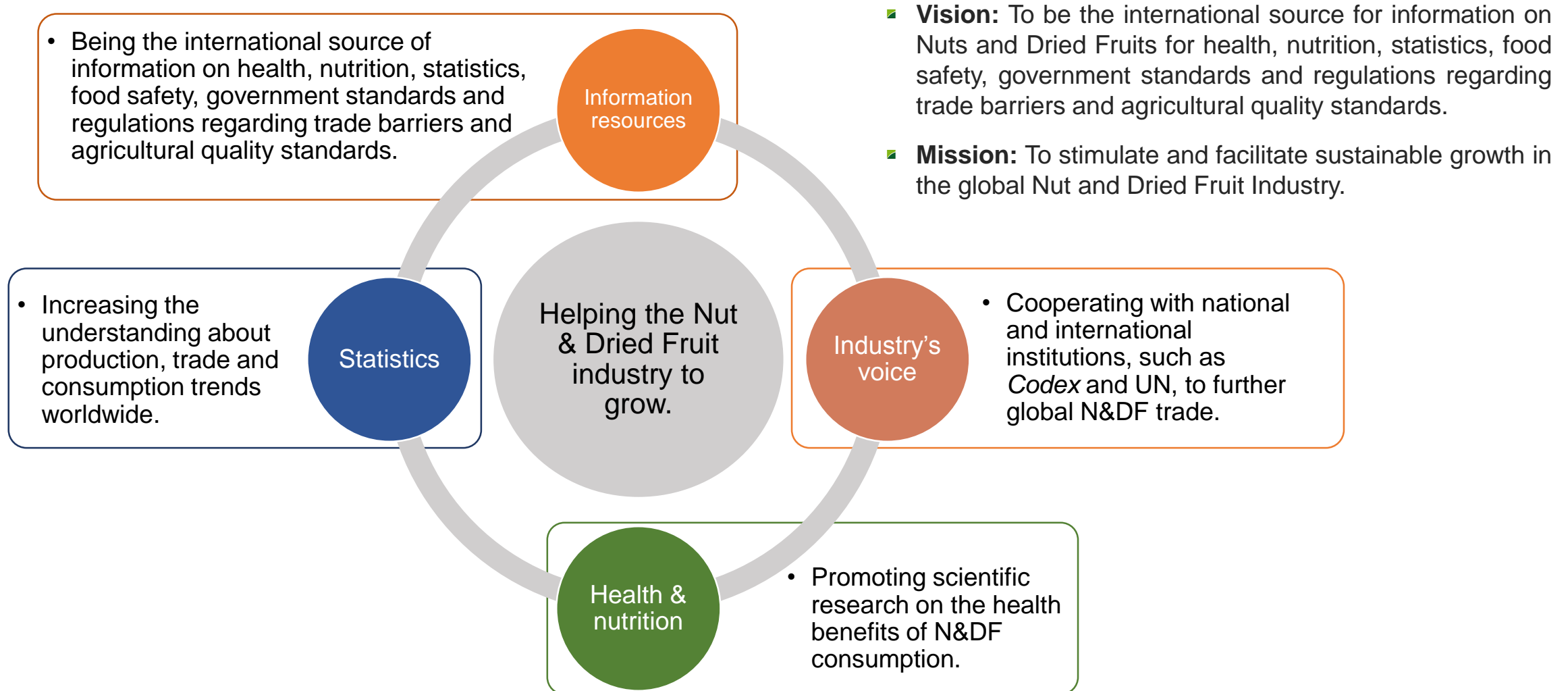


# Global Industry Review Forest Tree Nut Crops

**Mr. Pino Calcagni**

Vice Chairman, Chairman of the Statistics Committee, and Scientific and Government Affairs Committee, INC International Nut and Dried Fruit Council

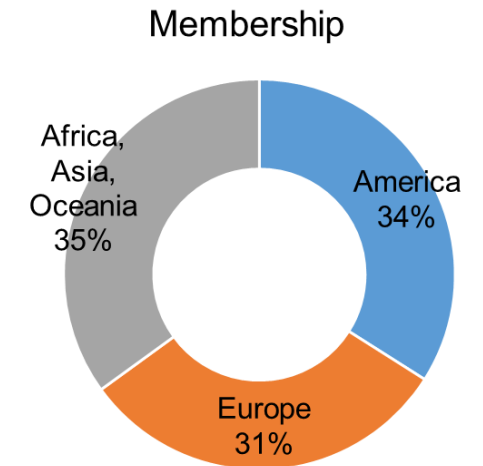


# About us

## 17 Products

- Almonds
- Apricot Kernels
- Brazil Nuts
- Cashews
- Hazelnuts
- Macadamias
- Pecans
- Pine Nuts
- Pistachios
- Walnuts
- Peanuts
- Dates
- Dried Apricots
- Dried Cranberries
- Dried Figs
- Prunes
- Raisins, Sultanas & Currants

- **800+ companies from 75+ countries**
- A Board of Trustees from 12 countries
- Ambassadors in 30+ countries
- An international team: 15 sub-committees

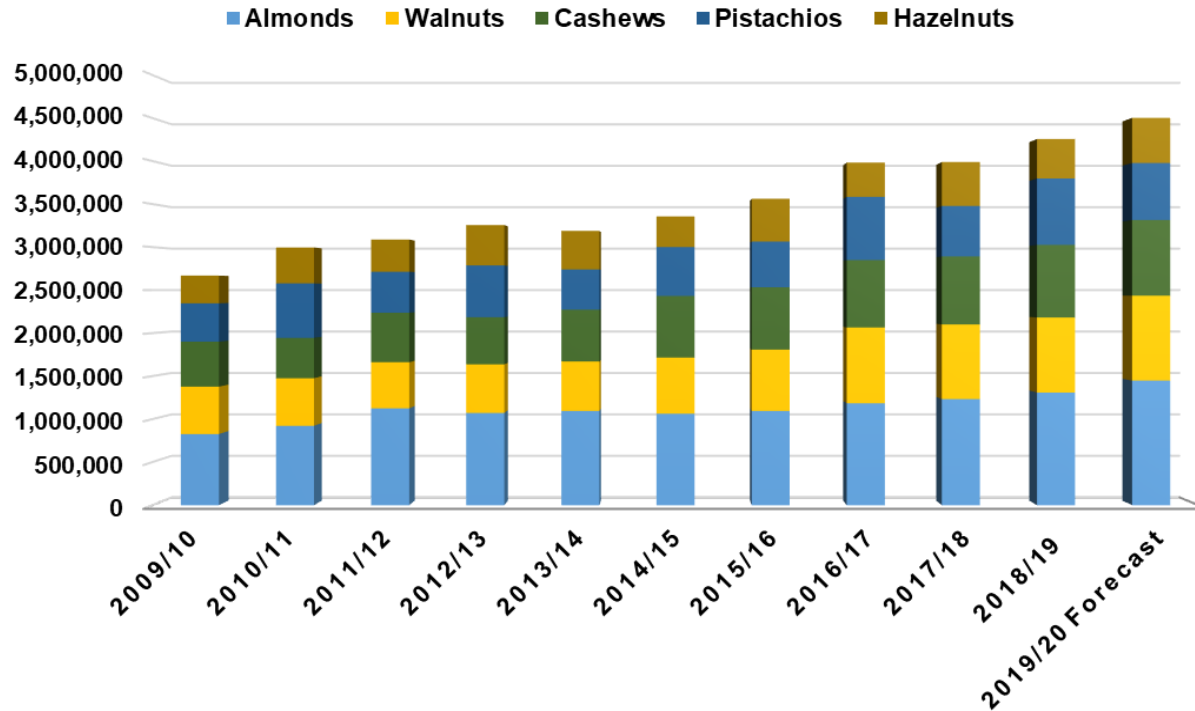


## Publications/Resources

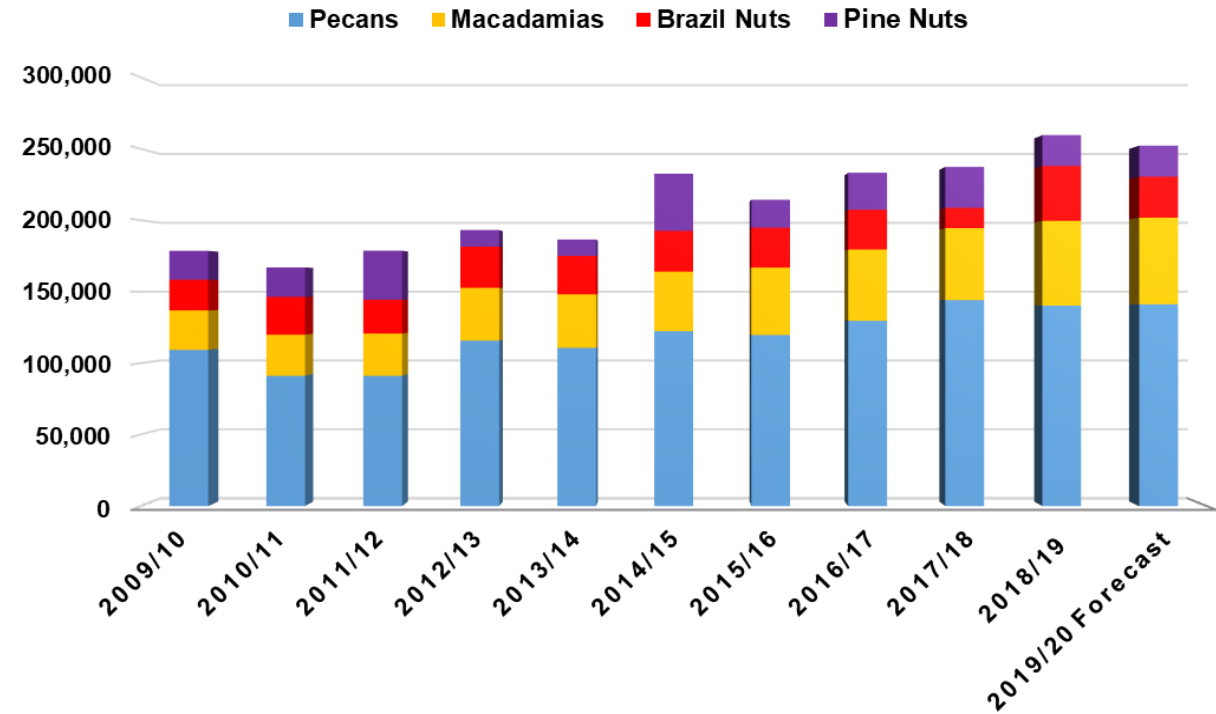
- Newsletters
- *Nutfruit* Magazine
- Online Database
- Statistical Yearbook
- Trade Flows World Maps
- Technical Information Kits
- Allergens Toolkit

# World Tree Nut Production

**World Tree Nut Production (Metric Tons)**  
Kernel basis, except pistachios in-shell. Source: INC



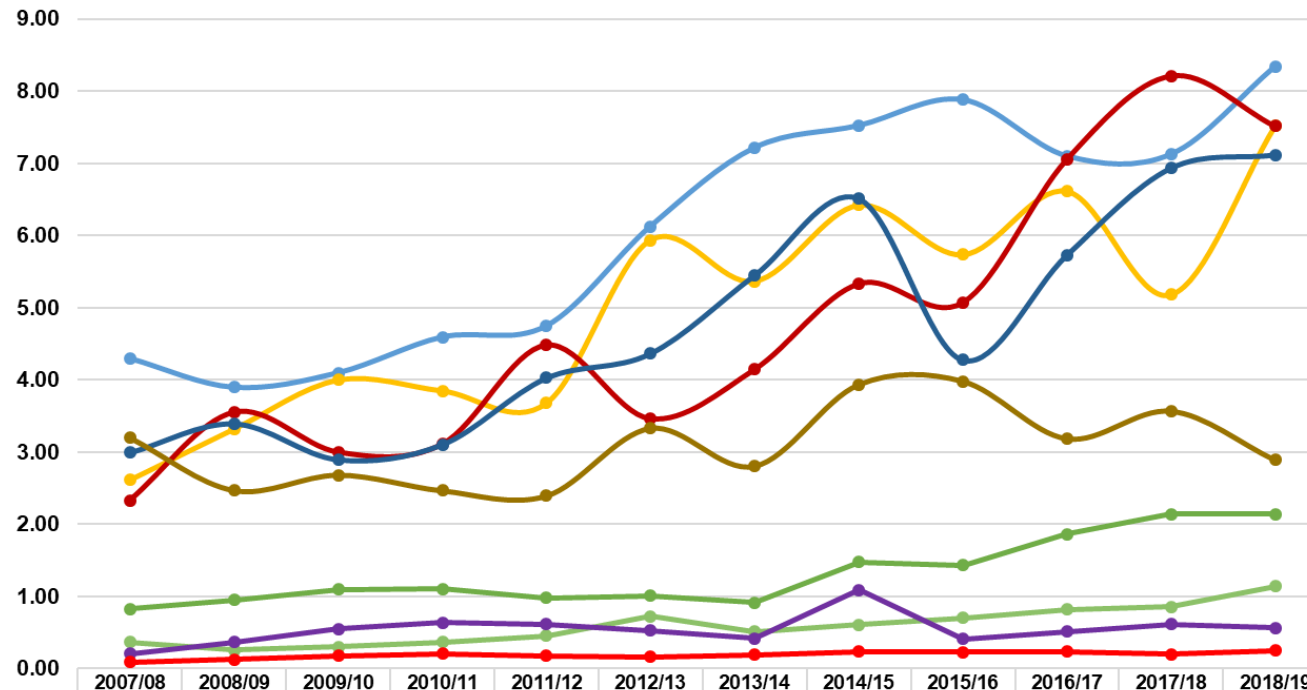
**World Tree Nut Production (Metric Tons)**  
Kernel basis. Source: INC



# World Tree Nut Supply Value

**Tree Nut Supply Value (Billion \$)**  
Kernel basis, except pistachios in-shell. Source: INC

Almonds Pistachios Cashews Walnuts Hazelnuts  
Pecans Macadamias Pine Nuts Brazil Nuts



**Forest Tree Nuts Supply Value:  
over \$8 Billion**



**Brazil Nuts**  
\$0.26 Billion  
38,500 Metric Tons



**Cashews**  
\$7.5 Billion  
840,000 Metric Tons



**Pine Nuts**  
\$0.56 Billion  
21,500 Metric Tons



# Tree Nut Trade

Shelled tree nuts, except pistachios in-shell

ALMONDS  
BRAZIL NUTS  
CASHEWS  
HAZELNUTS  
MACADAMIA  
PECANS  
PINE NUTS  
PISTACHIOS  
WALNUTS

Almonds Shelled (HS code 0802 12)
MT
EU+FTA
China
Canada
Japan
USA
South Korea
World Total

Pistachios in-shell (HS code 0802 32)
MT
China
EU+FTA
World Total

Walnuts Shelled (HS code 0802 32)
MT
USA
EU+FTA
Japan
South Korea
Canada
Australia
World Total

Pecans Shelled (HS code 0802 90 10)
MT
USA
EU+FTA
Canada
Japan
South Korea
World Total

Macadamias Shelled (HS code 0802 42)
MT
USA
Japan
Canada
China
Philippines
World Total

Pecans Shelled (HS code 0802 90 10)
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USA
World Total

Brazil Nuts Shelled (HS code 0801 22)
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Brazil Nuts Shelled (HS code 0801 22)
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EU+FTA
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Walnuts Shelled (HS code 0802 32)
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Macadamias Shelled (HS code 0802 42)
MT
EU+FTA
World Total

Brazil Nuts

Cashews

Pine Nuts

Map shows the major trade flows among leading trading countries.



# In-shell Trade

**Almonds In-shell**  
(HS code: 0802 11)

USA	MT
India	116,096
China	38,763
Viet nam	20,617
<b>World Total</b>	<b>219,193</b>

**Walnuts In-shell**  
(HS code: 0802 31)

USA	MT
EU+EFTA	39,802
Turkey	33,122
India	16,103
<b>World Total</b>	<b>139,041</b>

**Pecans In-shell**  
(HS code 0802 90 10)

USA	MT
China	30,157
Mexico	14,284
Vietnam	8,731
<b>World Total</b>	<b>55,213</b>

**Hazelnuts In-shell**  
(HS code: 0802 21)

USA	MT
Vietnam	15,193
Canada	4,535
China	3,620
<b>World Total</b>	<b>24,105</b>

**Pine nuts In-shell**

RUSSIAN FED,	MT
China	9,629
<b>World Total</b>	<b>9,629</b>

©INC

**Pecans In-shell**  
(HS code 0802 90 10)

MEXICO	MT
USA	19,090
<b>World Total</b>	<b>20,928</b>

**Brazil nuts In-shell**  
(HS code: 0801 21)

BRAZIL	MT
Peru	2,408
Bolivia	1,321
<b>World Total</b>	<b>3,989</b>

**Walnuts In-shell**  
(HS code: 0802 31)

CHILE	MT
Turkey	27,141
EU+EFTA	11,984
<b>World Total</b>	<b>56,479</b>

**Pine nuts In-shell**

PORTUGAL	MT
Turkey	2,846
Italy	1,435
<b>World Total</b>	<b>4,480</b>

**Cashews In-shell**  
(HS code: 0801 31)

WEST AFRICA	MT
Viet nam	582,695
India	495,551
<b>World Total</b>	<b>1,110,520</b>

Cashews

**Cashews In-shell**  
(HS code: 0801 31)

EAST AFRICA	MT
India	191,329
Viet nam	187,125
<b>World Total</b>	<b>380,011</b>

**Macadamias In-shell**  
(HS code: 0802 61)

AUSTRALIA	MT
China	11,982
Vietnam	6,056
<b>World Total</b>	<b>18,366</b>

**Macadamias In-shell**  
(HS code: 0802 61)

SOUTH AFRICA	MT
China	15,571
Vietnam	5,916
<b>World Total</b>	<b>21,802</b>

**Pecans In-shell**  
(HS code 0802 90 10)

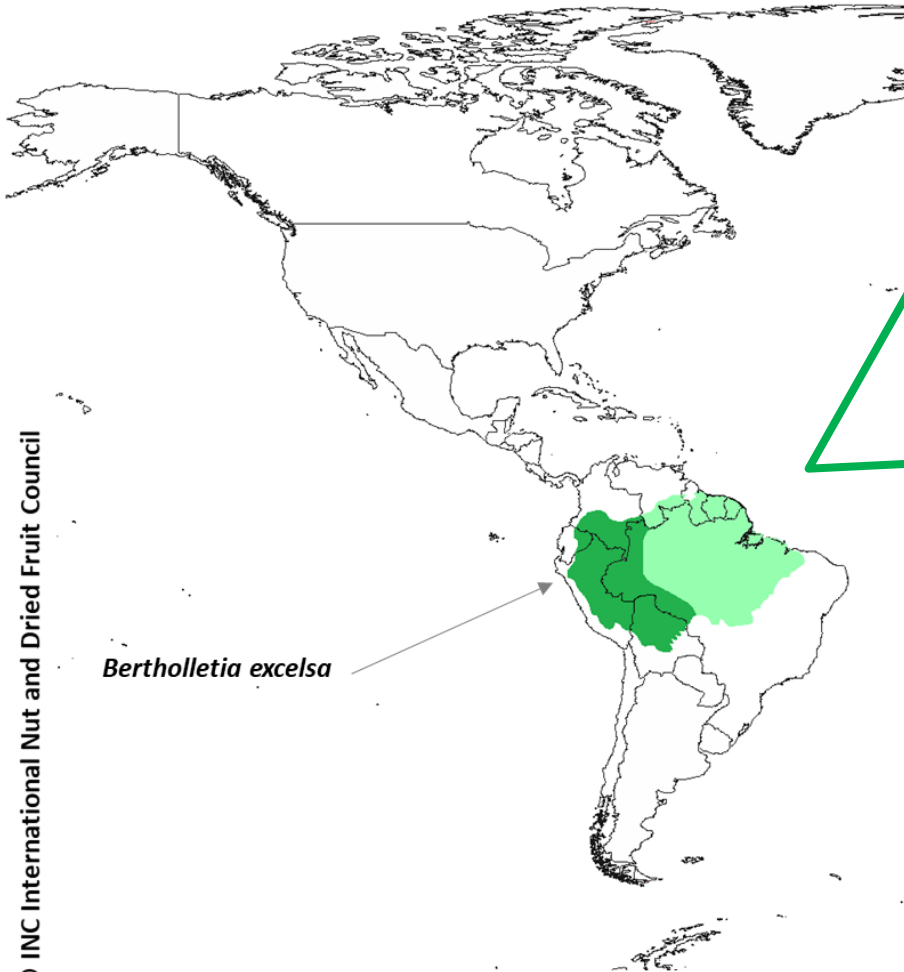
SOUTH AFRICA	MT
China	12,540
<b>World Total</b>	<b>12,912</b>

For pistachios in-shell, please see central map,

Brazil Nuts

Map shows the major trade flows among leading trading countries.

# BRAZIL NUTS – Growing Areas



- At present, collectors only access to **20%** of the growing area.
- The remaining **80% remains unexploited**.
- Potential to increase Brazil nut global production 4 times the current crop.
- 2019/2020 forecast: 86,100 metric tons (in-shell basis) / 28,700 MT (kernel basis).
- **Potential crop: 386,000 MT / 127,500MT.**



- The Brazil nut tree, *Bertholletia excelsa*, is one of the most important economic plants of the **Amazonian forest** due to its valuable edible seeds, known as Brazil nuts (Mori, 1992).
- Brazil nuts are **globally traded** and **collected by natives from the wild** since there are no economically viable plantations.
- The nuts are an important **source of income** for the local communities, which depend directly or indirectly on the Brazil nut trade (Arrus et al., 2005).
- Brazil nuts are one of the most important **Non-Wood Forest Products (NTFPs)** and have an important role in the **preservation** of the Amazonian rainforest (Arrus et al., 2005).
- Brazil nut pods can be used as a source of plant fiber.
- The Brazil nut model represents a **socioecological system** that may not require major changes to sustain productivity, supporting the “**conservation-through-use**” (Guariguata et al., 2017 and quotes cited therein).

Domestic efforts to curb deforestation:

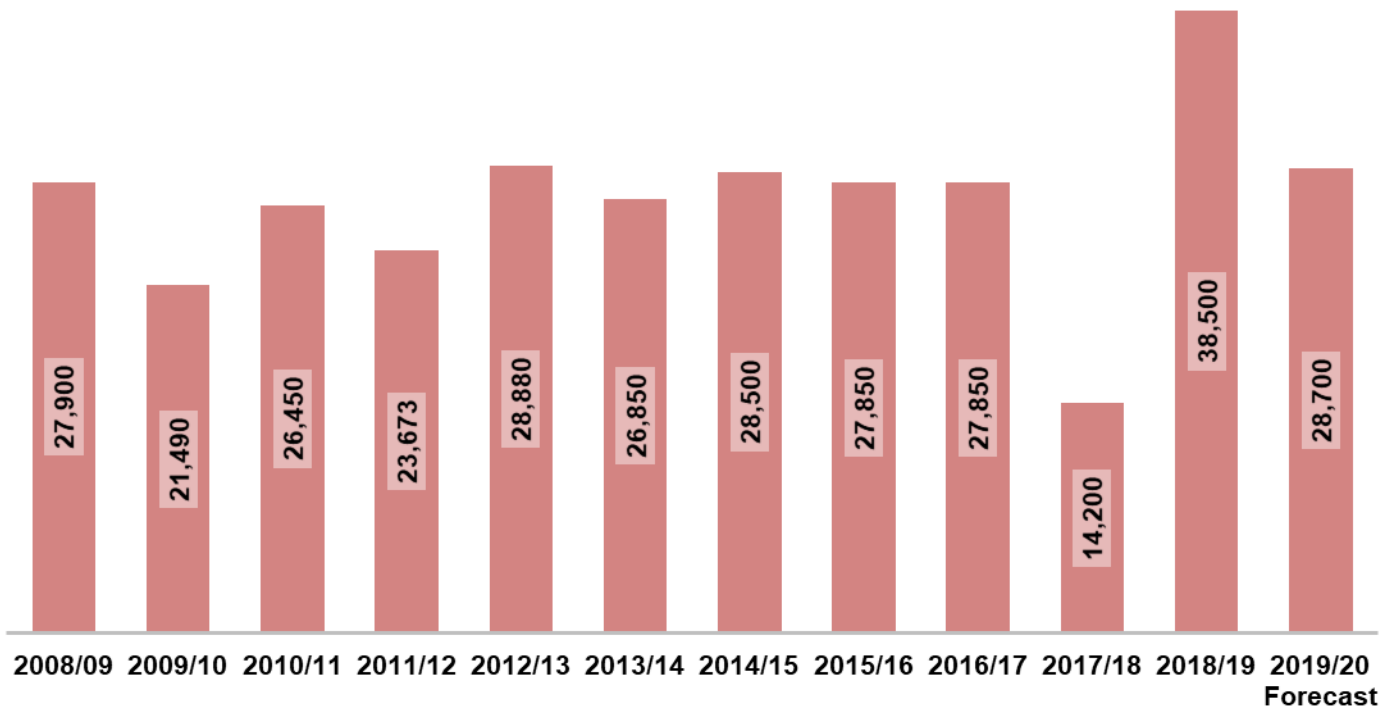
- Peru and Brazil have both included measures to reduce deforestation in their Nationally Determined Contributions (NCDs) towards keeping global temperature rise below 20°C.
- Opportunities exist to bolster conservation of Brazil nut-rich forests through incentives associated with Reducing Emissions from Deforestation and Forest Degradation (REDD+).
- Peru's National Forest Conservation Program grants subsidies per hectare to native and indigenous communities holding large tracts of forest in exchange for avoiding deforestation and degradation.

Source: Guariguata, M.R., Cronkleton, P., Duchelle A.E. and Zuidema, P.A. 2017. Revisiting the “cornerstone of Amazonian conservation”: a socioecological assessment of Brazil nut exploitation. *Biodiversity and Conservation*. 26:2007-2027.

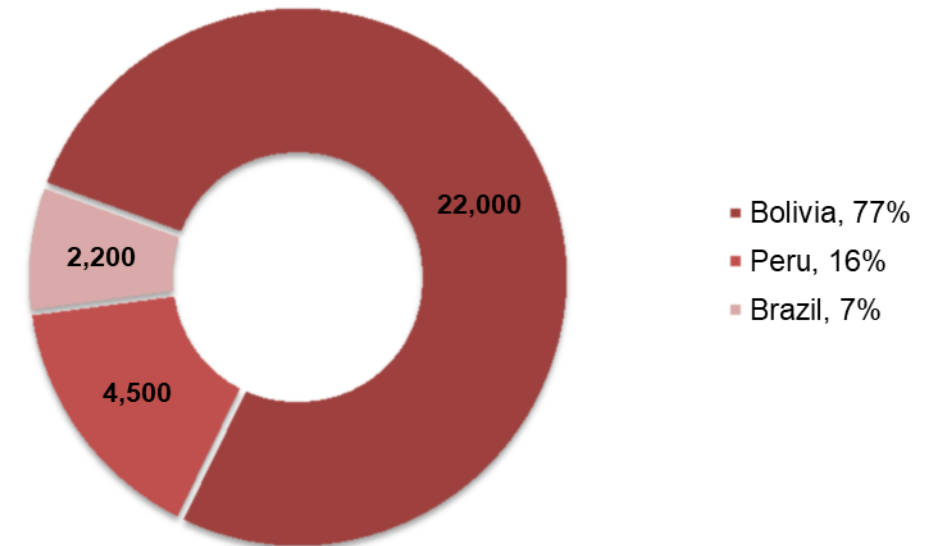
# World Brazil Nut Production

**WORLD BRAZIL NUT PRODUCTION**  
Kernel Basis (Metric Tons). Source: INC

34% over prior 10-year average

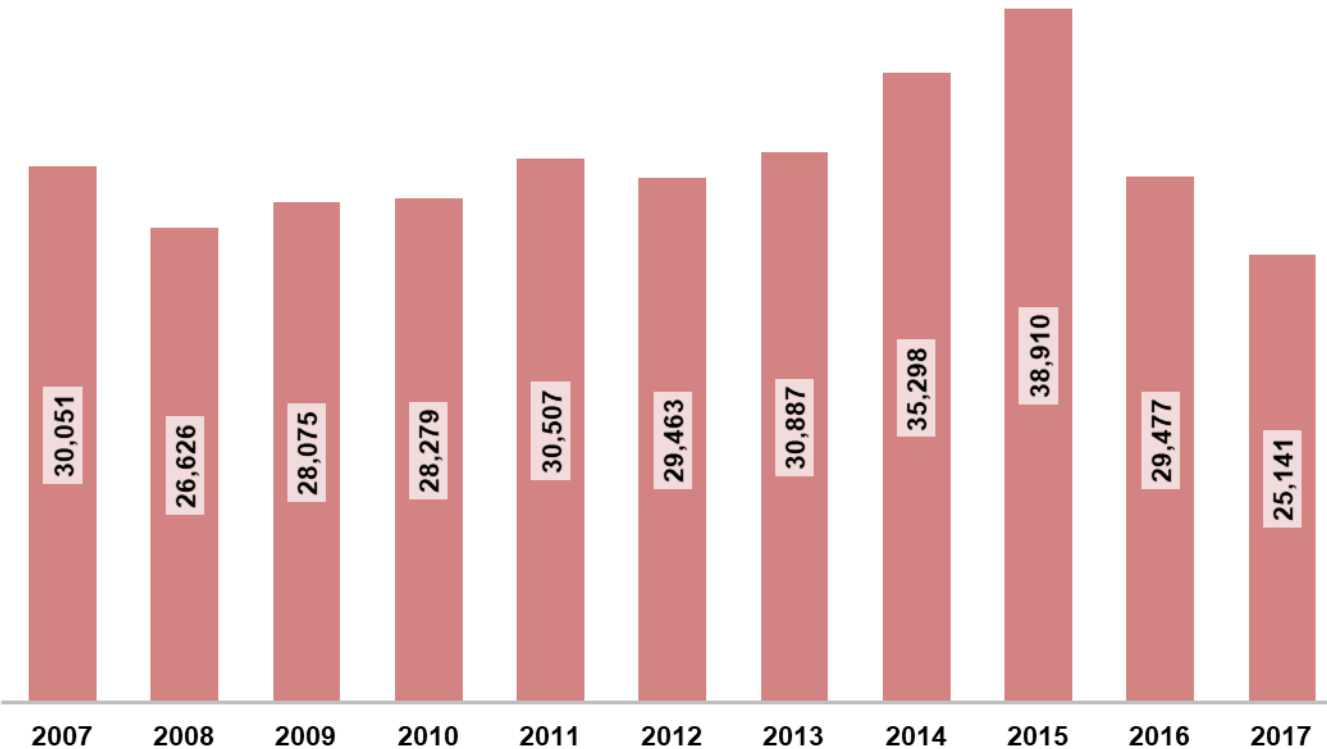


**2019/20 BRAZIL NUT PRODUCTION (forecast)**  
Kernel Basis (Metric Tons). Source: INC

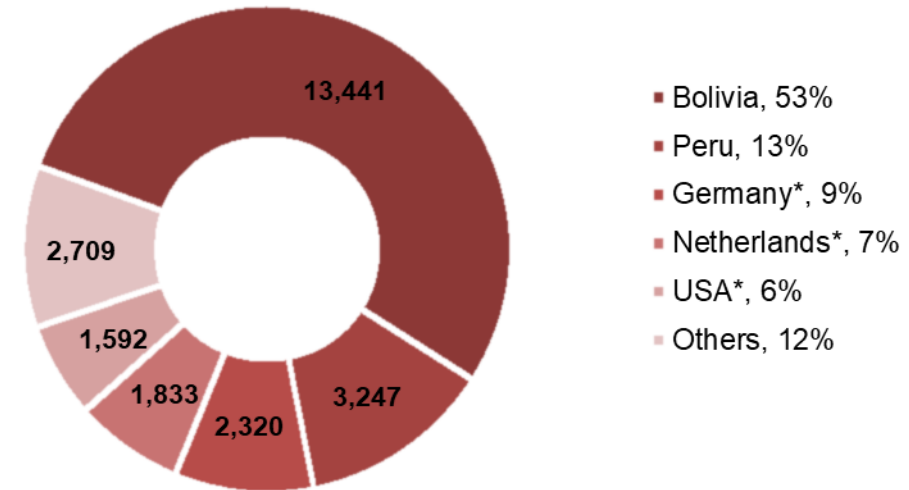


# World Brazil Nut Exports

**WORLD BRAZIL NUT EXPORTS**  
Shelled (Metric Tons). Source: UN Comtrade and INC



**2017 WORLD BRAZIL NUT EXPORTS**  
Shelled (Metric Tons). Source: UN Comtrade and INC



\* Transit country



# World Brazil Nut Imports

WORLD BRAZIL NUT IMPORTS / Shelled (Metric Tons). Source: UN Comtrade and INC

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Growth 2007-2017
USA*	9,644	8,140	8,848	7,732	6,553	7,969	7,647	8,622	9,127	3,709	4,159	-5,485
UK*	9,034	7,548	7,123	6,956	6,836	5,382	6,203	6,680	7,361	7,248	4,080	-4,954
Germany*	1,620	1,446	2,595	4,888	5,204	3,978	5,430	5,768	6,089	7,172	3,772	2,152
Korea Rep	1	0	0	0	4	0	0	39	2	189	2,855	2,854
Netherlands*	2,074	1,516	2,474	1,888	2,548	2,275	2,634	3,525	4,752	2,083	1,926	-148
Canada	521	600	593	738	739	788	948	996	1,669	1,014	1,397	876
France	200	250	317	358	698	336	365	498	686	817	781	581
Belgium*	903	577	712	808	224	274	316	385	528	447	752	-151
Australia	910	1,399	1,381	1,350	1,111	1,631	1,572	1,491	1,446	514	620	-290
Colombia	559	537	726	600	595	735	743	651	813	75	446	-113
Brazil	264	153	55	373	146	351	32	547	34	230	414	150
Italy	1,007	847	950	879	791	640	738	965	828	1,339	412	-595
Ireland	172	217	189	274	176	124	140	174	257	258	303	131
Spain	582	648	663	507	414	520	289	461	550	470	303	-279
Poland	140	62	81	402	186	96	167	250	434	529	272	132
Russian Fed.	447	841	427	495	519	910	747	587	408	278	230	-217
Czech Republic	126	105	168	140	87	90	112	219	166	199	222	96
Austria	66	112	83	173	181	93	145	132	232	267	209	143
New Zealand	249	223	191	348	235	299	375	454	491	286	202	-47
Sweden	165	245	214	188	197	704	233	277	211	233	184	19
Others	11,011	9,300	9,133	10,434	9,616	10,237	9,695	11,199	11,955	5,827	5,758	-5,253
World Total	30,051	26,626	28,075	31,799	30,507	29,463	30,887	35,298	38,910	29,477	25,141	-4,910

\*Transit country

# World Brazil Nut Estimated Consumption

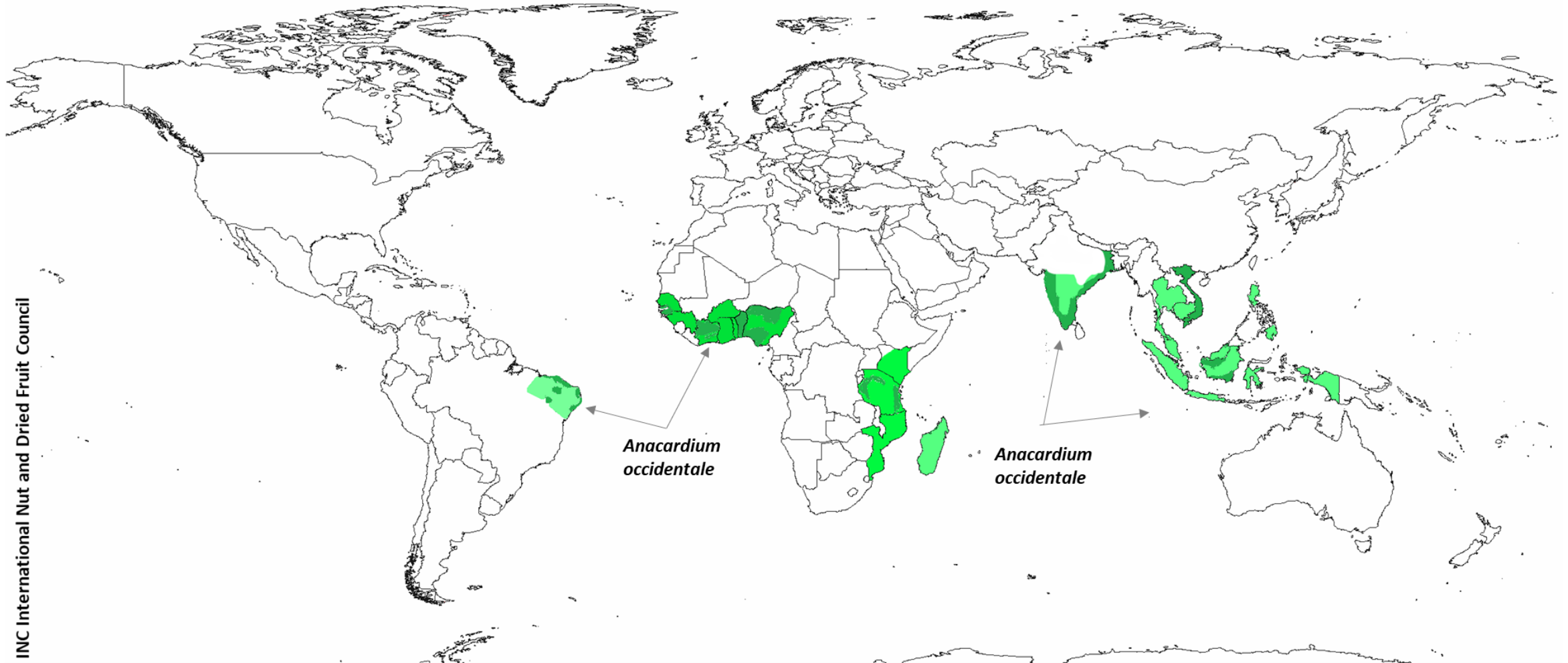
WORLD BRAZIL NUT ESTIMATED CONSUMPTION (Kernel Basis). Source: INC															
Country	2013			2014			2015			2016			2017		
	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>
Korea Rep	<1	-	-	39	0.001	0.001	2	-	-	186	0.004	0.005	2,855	0.056	0.075
UK	4,458	0.072	0.217	5,247	0.082	0.248	6,362	0.098	0.298	5,658	0.086	0.261	2,771	0.042	0.127
USA	7,021	0.023	0.069	7,858	0.025	0.075	8,002	0.025	0.075	2,755	0.009	0.026	2,567	0.008	0.024
Germany	4,501	0.055	0.184	4,219	0.052	0.173	3,714	0.046	0.153	4,448	0.054	0.181	1,452	0.018	0.059
Canada	926	0.027	0.271	946	0.027	0.268	1,550	0.043	0.431	876	0.024	0.241	1,100	0.030	0.300
France	325	0.005	0.172	426	0.006	0.215	601	0.009	0.311	719	0.011	0.370	716	0.011	0.368
Belgium	154	0.014	0.047	362	0.033	0.109	280	0.025	0.083	410	0.036	0.120	609	0.053	0.178
Australia	1,545	0.069	0.277	1,462	0.063	0.252	1,390	0.058	0.232	442	0.018	0.073	608	0.025	0.099
Colombia	737	0.016	0.162	642	0.013	0.131	806	0.017	0.167	67	0.001	0.014	446	0.009	0.091
Ireland	140	0.031	0.126	171	0.036	0.143	256	0.055	0.218	257	0.054	0.181	292	0.061	0.204
Italy	590	0.010	0.098	383	0.006	0.064	618	0.010	0.103	1,137	0.019	0.191	261	0.004	0.044
Poland	165	0.004	0.043	245	0.006	0.064	425	0.011	0.110	526	0.014	0.138	239	0.006	0.063
Russian Fed.	746	0.005	0.052	584	0.004	0.041	406	0.003	0.028	277	0.002	0.019	230	0.002	0.016
Spain	244	0.005	0.018	408	0.009	0.029	481	0.010	0.035	416	0.009	0.030	212	0.005	0.015
Austria	99	0.012	0.040	95	0.011	0.037	185	0.022	0.072	200	0.023	0.077	209	0.024	0.080
New Zealand	370	0.085	0.339	443	0.098	0.390	491	0.108	0.433	273	0.059	0.234	193	0.041	0.164
Czech Republic	112	0.011	0.107	187	0.018	0.175	139	0.013	0.132	166	0.016	0.157	188	0.018	0.177
Sweden	221	0.024	0.235	270	0.028	0.280	206	0.021	0.211	223	0.023	0.227	175	0.018	0.177
Israel	250	0.033	0.131	425	0.053	0.212	320	0.040	0.159	16	0.002	0.020	159	0.019	0.191
Switzerland	118	0.015	0.150	119	0.015	0.146	144	0.017	0.174	173	0.021	0.206	145	0.017	0.172
<b>World Total</b>	<b>27,270</b>	<b>0.004</b>		<b>29,100</b>	<b>0.004</b>		<b>29,150</b>	<b>0.004</b>		<b>26,960</b>	<b>0.004</b>		<b>16,840</b>	<b>0.002</b>	

Source: INC

<sup>1</sup> Total consumption expressed in Kg per person. Population data from United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision.

<sup>2</sup> Based on the estimated percentage of population consuming the specific product.

# CASHEWS – Growing areas



- Cashews trees grow in tropical areas and are native of **North-east Brazil**. During the 16th century, the Portuguese introduced it into **India** and Portuguese colonies in **Africa**. From India, cashew trees spread all over **South-east Asia**.
- The cashew establishment as a cash crop began in the 1950's and significantly expanded since the 1990's (Monteiro et al., 2017).
- The cashew shell contains an inedible phenolic oil, known as **cashew nut shell liquid (CNSL)** which has wide industrial uses thanks to its polymerizing and friction-reducing properties.
- The **cashew pear (apple)** is very high in Vitamin C and can be eaten fresh, mixed in fruit salads, or made into juice, which can be distilled to produce alcoholic drink.
- The cashew tree is widely **used in afforestation programs** as it does not require extensive irrigation or water-usage; it is environmentally friendly as the trees can grow in poor soils and dry climatic conditions.



## Cashew cultivation as an opportunity of sustainable growth in West Africa

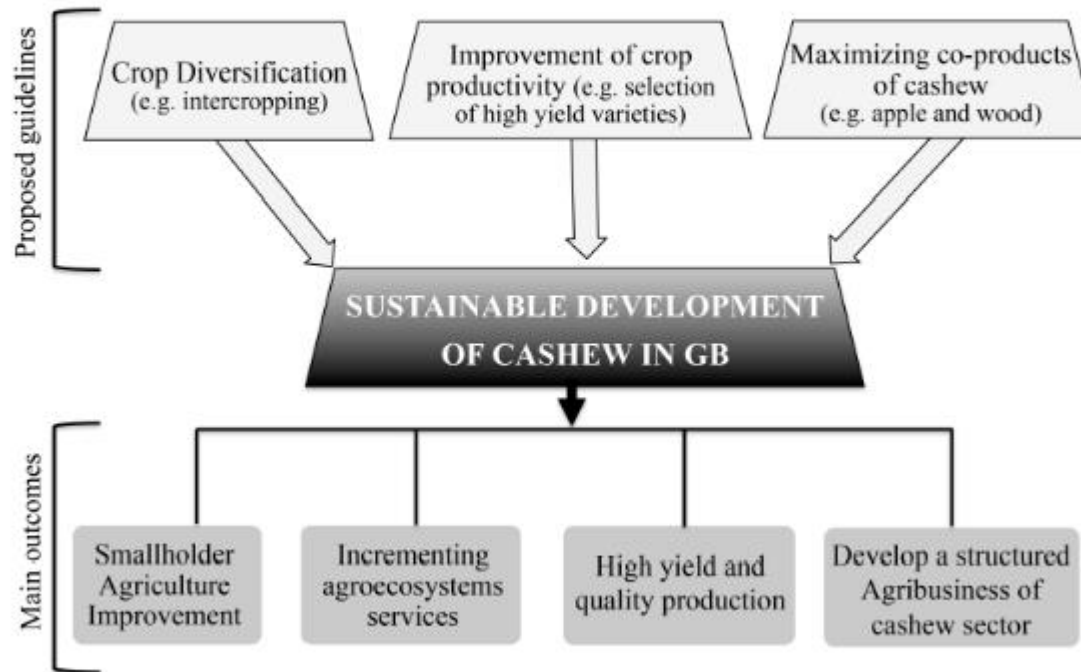
- Cashew cultivation contributes to both Gross Domestic Product (GPD) and exports exchanges in developing countries.
- It is an essential resource for the livelihood of smallholder farmers, providing positive economic and social effects: inclusive growth, **poverty alleviation** and **land securing** (maintenance of ownership and fallow).
- **Higher profitability** due to reduced production cost vs. cereals, for instance.
- Plantations implemented in fallow lands within semi-natural or savanna woodlands.
- Challenges: **Limited productivity** per hectare since standard agronomical practices are difficult to adopt and **loss of biodiversity**.

Source: Monteiro, F., Catarino, L., Batista, D., Indjai, B., Duarte, M.C. and Romeiras, M.M. 2017. Cashew as a High Agricultural Commodity in West Africa: Insights towards Sustainable Production in Guinea-Bissau. Sustainability 9:1666 and quotes cited therein.

# CASHEWS – Sustainability (Monteiro et al., 2017)

*Sustainability* **2017**, *9*, 1666

10 of 14



In West Africa, cashew is a case of a crop under agricultural expansion, which is currently in need of **secure guidelines for sustainable production** (Monteiro et al., 2017).

**Figure 6.** Guidelines for the sustainable production of cashew in Guinea-Bissau and expected outcomes.

Source: Monteiro, F., Catarino, L., Batista, D., Indjai, B., Duarte, M.C. and Romeiras, M.M. 2017. Cashew as a High Agricultural Commodity in West Africa: Insights towards Sustainable Production in Guinea-Bissau. *Sustainability* 9:1666.

## Vision

Achieving global growth and sustainability of the cashew nut sector.

## Mission

Promoting the global cashew nut sector by increasing awareness of the health benefits of cashews, promoting usage and consumption, and promoting food safety and quality standards.

- The INC formed the GCC aiming to bring together and keep producing and processing countries under the same umbrella.
- The efforts of the GCC in promoting **Good Agricultural Practices (GAP)** in the producing countries have contributed to the increment in the global production.

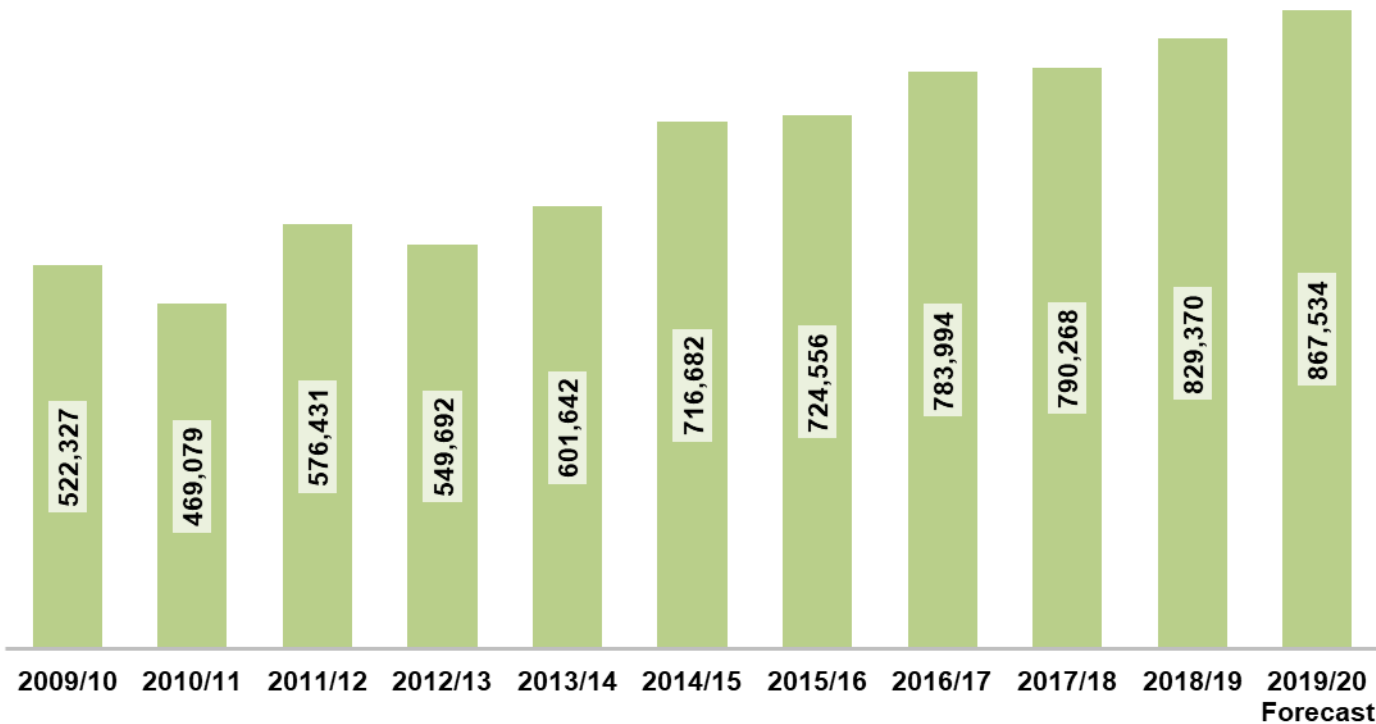
# Goals

1. To provide worldwide statistics of cashew production and consumption trends and to promote growth with a good balance between supply and demand.
2. To study and promote usage and consumption of cashews using appropriate platforms throughout the world.
3. To research the nutritional profile of cashews, to determine appropriate health platforms and possible health-claims, and to validate these benefits with scientific research including clinical trials.
4. To launch a program of activities to disseminate and publicize health messages related to cashews around the world.
5. To evaluate and suggest basic industry-standards for compliance with food safety regulations and issues internationally, and to work with regulatory bodies worldwide on food safety, social and ethical issues related to cashews.
6. To work actively on global cashew standards, with adaptations for different origins and destinations if necessary.
7. To evaluate possible synergies in the cashew value-chain and create added value to benefit producers, processors, traders, the food industry and the final consumer.
8. To liaison with international institutions such as the FAO, WTO, WHO, EU, CFC, etc. and other governmental and non-governmental bodies to gather necessary support for the above activities.

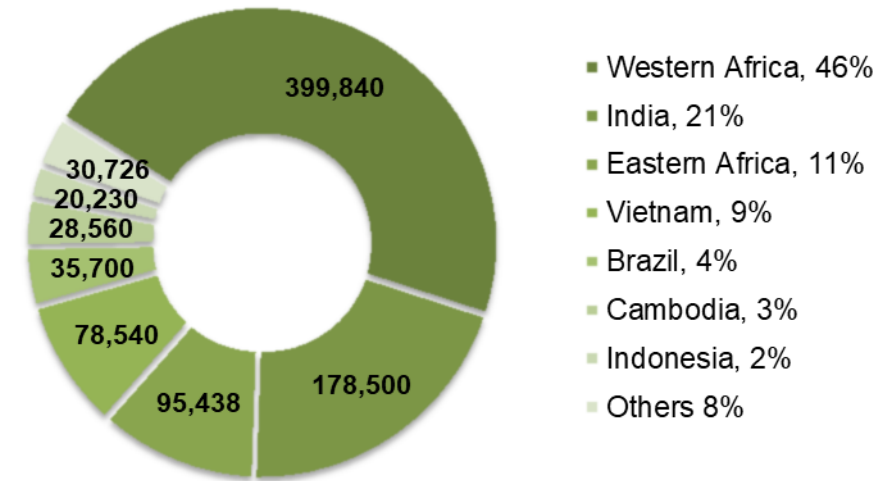


# World Cashew Production

**WORLD CASHEW PRODUCTION**  
Kernel Basis (Metric Tons). Source: INC

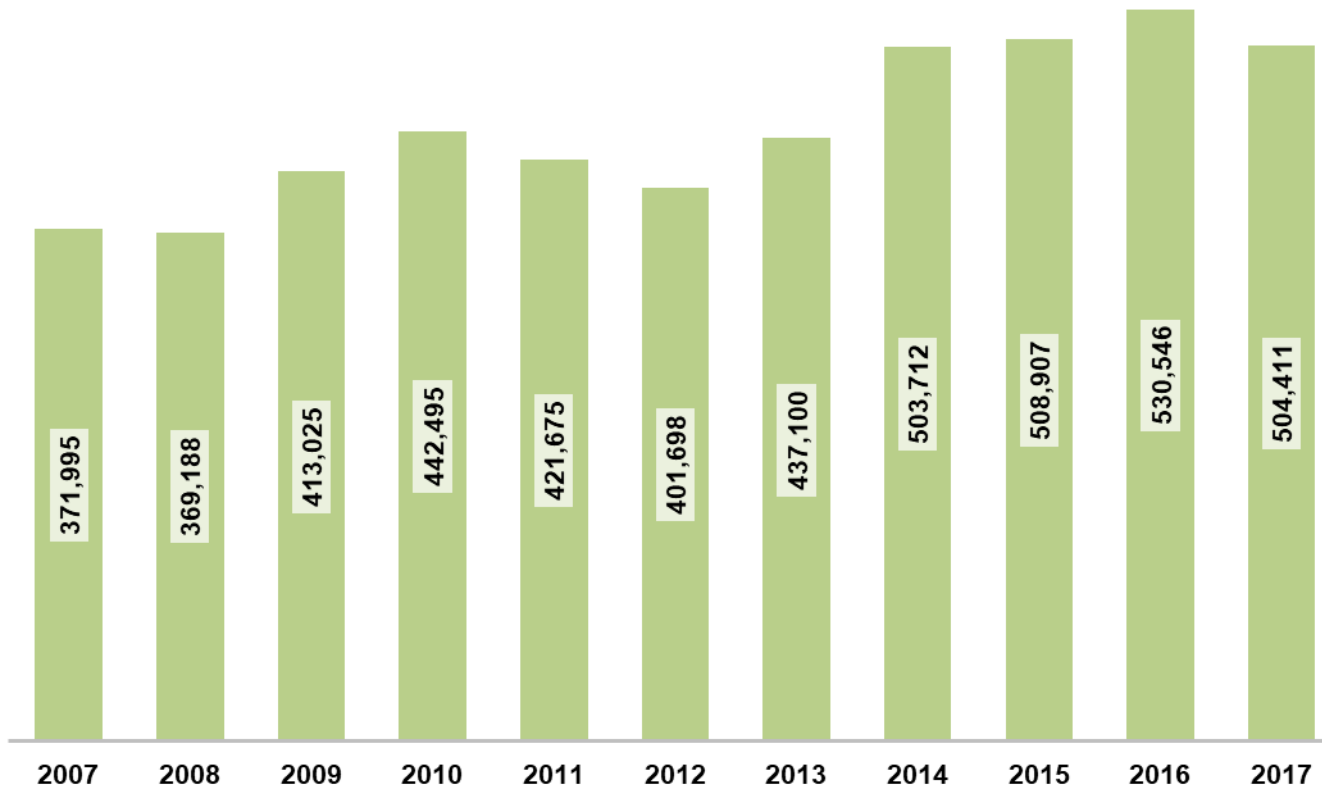


**2019/20 CASHEW PRODUCTION (forecast)**  
Kernel Basis (Metric Tons). Source: INC

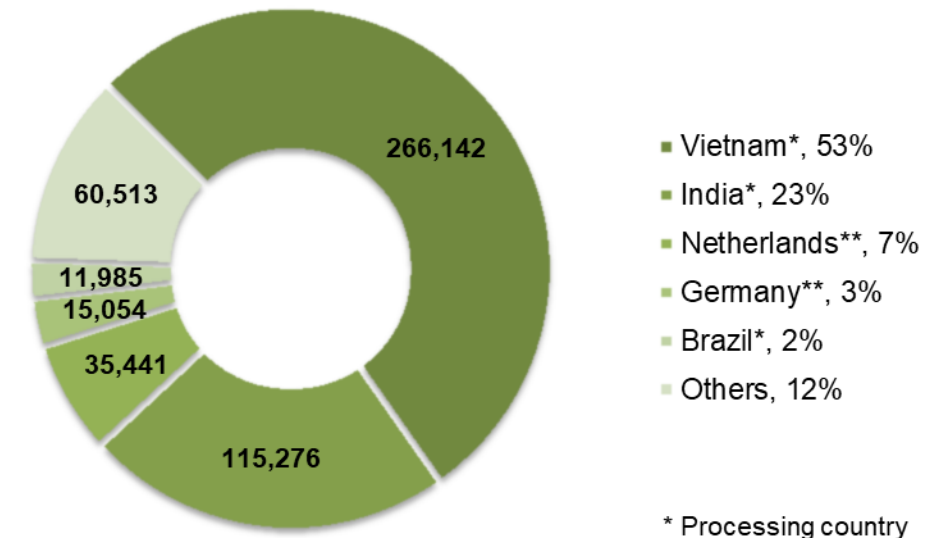


# World Cashew Exports

**WORLD CASHEW EXPORTS**  
Shelled (Metric Tons). Source: UN Comtrade and INC



**2017 WORLD CASHEW EXPORTS**  
Shelled (Metric Tons). Source: UN Comtrade and INC



\* Processing country

# World Cashew Imports

WORLD CASHEW IMPORTS / Shelled (Metric Tons). Source: UN Comtrade and INC

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Growth 2007-2017
<b>USA</b>	124,665	112,800	124,768	132,458	114,832	111,322	131,419	136,673	146,680	147,367	153,448	28,783
<b>Germany**</b>	23,063	15,598	19,690	22,521	23,694	30,271	27,924	31,006	35,940	47,397	53,950	30,887
<b>Netherlands**</b>	41,003	39,675	41,654	42,985	45,741	41,777	31,160	47,222	55,270	50,347	43,787	2,784
<b>UK</b>	17,470	14,297	15,996	15,523	12,974	14,135	14,035	17,931	21,861	21,935	22,266	4,796
<b>Australia</b>	14,553	14,075	13,759	14,158	14,160	15,695	15,794	16,725	16,940	16,704	15,342	789
<b>Belgium**</b>	4,763	3,477	5,630	4,764	5,037	3,767	6,894	5,375	6,189	9,369	10,809	6,046
<b>France</b>	8,842	10,312	8,471	8,316	9,588	8,498	9,044	10,342	10,642	9,907	10,610	1,768
<b>Japan</b>	5,733	6,180	6,232	7,590	8,018	7,580	8,146	11,523	11,235	8,099	10,231	4,498
<b>Italy</b>	3,572	3,628	4,506	5,765	5,344	5,856	5,269	7,999	7,580	8,690	7,386	3,814
<b>Spain</b>	4,659	3,075	4,996	4,726	5,064	4,764	5,047	4,730	5,574	3,714	6,114	1,455
<b>Russian Fed.</b>	7,882	8,893	5,894	6,351	8,542	10,146	10,060	12,240	3,801	5,226	5,914	-1,968
<b>China</b>	27,414	27,615	40,011	42,504	41,332	51,156	53,291	52,280	50,271	51,720	5,691	-21,723
<b>Poland</b>	846	1,122	1,223	1,245	892	928	1,514	2,990	3,482	3,851	4,555	3,709
<b>India*</b>	2,332	13,082	7,204	9,294	21,997	11,635	6,689	4,275	4,126	4,932	4,432	2,100
<b>Turkey</b>	1,192	1,599	1,333	1,733	1,175	2,794	3,920	2,871	2,297	5,593	3,944	2,752
<b>Israel</b>	1,950	2,454	3,075	2,991	2,579	4,041	2,840	4,493	4,352	4,094	3,756	1,806
<b>Korea Rep</b>	708	765	1,130	859	1,022	1,150	2,676	3,920	3,114	4,167	3,004	2,296
<b>New Zealand</b>	1,976	1,766	1,985	2,187	1,984	2,405	2,651	2,896	3,022	2,820	2,910	934
<b>Malaysia</b>	2,827	2,801	3,442	4,011	1,379	1,675	3,945	3,063	3,289	4,178	2,835	8
<b>Sweden</b>	1,489	1,836	2,359	2,398	1,629	1,375	2,453	2,140	2,156	2,790	2,473	984
<b>Others</b>	75,056	84,138	99,667	110,116	94,692	70,728	92,329	123,018	111,088	117,646	130,952	-11,039
<b>World Total</b>	<b>371,995</b>	<b>369,188</b>	<b>413,025</b>	<b>442,495</b>	<b>421,675</b>	<b>401,698</b>	<b>437,100</b>	<b>503,712</b>	<b>508,907</b>	<b>530,546</b>	<b>504,411</b>	<b>132,416</b>

\*Processing country

\*\*Transit country

# World Cashew Estimated Consumption

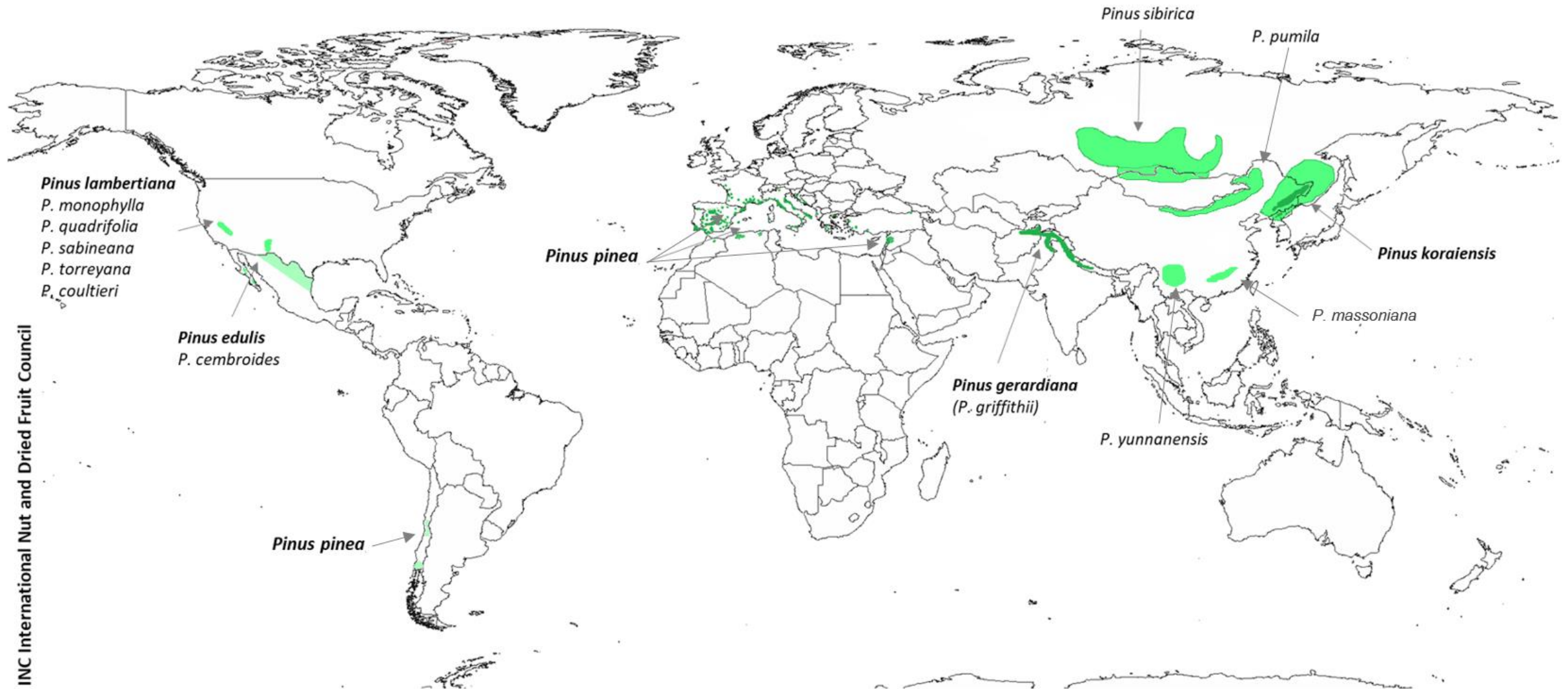
WORLD CASHEW ESTIMATED CONSUMPTION (Kernel Basis). Source: INC															
Country	2013			2014			2015			2016			2017		
	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>
India	230,278	0.182	0.360	224,384	0.177	0.360	257,190	0.203	0.406	301,719	0.228	0.456	253,768	0.189	0.379
USA	130,477	0.422	1.279	128,342	0.402	1.219	141,119	0.439	1.329	143,256	0.445	1.347	150,230	0.463	1.404
Germany	25,591	0.313	1.252	23,016	0.283	1.133	23,810	0.295	1.180	35,930	0.439	1.097	56,955	0.694	1.734
China	51,350	0.038	0.116	52,159	0.038	0.115	49,925	0.036	0.109	50,051	0.035	0.106	47,549	0.033	0.100
UK	9,636	0.155	0.469	16,052	0.251	0.759	19,854	0.307	0.930	16,772	0.255	0.773	19,857	0.300	0.910
Australia	15,763	0.707	1.414	16,572	0.715	1.430	15,893	0.663	1.326	16,471	0.683	1.365	15,084	0.617	1.233
France	8,698	0.138	0.553	10,027	0.151	0.606	10,418	0.162	0.647	8,649	0.134	0.535	12,788	0.197	0.788
Netherlands	23,005	1.385	1.731	20,796	1.240	1.550	23,536	1.391	1.738	17,236	1.015	1.268	10,417	0.612	0.765
Japan	8,146	0.064	0.116	11,523	0.091	0.166	11,235	0.089	0.161	8,040	0.063	0.114	10,245	0.080	0.146
Saudi Arabia	5,310	0.193	0.584	7,977	0.272	0.823	8,541	0.271	0.821	7,854	0.243	0.737	7,716	0.234	0.709
Russian Fed.	10,060	0.071	0.283	12,161	0.086	0.345	3,604	0.025	0.100	5,830	0.040	0.162	6,978	0.049	0.194
Italy	4,744	0.078	0.523	7,000	0.117	0.783	6,745	0.113	0.752	7,060	0.119	0.792	6,522	0.110	0.734
Poland	1,443	0.038	0.151	2,938	0.077	0.308	3,404	0.088	0.353	2,166	0.057	0.227	6,172	0.162	0.647
Spain	4,935	0.107	0.428	4,511	0.096	0.382	5,303	0.115	0.460	3,498	0.075	0.302	5,649	0.122	0.487
Canada	11,958	0.350	0.701	12,156	0.344	0.689	11,812	0.329	0.657	14,267	0.393	0.786	4,514	0.123	0.247
Israel	2,840	0.373	0.745	4,490	0.561	1.121	4,349	0.539	1.079	4,001	0.488	0.977	4,144	0.497	0.995
Turkey	3,895	0.053	0.161	2,860	0.038	0.114	2,294	0.029	0.088	2,371	0.030	0.090	3,978	0.049	0.148
New Zealand	2,651	0.607	1.214	2,884	0.635	1.270	3,006	0.664	1.328	2,811	0.603	1.206	3,003	0.638	1.277
Korea Republic	2,676	0.054	0.164	3,920	0.078	0.236	3,085	0.061	0.186	3,964	0.078	0.237	2,997	0.059	0.179
Sweden	2,213	0.236	0.944	2,090	0.217	0.869	2,080	0.213	0.851	2,739	0.278	1.114	2,888	0.292	1.166
World Total	601,642	0.087		716,682	0.100		724,556	0.099		792,323	0.106		769,468	0.102	

<sup>1</sup> Total consumption expressed in Kg per person. Population data from United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision.

<sup>2</sup> Based on the estimated percentage of population consuming the specific product.



# PINE NUTS – Growing areas



# PINE NUTS - Facts

- Pine nuts are the edible seeds of the pine trees, which are spread across the Northern hemisphere in Asia, Europe, the Near East and North America. Several species of pine trees produce edible nuts.
- They are adapted to a **wide range of weather conditions**: from the cold climate of North East Siberia to the hot dry deserts of Nevada and Mexico. They are long-lived and may reach ages of 100-1,000 years, or even longer.
- Pine nuts are considered as a **gourmet product** and are very appreciated as ingredients for several recipes, e.g. the world-famous “**pesto**” **sauce**. Most of the pine nuts are **marketed shelled**, although a small quantity is marketed in-shell.
- Most of the pine nuts available on the market come from **natural forests**, where no cultivation techniques are applied except for silvicultural practices. Commercial plantations are very scarce.
- Although pine nuts are collected without any expense of plantation forestry, the labor cost is particularly important given that the **collection and processing are very labor intensive**.

# PINE NUTS – Sustainability (Mutke et al., 2018)

- Pine nuts are among the **Non-wood Forest Products (NWFP's)** collected from Mediterranean forest.
- NWFP's are relevant resources for rural economies and play a role in circular bioeconomy as sustainable alternatives to fossil raw materials, e.g. resin from pine cones or cork.
- NWFP's have been regaining recognition as essential resources for livelihood and sustainability of forest use, and as a contribution to rural household economies and food security, to national economies and environmental objectives.
- Overall challenges: fair profitability for all actors in the value chain and raising consumer awareness.
- Challenges for Mediterranean pine nuts: damages by exotic pests (e.g. conifer seed bug), decreased yields due to increasing droughts, persisting black markets and lack of effective implementation of certified and traced quality standards “from forest to fork” (mandatory as per the Regulation (EC)178/2002).

Source: Mutke, S., Bonet, J.A., Calado, N., Calvo, J., Taghouti, I., Redondo, C., Martinez de Arano, I. 2018. Innovation networks on Mediterranean Non Wood Forest Products. 4<sup>th</sup> International Non-Wood Forest Products Symposium. 4-6 October, Burse, Turkey.

- In this context, aiming at innovation and capacity building in production, processing and trade of Mediterranean NWFPs, the thematic network **INCREDIBLE** (Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin) was launched by EFIMED, the Mediterranean Facility of the European Forest Institute, funded by the European Union's Horizon 2020 Research and innovation program.
- The following priority themes were marked for future INCREDIBLE activities:
  1. Processing quality (standards and good practices for each product line).
  2. Mitigation of damages from pest and diseases, as well as ongoing climate change.
  3. Optimized forest and plantation management and tending schemes (good practices).
  4. Improved marketing, labelling, and consumers' awareness rise about health, environment and cultural benefits of wild nut consumption, e.g. by organic food and/or sustainably managed forest product labels.

Source: Mutke, S., Bonet, J.A., Calado, N., Calvo, J., Taghouti, I., Redondo, C., Martinez de Arano, I. 2018. Innovation networks on Mediterranean Non Wood Forest Products. 4<sup>th</sup> International Non-Wood Forest Products Symposium. 4-6 October, Burse, Turkey.

## China Sustainability Programs

- The exploitation of land, forest and water over thousands of years along with the rapid population rise, industrialization and development since the 1950's had seriously degraded China's environment culminating in a **sustainability emergency**.
- China responded to this emergency via an integrated portfolio of 16 sustainability programs, including **afforestation and reforestation programs** (USD 378.5 billion, 623.9 million hectares and 500+ million people since 1998).
- Environmental objectives: to reduce erosion, sedimentation and flooding; **conserve forest**; mitigate desertification and dust storms; and increase agricultural.
- Socio-economic objectives: poverty reduction, rural economic development, and national food security.
- Despite some adverse outcomes, China's integrated portfolio of sustainability programs has achieved considerable overall success.

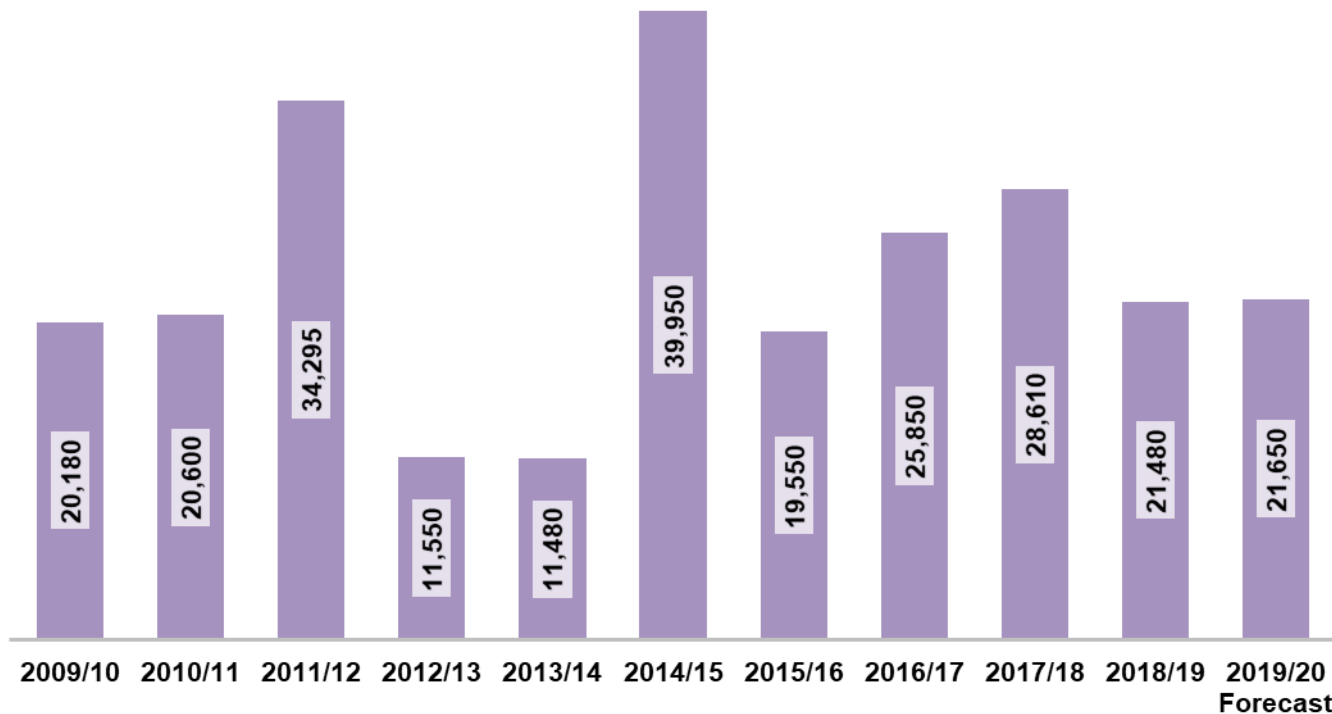
Source: Bryan, B. A., Gao, L., Ye, Y., Sun, X., Connor, J. D., Crossman, N. D., ... Hou, X. 2018. China's response to a national land-system sustainability emergency. Nature, 559(7713): 193–204.



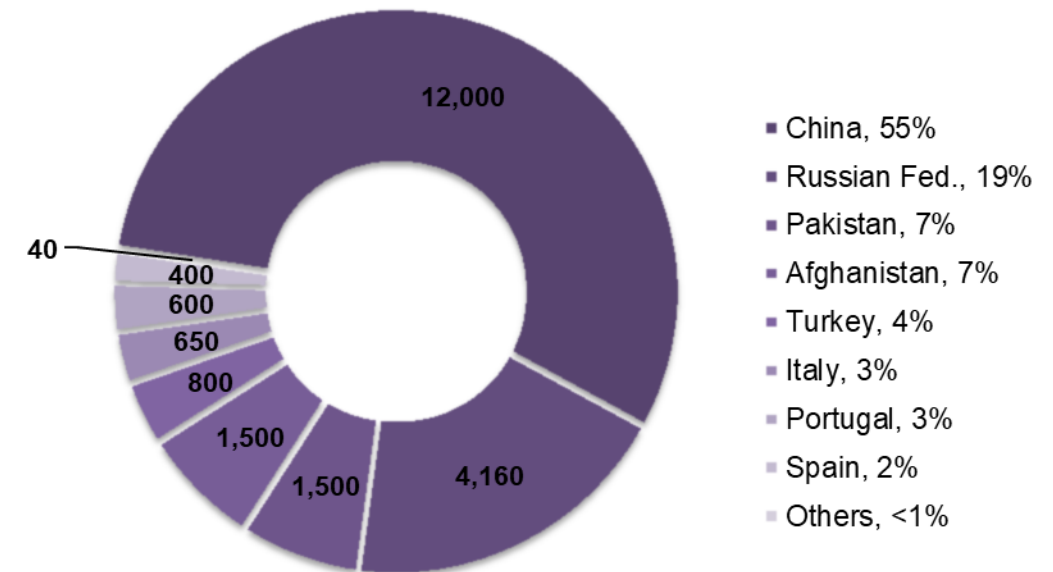
# World Pine Nut Production

Current Pine Nut world demand is higher than supply, which represents an opportunity to growth.

**WORLD PINE NUT PRODUCTION**  
Kernel Basis (Metric Tons). Source: INC

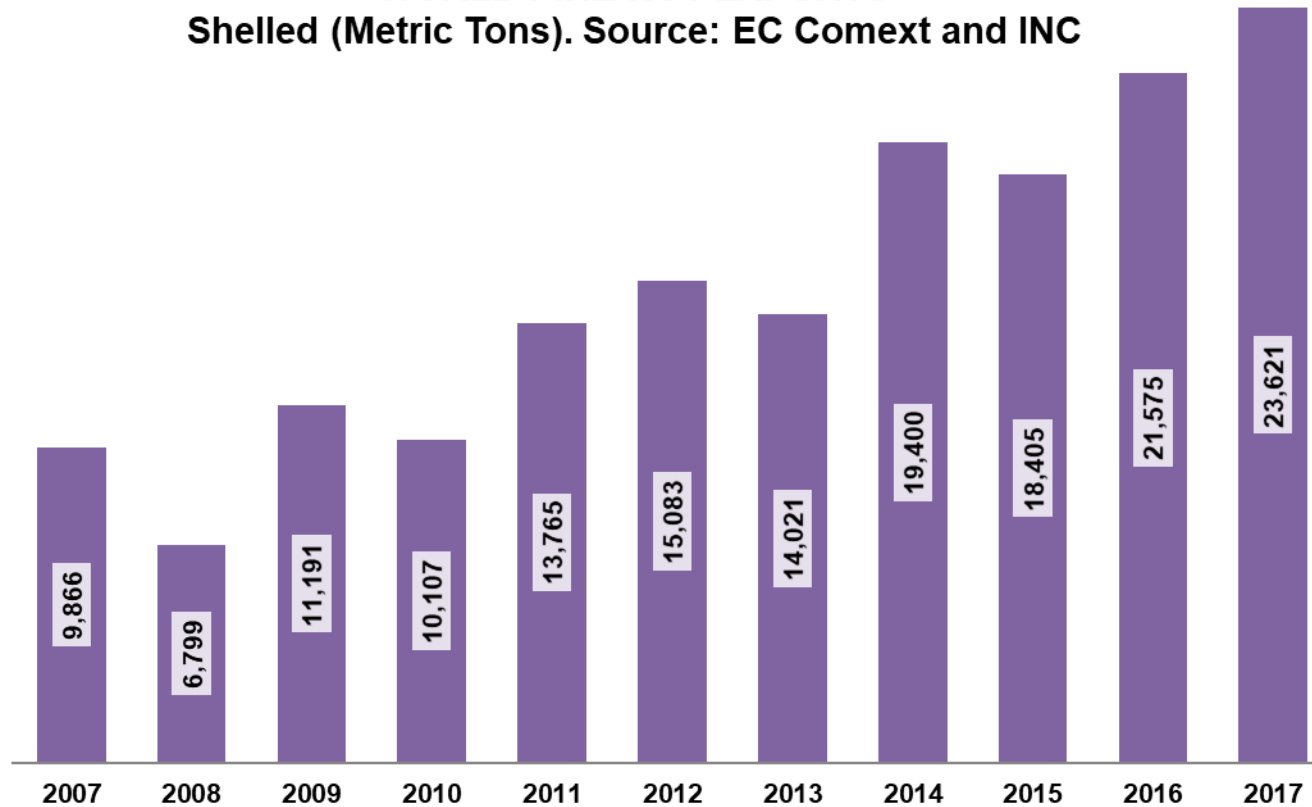


**2019/20 PINE NUT PRODUCTION (forecast)**  
Kernel Basis (Metric Tons). Source: INC

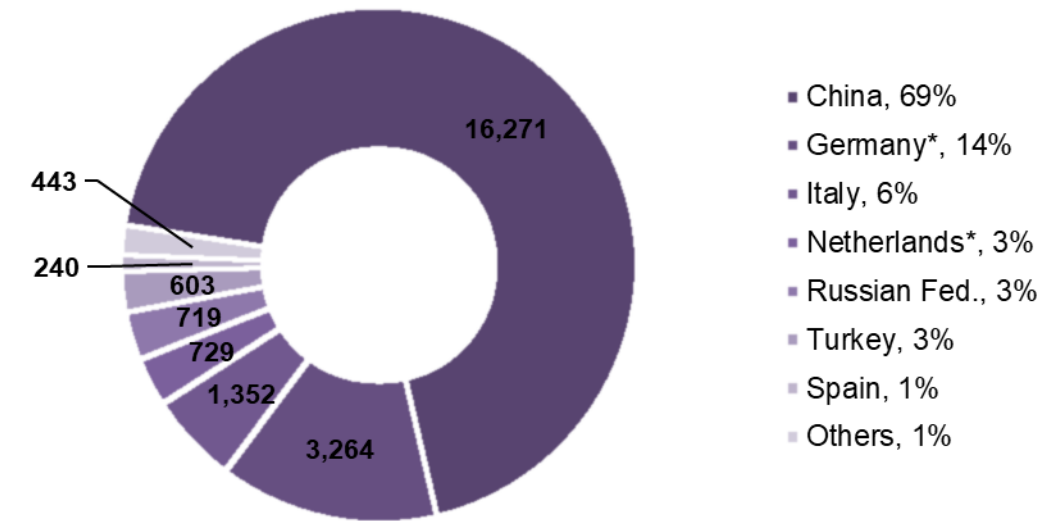


# World Pine Nut Exports

**WORLD PINE NUT EXPORTS**  
Shelled (Metric Tons). Source: EC Comext and INC



**2017 WORLD PINE NUT EXPORTS**  
Shelled (Metric Tons). Source: EC Comext and INC



\* Transit country

# World Pine Nut Imports

WORLD PINE NUT IMPORTS / Shelled (Metric Tons). Source: EC Comext and INC

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Growth 2007-2017
<b>Germany</b>	1,362	654	1,657	1,781	2,361	2,449	2,259	2,365	5,334	5,138	7,365	6,003
<b>USA</b>	2,112	1,496	2,438	2,214	3,010	3,718	3,144	3,350	3,879	3,670	3,619	1,507
<b>Netherlands</b>	945	503	219	1,262	1,316	955	1,933	-	1,563	2,054	2,083	1,138
<b>Italy*</b>	1,471	1,284	1,514	1,308	965	850	1,978	525	1,949	2,170	1,922	451
<b>UK</b>	665	249	527	413	636	471	710	398	448	1,082	1,319	654
<b>France</b>	618	246	325	323	219	246	787	863	914	933	1,202	584
<b>Israel</b>	210	128	302	228	529	384	-	-	359	634	820	610
<b>Australia</b>	271	174	515	427	636	860	-	622	722	902	808	537
<b>Spain</b>	282	114	175	255	200	232	91	85	160	502	675	393
<b>Belgium</b>	64	42	145	55	37	283	295	265	345	304	420	356
<b>China</b>	322	881	918	1,620	2,481	2,279	1,938	6,810	703	237	260	-62
<b>Others</b>	1,544	1,028	2,456	221	1,375	2,356	886	4,117	2,030	3,949	3,129	1,585
<b>World Total</b>	<b>9,866</b>	<b>6,799</b>	<b>11,191</b>	<b>10,107</b>	<b>13,765</b>	<b>15,083</b>	<b>14,021</b>	<b>19,400</b>	<b>18,405</b>	<b>21,575</b>	<b>23,621</b>	<b>13,755</b>

\*Processing for pesto sauce

# World Pine Estimated Consumption

WORLD PINE NUT ESTIMATED CONSUMPTION (Kernel Basis). Source: INC															
Country	2013			2014			2015			2016			2017		
	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>	Cons. (MT)	Cons. per capita (kg/year) <sup>1</sup>	Est. Cons. per capita (kg/year) <sup>2</sup>
<b>China</b>	2,058	0.002	0.005	8,882	0.006	0.020	1,610	0.001	0.004	4,605	0.003	0.010	5,213	0.004	0.011
<b>Germany</b>	2,259	0.028	0.154	2,365	0.029	0.162	5,278	0.065	0.363	2,294	0.028	0.156	4,101	0.050	0.278
<b>USA</b>	3,144	0.010	0.041	3,350	0.011	0.042	3,871	0.012	0.048	3,659	0.011	0.045	3,617	0.011	0.045
<b>Korea DPR</b>	1,159	0.049	0.196	1,329	0.056	0.224	2,318	0.092	0.369	3,868	0.152	0.610	2,031	0.080	0.319
<b>Russian Fed.</b>	1,389	0.010	0.098	2,550	0.018	0.181	3,920	0.027	0.273	3,304	0.023	0.230	1,534	0.011	0.107
<b>Italy</b>	2,153	0.036	0.142	375	0.006	0.025	2,164	0.036	0.145	2,214	0.037	0.149	1,520	0.026	0.103
<b>Netherlands</b>	1,563	0.093	0.373	1,563	0.093	0.373	1,391	0.082	0.329	1,545	0.091	0.364	1,354	0.080	0.318
<b>UK</b>	710	0.011	0.046	398	0.006	0.025	448	0.007	0.028	1,006	0.015	0.061	1,256	0.019	0.076
<b>France</b>	787	0.012	0.062	863	0.013	0.065	912	0.014	0.071	891	0.014	0.069	1,137	0.018	0.088
<b>Israel</b>	361	0.048	0.193	375	0.047	0.188	359	0.045	0.178	634	0.077	0.310	820	0.098	0.393
<b>Australia</b>	610	0.028	0.112	622	0.027	0.107	722	0.030	0.120	902	0.037	0.150	808	0.033	0.132
<b>Spain</b>	1,033	0.023	0.114	1,022	0.022	0.108	416	0.009	0.045	630	0.014	0.068	755	0.016	0.081
<b>Belgium</b>	295	0.027	0.150	265	0.024	0.133	336	0.030	0.165	286	0.025	0.140	410	0.036	0.199
<b>World Total</b>	<b>20,867</b>	<b>0.003</b>		<b>28,095</b>	<b>0.004</b>		<b>28,950</b>	<b>0.004</b>		<b>28,690</b>	<b>0.004</b>		<b>32,223</b>	<b>0.004</b>	

<sup>1</sup> Total consumption expressed in Kg per person. Population data from United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision.

<sup>2</sup> Based on the estimated percentage of population consuming the specific product.

## Production

✓ **Bearing planted area** by producing region

✓ **Non-bearing planted area** by producing region

✓ **New plantings** up to 2030

✓ **Projected production** up to 2030

## Sustainability

✓ **Water management:** drip, sprinkler, flood irrigation, rainfed

✓ **By-products:** Livestock food, composting, biomass, mulching, livestock bedding, substances or material generation

✓ **Renewable energies:** bioenergy, hydropower, geothermal, solar, wind energies

**Objective:** To estimate future production levels of nuts and dried fruits and to analyze trends on sustainability.

# UN Sustainable Development Goals (SDGs)

Food and agriculture can help achieve multiple SDGs<sup>1</sup>



<sup>1</sup>FAO. 2018. Transforming food and agriculture to achieve the SDGs



# Thank you for your attention

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International Nut and Dried Fruit Council  
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