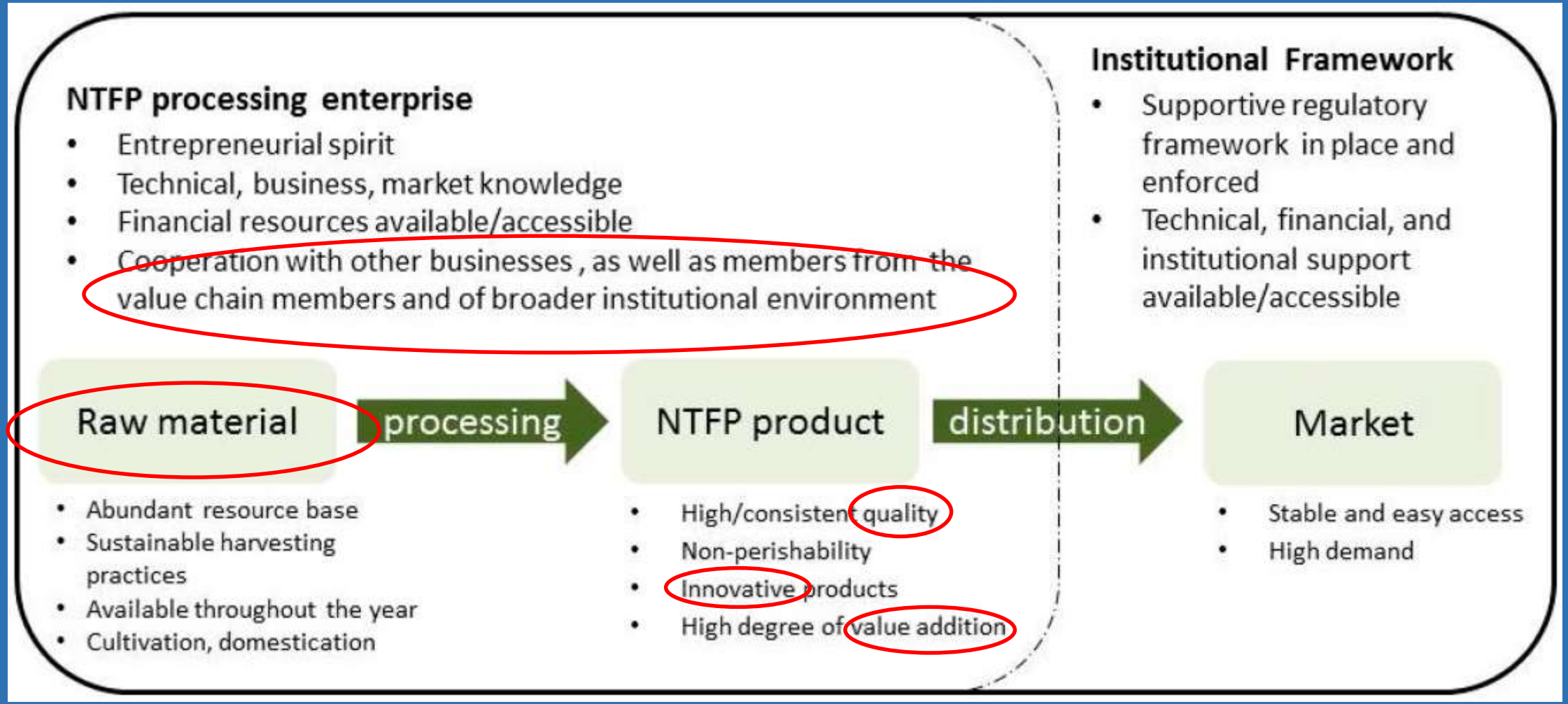
Some countries have targeted and specific laws and policies on NWFPs



✓ Enabling environment



Source: Meinhold, K. and Darr, D., 2019. The Processing of Non-Timber Forest Products through Small and Medium Enterprises—A Review of Enabling and Constraining Factors. *Forests*, *10*(11), p.1026.

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✓ **No one size fits all strategy!**

✓ Mass produced…

- Single large scale enterprises producing quantities of standardized, mass-market oriented products
- e.g. **Cork** - uses beyond bottle stoppers (e.g. thermal, acoustic properties)
- Vertical integration, short value chain can achieve significant economic performance "traditional model"

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✓ Speciality/niche products

- SMEs supplying limited quantities of **high quality products** oriented to niche markets
- Product speciality identification, integration, clustering among SMEs = “net system approach” (Secco et al 2009)
- high degree of **value addition** via processing of NTFPs can positively influence income and profits generated
- co-production of multiple products from a single source can increase the total value added
- **Innovative products**, in contrast to traditional and often very similar or even identical products, have the advantage that new and larger markets may be accessed
- Products which can be stored for a longer time period can be sold throughout the year; for instance, when a better price can be fetched.

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✓ From products to landscapes and services

- NWFPs as services, “bundles” or complementary products
- marketed as part of large forest packages
- Mycotourism, chestnut/tr roads
- Geographic Indication: chestnuts, honey, saffron licorice, wild camomile, schisandra fruit, etc.
- Territorial marketing
- Certification (e.g. multiple use FSC certified cork oak woodlands – hunting, grazing, crop production)

PROTECTED GEOGRAPHICAL INDICATION

Strada della Castagna
castagna
del Monte
AMIATA
INDICAZIONE GEOGRAFICA PROTETTA

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3. FAO's NWFP Programme

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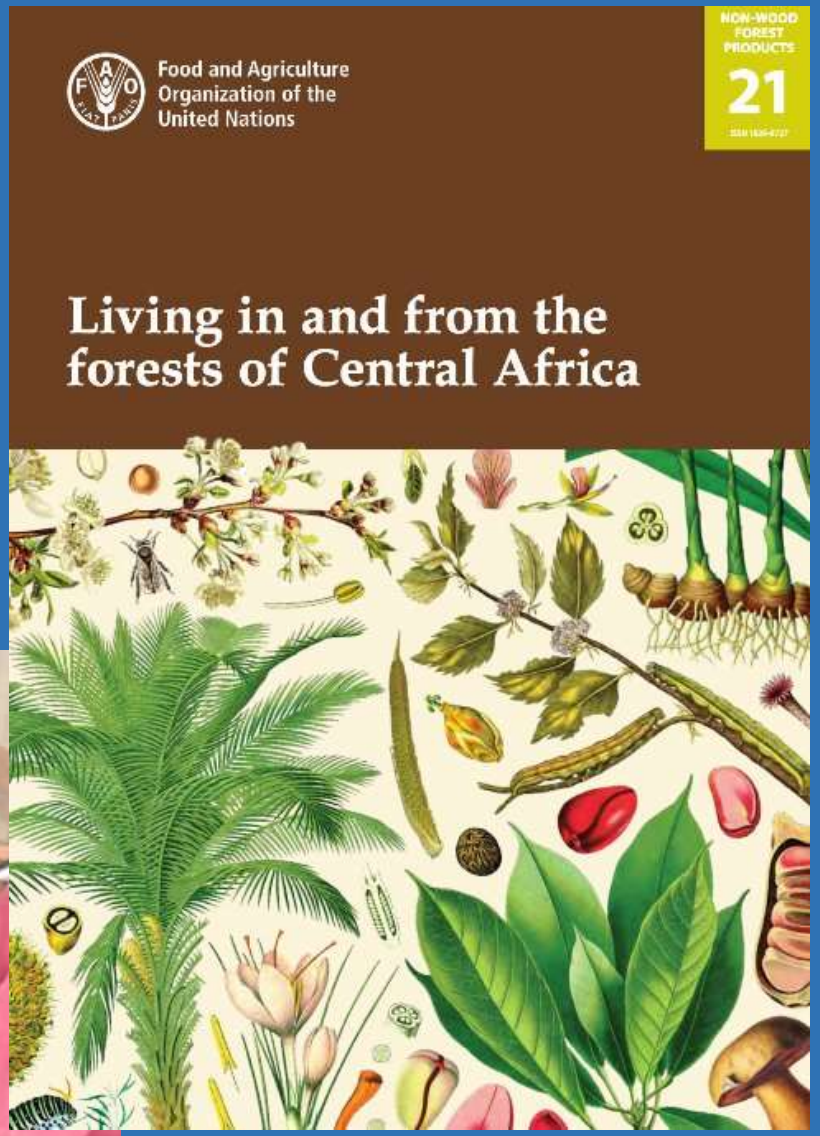
FAO's NWFP Programme

- ✓NUTRITION AND FOOD SECURITY.
- ✓VALUE CHAINS.
- ✓SUSTAINABLE MANAGEMENT.
- ✓DATA.

Children in Congo Basin consuming Njansang kernals –rich in lipids, carbohydrates, calcium and fats

Participatory domestication of Gnetum spp.



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- Supporting biodiversity-friendly, nutrition-sensitive and innovative **NWFP-based value chains** for improved food security, nutrition and livelihoods

Main areas of work:

- ✓ NWFP **data** and **statistics**
- ✓ NWFP **certification** and **labelling**
- ✓ NWFP **value chains** at all levels
- ✓ NWFP **nutritional and chemical analyses**
- ✓ NWFP in **land-use planning and forest management**
- ✓ NWFP **governance**

Terminolgy, Data and statistics

Changes in agricultural and forest product codes in the Harmonized System (HS) nomenclature maintained by the World Customs Organization (WCO)

FAO on behalf of the Intersecretariat Working Group (IWG) on Forest Sector Statitics (Eurostat, FAO, ITTO and UNECE) submitted a proposal for amendments to WCO in April 2017. The proposal was examined by WCO's HS Review Sub Committee and Harmonized System Committee in 2017-2019, and finally accepted in January 2020.

HS 2017 Available at: http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs-nomenclature-2017-edition/hs-nomenclature-2017-edition.aspx IWG-iniciated changes approved by WCO in HS 2017 review cycle are highlighted green.	HS 2022 *(new, in force from 1-Jan-2022)* Amendments originating from FAO proposal are highlighted in green. Amendments originating from WCO secretariat, members or other agencies are highlighted in yellow. See WCO Press Release (29 January 2020).
Chapter 2 **Meat and edible meat offal**	**Chapter 2** **Meat and edible meat offal**
Note. 1.- This Chapter does not cover : (a) Products of the kinds described in headings 02.01 to 02.08 or 02.10, unfit or unsuitable for human consumption; (b) Guts, bladders or stomachs of animals (heading 05.04) or animal blood (heading 05.11 or 30.02); or (c) Animal fat, other than products of heading 02.09 (Chapter 15).	**Note.** 1.- This Chapter does not cover : (a) Products of the kinds described in headings 02.01 to 02.08 or 02.10, unfit or unsuitable for human consumption; (b) Edible, non-living insects (heading 04.10); (c) Guts, bladders or stomachs of animals (heading 05.04) or animal blood (heading 05.11 or 30.02); or (d) Animal fat, other than products of heading 02.09 (Chapter 15).
...	...
Chapter 4 **Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included**	**Chapter 4** **Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included**
Notes.	**Notes.**
...	...
4.- This Chapter does not cover : (a) Products obtained from whey, containing by weight more than 95 % lactose, expressed as anhydrous lactose calculated on the dry matter (heading 17.02); (b) Products obtained from milk by replacing one or more of its natural constituents (for example, butyric fats) by another substance (for example, oleic fats) (heading 19.01 or 21.06); or (c) Albumins (including concentrates of two or more whey proteins, containing by weight more than 80 % whey proteins, calculated on the dry matter) (heading 35.02) or globulins (heading 35.04).	5.- This Chapter does not cover : (a) Non-living insects, unfit for human consumption (heading 05.11); (b) Products obtained from whey, containing by weight more than 95 % lactose, expressed as anhydrous lactose calculated on the dry matter (heading 17.02); (c) Products obtained from milk by replacing one or more of its natural constituents (for example, butyric fats) by another substance (for example, oleic fats) (heading 19.01 or 21.06); or (d) Albumins (including concentrates of two or more whey proteins, containing by weight more than 80 % whey proteins, calculated on the dry matter) (heading 35.02) or globulins (heading 35.04). 6.- For the purposes of heading 04.10, the term "insects" means edible non-living insects, whole or in parts, fresh, chilled, frozen, dried, smoked, salted or in brine, as well as flours and meals of insects, fit for human consumption. However, it does not cover edible non-living insects, otherwise prepared or preserved (generally Section IV).
...	...

For more information, please contact Arvydas.Lebedys@fao.org

11 new NWFP codes for HS 2022
(mushrooms, insects, pine nuts, *Prunus Africana*)

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building nutrition sensitive NWFPs value chains

Main findings from field surveys

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Balanites aegyptica (desert date)

- ✓ **Identifying promising NWFPs and assessing their value chains**
- ✓ **Nutritional and chemical assessments of key products**
- ✓ **Addressing key bottlenecks by improving capacities, skills and knowledge**
- ✓ **Promoting sustainable use and management of NWFP sources (including participatory domestication)**

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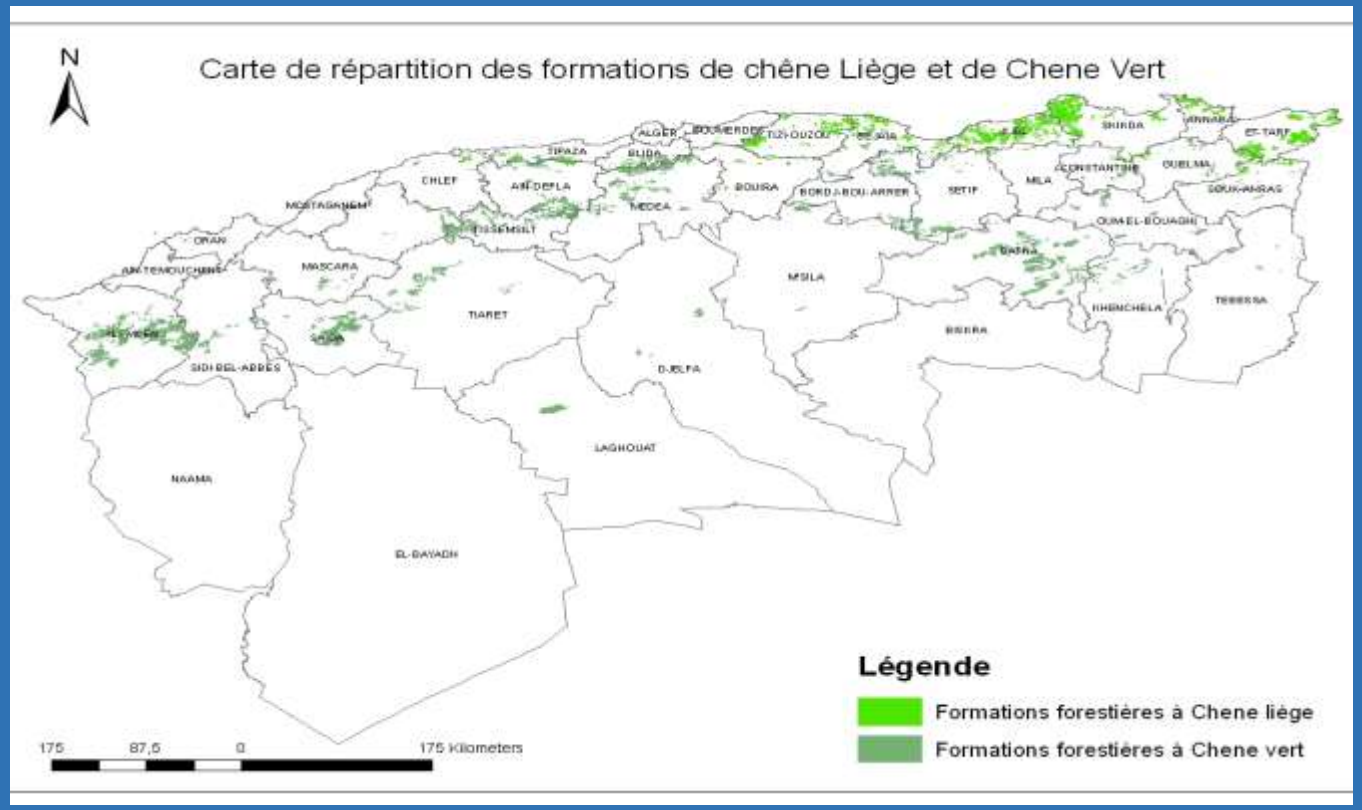
Raw comb honey (UGX/Kg)	Filtered honey (UGX/Kg)	Beeswax (UGX/Kg)
4,500-7,000/kg	12,000-16 000	25,000-30 000

Nutritional benefits

- ✓ The fat content of *R. differens* (42-52g/100g) is higher than that of most staple food crops consumed in Uganda and other sub Saharan Africa.
- ✓ High levels of unsaturated fatty acids (65-68%) ("good fats").
- ✓ Essential minerals (Iron, Zinc, Selenium), particularly beneficial for pregnant women.

Oak acorn (*Quercus suber, ilex)* cous cous “bilballout” - Algeria



Source: Sebti, Mohamed. 2017. Utilisation des glands de chenes dans la preparation du couscous bilaballout a Jijel.

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Production of oak acorn flour

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- ✓ Innovative entrepreneurs re-introducing oak acorn flour into cous-cous
- ✓ Creating demand to collect and process oak acorn nuts into flour
- ✓ Wild oak acorn festivals

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Comprehensive REVIEWS in Food Science and Food Safety

A New Age for *Quercus* spp. Fruits: Review on Nutritional and Phytochemical Composition and Related Biological Activities of Acorns

Ana F. Vinha, João C. M. Barreira, Anabela S.G. Costa, and M. Beatriz P. P. Oliveira

Abstract: The current global food system must adapt to the expected growth of world population (about 9 billion individuals by 2050). This adaptation will probably include an increased consumption of edible wild foods, due to their richness in micronutrients and bioactive compounds, besides providing a cost-effective and sustainable way of improving caloric food security. A striking example of such natural matrices is the *Quercus* genus, which has the additional advantage of being widespread throughout the Northern Hemisphere. In a traditional sense, *Quercus* fruits (acorns) were mainly used in animal feeding, despite their potentially important role on the rural economy. But this preconception is changing. In fact, their nutritional value, high contents in phytochemical compounds, biological activity (such as antioxidant, anticarcinogenic, and cardioprotective properties) and use in the treatment of specific diseases (such as atherosclerosis, diabetes, or Alzheimer's disease) have raised the interest in integrating acorns into the human diet. Accordingly, this comprehensive overview was designed to provide an evidence-based review of the literature, with the objective to achieve useful conclusions regarding the nutritional properties, methodologies of extraction, identification, and characterization of a wide variety of bioactive compounds and scientifically validated bioactivities in *Quercus* species worldwide. The industrial by-products from acorn oil extraction or flour production are also included. Data regarding the analytical techniques, individual compounds, and their bioactivities, are organized in tables. The reported data are discussed and directions for further investigations are suggested, highlighting the use of acorns in food, nutraceutical, and pharmaceutical applications.

Keywords: acorns, biological activity, nutritional composition, phytochemicals, *Quercus* spp., sustainability

Introduction

Quercus spp. (family Fagaceae) represent an important group of evergreen or deciduous trees from temperate and tropical climatic areas. The *Quercus* genus is comprised of around 450 species worldwide, which often differ in their flowering and fruiting dynamics and by maturation index (Tejerina and others 2011; Sánchez-Burgos and others 2013). These species produce a widely known

characteristics such as shape, size, and moisture content with ecological factors like climate and vegetation type, since the size of a fully developed acorn usually depends on its growth conditions (Pritchard and others 2004). An acorn size is also positively correlated with seedling survival rate under stress conditions (Aizen and Woodcock 1996).

Besides their association with physiological factors, acorns have

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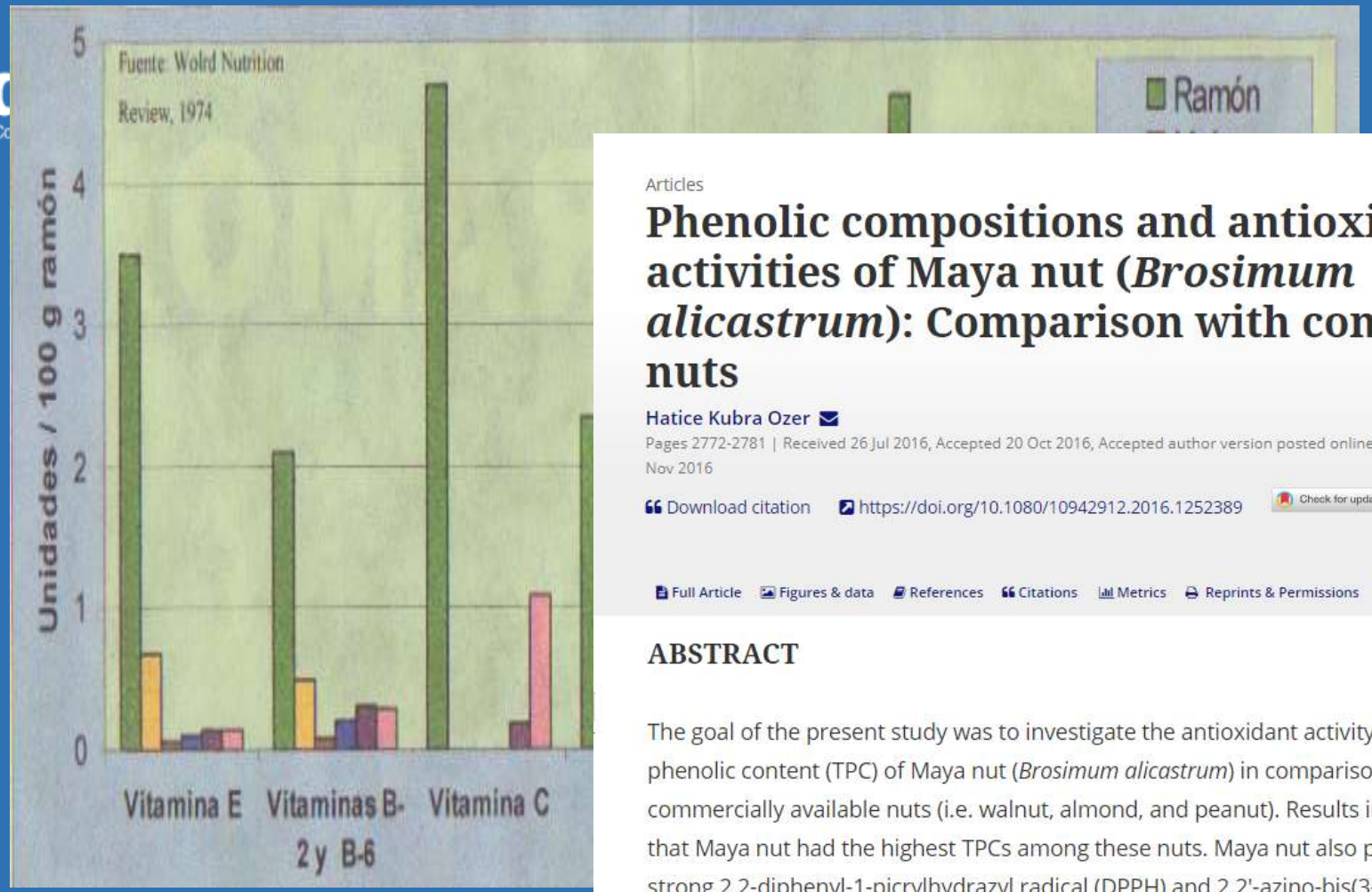
Ramon nut
Guatemala

Protected areas of high extension located in the heart of the Selva Maya region

The Ramón seed, also known as Ramon nut or locally as *Ojite, Masica, Ojoche, Mojú, Ujuxte, Xoxte, Iximché*, derives from the fruit of the Ramón tree *(Brosimum alicastrum)*, which grows naturally throughout Mesoamerica.



Articles

Phenolic compositions and antioxidant activities of Maya nut (*Brosimum alicastrum*): Comparison with commercial nuts

Hatice Kubra Ozer

Pages 2772-2781 | Received 26 Jul 2016, Accepted 20 Oct 2016, Accepted author version posted online: 16 Nov 2016, Published onl
Nov 2016

Download citation https://doi.org/10.1080/10942912.2016.1252389 Check for updates

Full Article Figures & data References Citations Metrics Reprints & Permissions Get access

ABSTRACT

The goal of the present study was to investigate the antioxidant activity and total phenolic content (TPC) of Maya nut (*Brosimum alicastrum*) in comparison with commercially available nuts (i.e. walnut, almond, and peanut). Results indicated that Maya nut had the highest TPCs among these nuts. Maya nut also possessed strong 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) and 2.2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) scavenging activities and ferric reducing antioxidant power (FRAP) ($p < 0.05$) as compared to walnut, almond, and peanut. Five phenolic acids (gallic acid, *p*-hydroxybenzoic acid, vanillic acid, caffeic acid, and *p*-coumaric acid) and one flavonoid ((-)-epicatechin) were identified and the phenolic content ranged from 6.5 to 326.2 µg/g.

KEYWORDS: Antioxidant activity, Maya nut, Nuts, Phenolics, Polyphenols, Total phenolic content

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ACOFOP
Asociación de Comunidades Forestales de Petén

- ✓ **Forest management plans** covering 120,780 ha of forests to sustainably harvest ramón seed through various associations counting over 500 people (ACOFOP)
- ✓ **Educational campaigns**
- ✓ **School meals & snacks**
- ✓ Study **nutritional composition** of Ramon

Dia del Ramon

les invitamos cordialmente a

La Asamblea General del Comité de la Cadena de Valor de la Semilla de Ramón

El Prímer Día de Ramón

Fecha: Miercoles 5.12.17
Hora: 8.30
Lugar: ACOFOP, Santa Elena

la ***Asamblea General del Comité de la Cadena de Valor de la Semilla de Ramón*** se dará a conocer la importancia de la Semilla de ramón, así como los avances del comité antes mencionado, que se han tenido en el año 2017 y la proyección para el año 2018. La asamblea se llevará a cabo en el salón de ACOFOP, 3ª Avenida, 4ª Calle, Zona 2, Santa Elena, Petén.
La asamblea iniciará puntual a las 8:30 y finalizará con un almuerzo para nuestros invitados. En el anexo de la invitación se adjunta la agenda. De antemano les agradecemos su asistencia y puntualidad.

"Si consumimos ramón, no sólo contribuimos económicamente a las familias comunitarias que la aprovechan, si no también contribuimos a la conservación de los bosques"

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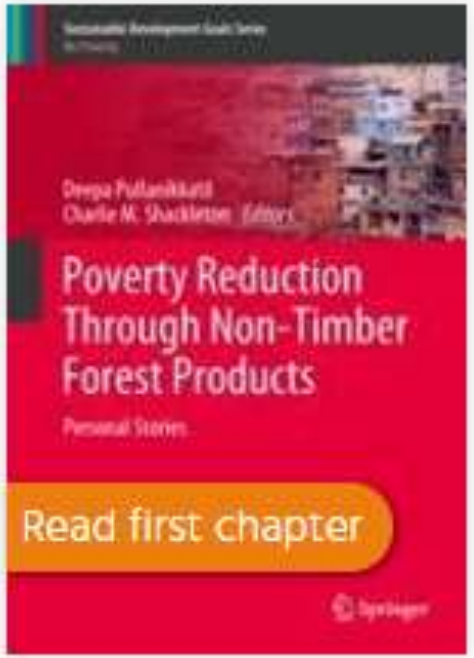
Guatemala's Nutritious Green Gold from the "Tree of Life"



Authors: Angela Izabela, Fajardo Barrientos, Giulia Muir, Julio Javier Madrid, Elena Baumanns, Luisa Vanderwegen

Publisher: Springer International Publishing

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4. Future prospects for NWFPs?

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- the revalorization of traditional wild products and practices linked to regional identity (Kilchling et al, 2009; Wong JLG & Prokofieva I, 2014);
- emerging niche and experiential Non Wood Forest Products (NWFP)-based markets (Kilchling et al, 2009; Wong JLG & Prokofieva I, 2014);
- growing consumer interest towards what is natural/wild – in part due to the mounting evidence on the salutary benefits of forests (Mao *et al.*, 2017), the declining nutritional content of domesticated crops (*Nature* 544, 2017; Davis *et al.*, 2004) and concerns about the safety, ethical, ecological and social credentials of food;
- policy shift from calories to nutrients – articulated in the New Global Research Agenda for Food (Haddad *et al.* 2016).

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From “famine foods” to……. delicacies

For $300, You Can Drink Gin Made From The Bodies Of Foraged Ants

Tree bark in “gourmet” cooking (indigenous Sami culture)

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Ecological Economics
Volume 120, December 2015, Pages 303–311
ELSEVIER

Surveys

From famine foods to delicatessen: Interpreting trends in the use of wild edible plants through cultural ecosystem services

Victoria Reyes-García[a, b], Gorka Menende
Naranjo[d], Laura Calvet-Mir[b, e], Pablo Domínguez[b],
Show more

https://doi.org/10.1016/j.ecolecon.2015.11.003

Highlights

- General decrease in the consumption
- Diverging trends were observed: popu
  abandoned uses.
- Popular wild edible plants are culturall
- The gathering of popular wild edible pl
- Trends in wild edible plants gathering
  services and values.

Hum Ecol
CrossMark

New Interest in Wild Forest Products in Europe as an Expression of Biocultural Dynamics

K. F. Wiers

Acta Societatis Botanicorum Poloniae
Journal homepage: pbsociety.org.pl/journals/index.php/asbp
INVITED REVIEW Received: 2012.07.20 Accepted: 2012.09.12 Published electronically: 2012.11.19 Acta Soc Bot Pol 81(4):359–370 DOI: 10.5586/asbp.2012.031

Wild food plant use in 21st century Europe: the disappearance of old traditions and the search for new cuisines involving wild edibles

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[6] Uppsala Centre for Russian and Eurasian Studies, Uppsala University, Box 514, 751 20 Uppsala, Sweden
[7] Institute of Veterinary Medicine and Animal Sciences, Estonian University of Life Sciences, Kreutzwaldi 62, 51014 Tartu, Estonia

Abstract

The aim of this review is to present an overview of changes in the contemporary use of wild food plants in Europe, mainly using the examples of our home countries: Poland, Italy, Spain, Estonia and Sweden. We set the scene referring to the nutrition of 19th century peasants, involving many famine and emergency foods. Later we discuss such issues as children's wild snacks, the association between the decline of plant knowledge and the disappearance of plant use, the effects of over-exploitation, the decrease of the availability of plants due to ecosystem changes, land access rights for foragers and intoxication dangers. We also describe the 20th and 21st century vogues in wild plant use, particularly their shift into the domain of haute-cuisine.

Keywords: wild edible plants, famine, food security, culinary vogues, habitat transformations

New uses for “old”, abandoned or underutilized products

- Natural **resins** in the cosmetics industry
- **Oak acorn & chestnut** flour/cous-cous
- **Beeswax** (packaging)
- “**Future smart foods**” (neglected and underutilized)

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From “famine foods” to……. super foods

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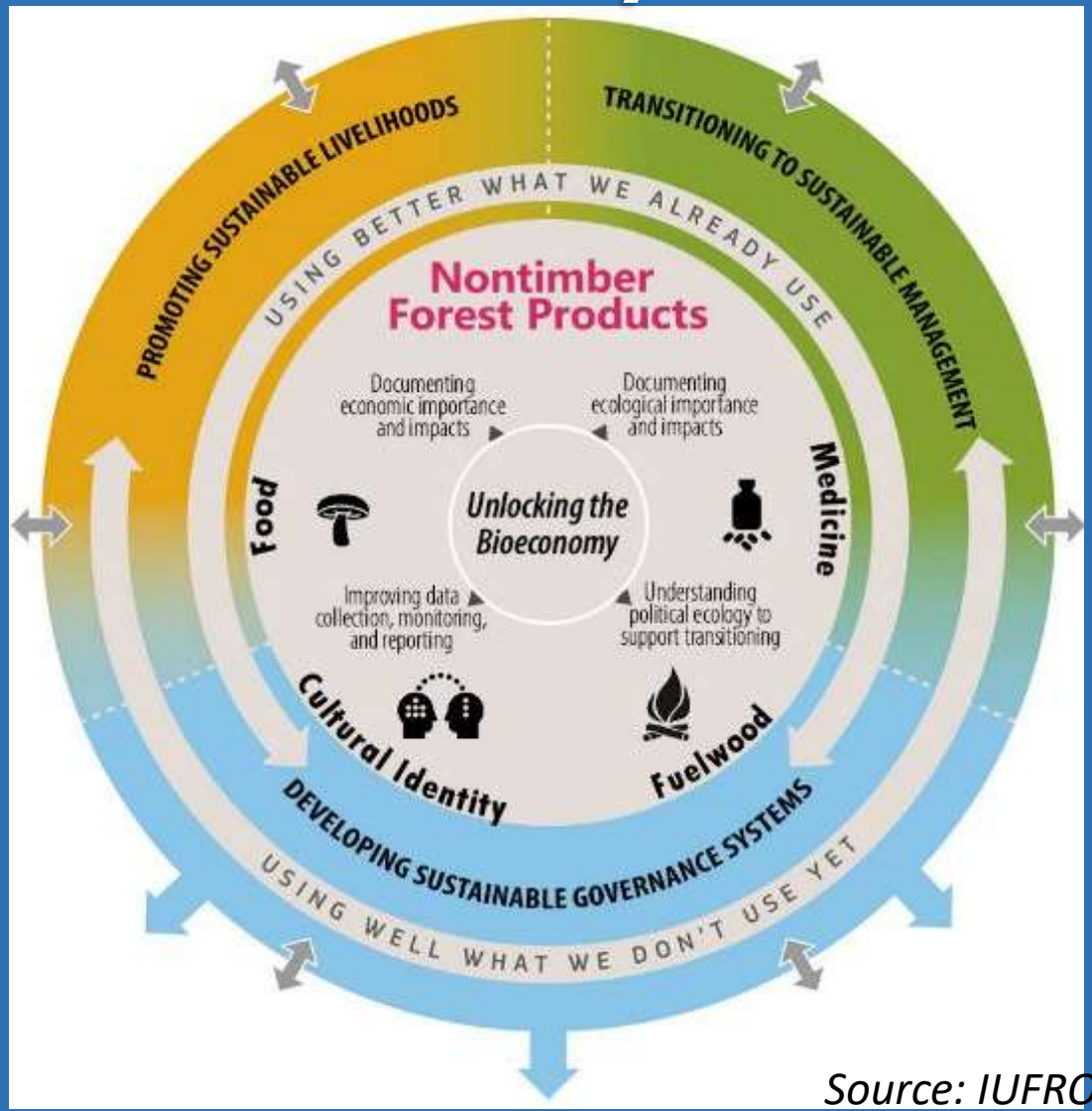
From “famine foods” to……. nutritional boons throughout the world, regardless of development status

NWFP value chains in the bioeconomy



Source: IUFRO NTFP Task Force, 2019

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Picea abies

transforming “waste” into nutrition

- Wood widely commercialized
- Buds, resin, leaves, twigs long used in traditional medicine to cure colds
- Buds rich in Vitamin C
- Wood-ing currently developing health drink from its buds

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Working beyond the forest sector: building biodiverse & nutritious food systems

- Supporting FAO's work on nutrition and Decade of Action on Nutrition with nutritional analyses of NWFPs, many of which are under-assessed yet make a significant contribution to more biodiverse and nutritious food systems!

INFOODS

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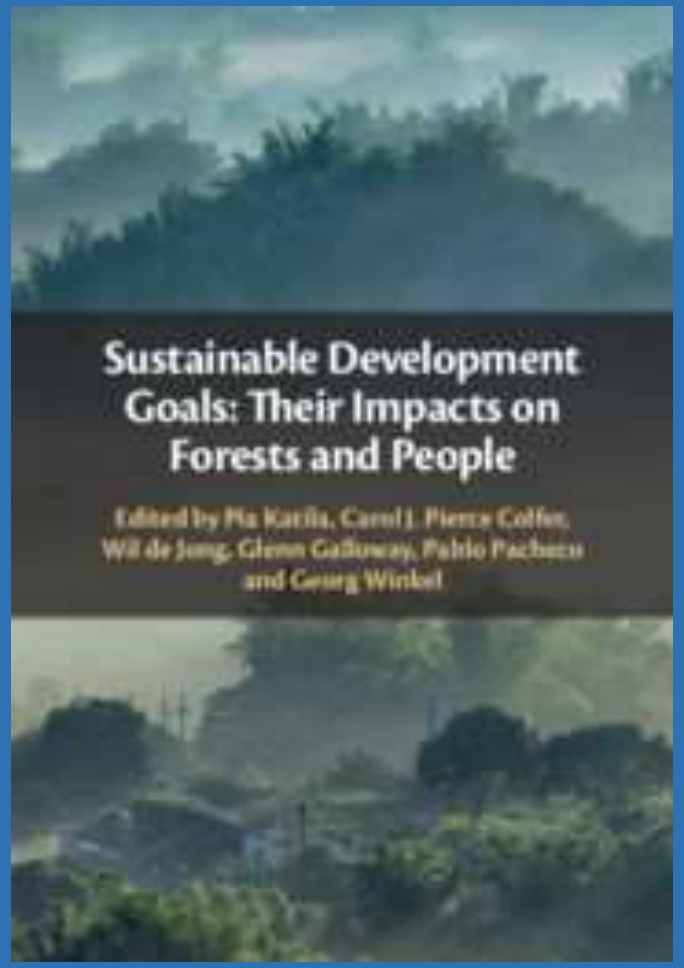

NEWS

Revolutionize food production system or face mass deforestation, scientists warn

Unless land management strategies are overhauled to reduce the gap between forestry and agriculture, it will be impossible to feed and nourish the human population without further damaging the environment and forests, according to scientists.

https://forestsnews.cifor.org/63891/revolutionize-food-production-system-or-face-mass-deforestation-scientists-warn?fnl=en

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Take home messages

- Many challenges….but also **unprecedented opportunities** to contribute to build more biodiverse and nutritious food systems and support emerging bio-economies with innovative NWFP value chains
- Need to **collaboratively** work on enabling environment, from assuring raw material to product development and building consumer demand
- New era for NWFPs/wild products?

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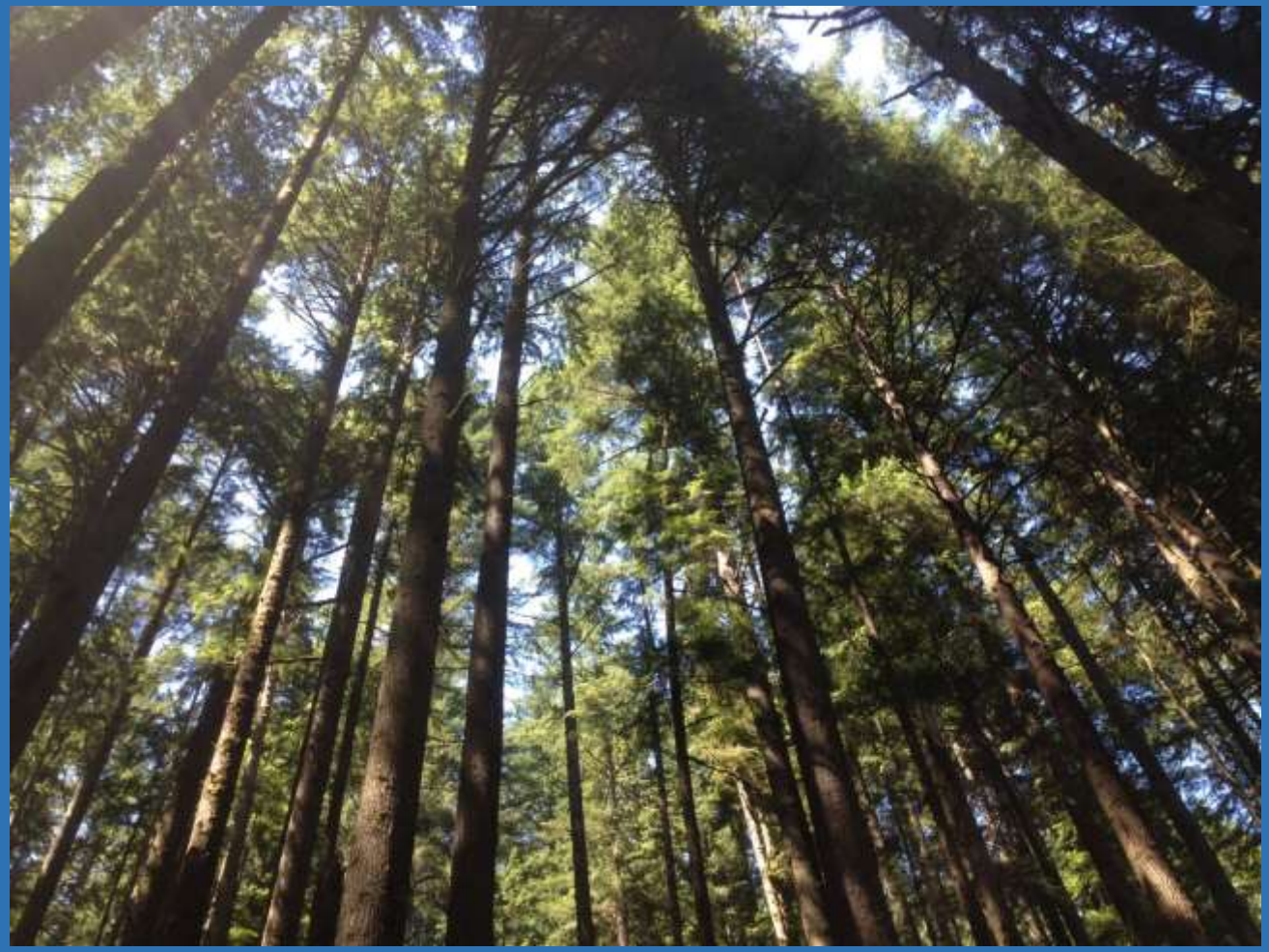

"In Wildness is the preservation of the world."

-Henry David Thoreau

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Thanks for your attention!

Giulia.Muir@fao.org

Coordinator

Partners

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www.incredibleforest.net