

# Beyond timber production: the international trade of Non-Wood Forest Products

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Multipurpose trees and non-wood forest products, a challenge and opportunity

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# Outlines

1. NWFP: **definition**
2. Trade or production: problem of **data source**
3. Int. **trade overview** for some key NWFP
4. The role of NWFP **international** trade in the **local** economy
5. Mass VS speciality products: case studies.



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## NWFP definition

NWFP are “**products of biological origin other than wood derived from forests, other wooded land and trees outside forests**” - (FAO 1999)

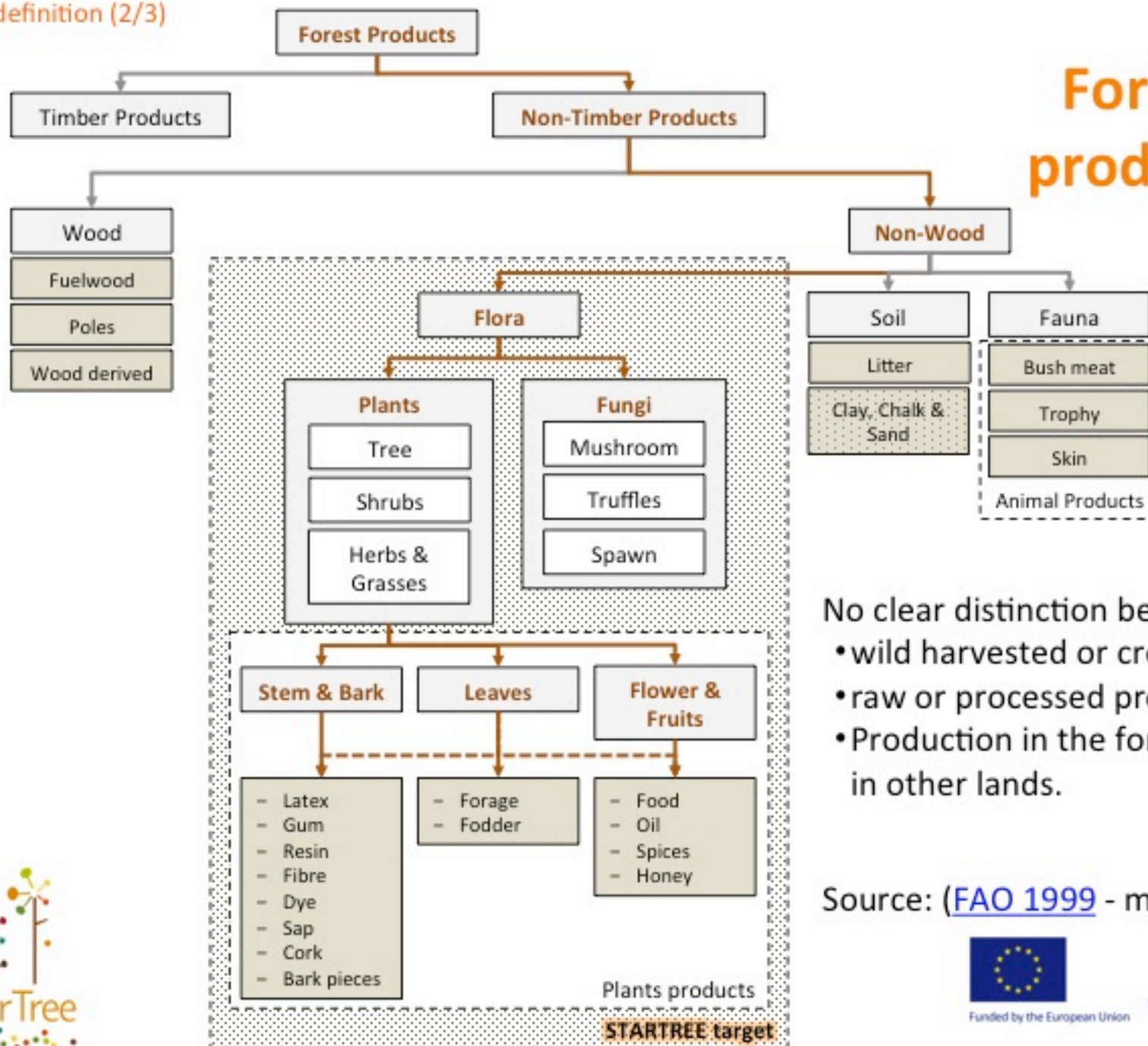
NTFP are “**all biological materials other than timber which are extracted from forest for human use**” - (De Beer and McDermott 1989)





# 1. NWFP definition (2/3)

# Forest products



No clear distinction between:

- wild harvested or cropped;
- raw or processed product;
- Production in the forest or in other lands.

Source: ([FAO 1999](#) - mod)



# NWFP definition

The main problems of NWFP statistics are linked to the interpretation of NWFP definition.

- **Source:**
  - *From forest*
  - *Other wooded land*
  - *Trees outside the forest*
- Type **production:**
  - Wild harvest or Cultivation
- Level of **processing:**
  - Raw or processed NWFP



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## NWFP data source

- Primary (*collect ad-hoc*) or secondary (*formal or reported statistics*) data source
- Scale of data source
  - International (*ComTrade, FAOStat, EuroStat, US Bureau, World Bank, etc.*)
  - National/Regional (*national statistical agency, category associations, etc.*)
  - Local/SME (*public or private accountability*)
  - Case study (ad-hoc data collection)
- Production (supply), consumption (demand), trade





# NWFP classification

- Product/commodity classification system (HS, SITC, CN, FAO, WB etc.)
- Aggregation level of the product information
  - By specie
    - by level of processing (raw, processed, end product)
    - by commercial categories (size, fresh, dry, purity, etc.)
    - by origin (wild, cultivated, forest, agriculture, physical or chemical extract)
  - By commodity refinement
- Functional classification
  - ecological, trade, market behaviours, property right, etc.



## NWFP functional classification

i.e. Global Resource Assessment set up a functional classification by use of the NWFP

Plant products/raw material	Code	Animal products/raw material	Code
- Food	<i>f</i>	- Living animals	<i>la</i>
- Raw material for medicine and aromatic products	<i>a</i>	- Hides, skins and trophies	<i>ap</i>
- Raw material for colorants and dyes	<i>c</i>	- Wild honey and beeswax	<i>hb</i>
- Raw material for utensils, handicrafts and construction	<i>r</i>	- Wild meat	<i>gm</i>
- Ornamental plants	<i>p</i>	- Raw material for medicine	<i>rm</i>
- Exudates	<i>e</i>	- Raw material for colorants	<i>nn</i>
- Other plant products	<i>o</i>	- Other edible animal products	<i>nn</i>
		- Other non-edible animal products	<i>nn</i>

Source: ([FAO 2010](#) – modif.)

# Functional classification used in Star-Tree

Ecological classification

Commercial classification of NWFP

Ecological position	NWFP category	NWFP types	Score	HS Codes
Products of the stem, leaves or tree reproductive system	Stem-based Products (tree in cut)	Christmas tree	2	0604 90*
		Fibre	2	4601 91, 4601 29, 4601 94, 4601 99, 4602 19
		bio-refining	1	3826 00
		Tar	5	3803 00, 3807 00
		Tannins	5	3201 10, 3201 20, 3201 30, 3201 50
	Leaf based products (branches are removed from the stem)	Sorbital and essential	2	2905 43, 2905 44, 2924 60
		Essential oils	12	3301 29, 3301 90
		Phytochemical	5	2939 20, 2939 39
		Pigments	5	3204 17
		Foliage	11	0604 20*, 0604 90*, 0604 91, 0604 99*
	Extracts from tree (or its kept alive)	Sap	1	1302 19*
		Natural gums and resins	2	1302 29, 1302 30, 1301 90, 3806 10
		Essentials	9	3301 30, 3305 10, 3305 20, 3305 30, 3306 10, 3306 20, 3306 30
		Bark and cork	18	4501 10, 4501 90, 4502 00, 4503 10, 45 30, 4504 10, 4504 30
		Tree flowers	2	0910 90, 2001 90*
Tree dependent product	Fruits & flowers	Fruits	15	0810 90, 2001 90*, 20 10, 2007 99
		Essentials	19	0802 11, 0802 12, 0802 21, 0802 22, 0802 31, 0802 32, 0802 41, 0802 40, 0802 42, 0802 50, 0802 51, 0802 52, 0802 90, 2001 90*, 20 10, 2007 99, 2008 19
	Wild fungi	24	0709 31, 0709 39*, 0711 10, 0711 39*, 0712 30, 0713 21, 0713 32, 0713 33, 0713 39, 2003 10, 2003 90, 0709 52, 0713 59	
Forest secondary products	Bark and twig residues collect by animals	Honey and Products	25	0409 10, 21 30
		Berries	14	0810 10, 0810 20, 0810 30, 0810 40, 0810 50, 0811 10, 0811 20, 0811 90, 0812 90, 08 30, 0813 50, 2001 90*, 2007 10, 2007 99, 2008 30, 2008 51, 2008 57, 2008 99, 2009 81, 2009 89, 20 30
	Other forest plants	Live trees/plants	7	0602 10, 0602 20, 0602 30
		Medicinal and aromatic plants	1	0909 50, 0909 61, 0909 62, 0910 20, 0910 41, 0910 59
Animal and animal parts	Mosses & lichens		10	0604 10, 0604 20*, 0604 90*
		Other	14	-
	Wild fish		15	0301 91, 0301 92, 0301 99, 0302 11, 0302 19, 0302 59, 0302 73, 0302 79, 0303 14, 0303 19, 0303 25, 0304 42, 0304 49, 0304 82, 0304 89, 0305 43, 0305 49, 0305 64, 0306 79, 0306 17, 0306 27
		Game meat	20	0208 10, 0208 30, 0210 99
Live animals		4	0106 19, 0106 20, 010790, 0106 14, 0106 31, 0106 39, 0106 41, 0106 49, 0106 90	
	Animal parts	9	0502 10, 0502 90, 0505 10, 0505 90, 0506 10, 0506 90, 0507 10, 0507 90, 0510 00, Chapter 41, Chapter 42, Chapter 43	
Anti egg		2	0511 99	

NWFP type	Category	Commodity group	HS Code	Period of validity
Tannins	Tannins	Tannins	2939 20	2000-2001
			2939 39	2000-2001
			3201 10	2000-2001
			3201 20	2000-2001
			3201 30	2000-2001
			3201 50	2000-2001
			3803 00	2000-2001
			3807 00	2000-2001
			4601 91	2000-2001
			4601 99	2000-2001
Essential oils	Essential oils	Essential oils	3301 29	2000-2001
			3301 90	2000-2001
			2939 20	2000-2001
			2939 39	2000-2001
			3204 17	2000-2001
			0604 20*	2000-2001
			0604 90*	2000-2001
			0604 91	2000-2001
			0604 99*	2000-2001
			1302 19*	2000-2001
Foliage	Foliage, branches and other parts of plants	Foliage	0604 20*	2000-2001
			0604 90*	2000-2001
			0604 91	2000-2001
			0604 99*	2000-2001
			3301 29	2000-2001
			3301 90	2000-2001
			2939 20	2000-2001
			2939 39	2000-2001
			3204 17	2000-2001
			1302 19*	2000-2001
Bark and cork	Bark and cork	Bark and cork	4501 10	2000-2001
			4501 90	2000-2001
			4502 00	2000-2001
			4503 10	2000-2001
			45 30	2000-2001
			4504 10	2000-2001
			4504 30	2000-2001
			4504 90	2000-2001
			0910 90	2000-2001
			2001 90*	2000-2001
Fruits & flowers	Fruits & flowers	Fruits	0810 90	2000-2001
			2001 90*	2000-2001
			20 10	2000-2001
			2007 99	2000-2001
			0802 11	2000-2001
			0802 12	2000-2001
			0802 21	2000-2001
			0802 22	2000-2001
			0802 31	2000-2001
			0802 32	2000-2001
Wild fungi	Wild fungi	Wild fungi	0709 31	2000-2001
			0709 39*	2000-2001
			0711 10	2000-2001
			0711 39*	2000-2001
			0712 30	2000-2001
			0713 21	2000-2001
			0713 32	2000-2001
			0713 33	2000-2001
			0713 39	2000-2001
			2003 10	2000-2001
2003 90	2000-2001			
Honey and Products	Honey and Products	Honey and Products	0409 10	2000-2001
			21 30	2000-2001
			0810 10	2000-2001
			0810 20	2000-2001
			0810 30	2000-2001
			0810 40	2000-2001
			0810 50	2000-2001
			0811 10	2000-2001
			0811 20	2000-2001
			0811 90	2000-2001
Berries	Berries	Berries	0812 90	2000-2001
			08 30	2000-2001
			0813 50	2000-2001
			2001 90*	2000-2001
			2007 10	2000-2001
			2007 99	2000-2001
			2008 30	2000-2001
			2008 51	2000-2001
			2008 57	2000-2001
			2008 99	2000-2001
Live trees/plants	Live trees/plants	Live trees/plants	0602 10	2000-2001
			0602 20	2000-2001
			0602 30	2000-2001
			0909 50	2000-2001
			0909 61	2000-2001
			0909 62	2000-2001
			0910 20	2000-2001
			0910 41	2000-2001
			0910 59	2000-2001
			0213 90	2000-2001
Mosses & lichens	Mosses & lichens	Mosses & lichens	0604 10	2000-2001
			0604 20*	2000-2001
			0604 90*	2000-2001
			0301 91	2000-2001
			0301 92	2000-2001
			0301 99	2000-2001
			0302 11	2000-2001
			0302 19	2000-2001
			0302 59	2000-2001
			0302 73	2000-2001
0302 79	2000-2001			
Game meat	Game meat	Game meat	0208 10	2000-2001
			0208 30	2000-2001
			0210 99	2000-2001
			0106 19	2000-2001
			0106 20	2000-2001
			010790	2000-2001
			0106 14	2000-2001
			0106 31	2000-2001
			0106 39	2000-2001
			0106 41	2000-2001
0106 49	2000-2001			
Live animals	Live animals	Live animals	0502 10	2000-2001
			0502 90	2000-2001
			0505 10	2000-2001
			0505 90	2000-2001
			0506 10	2000-2001
			0506 90	2000-2001
			0507 10	2000-2001
			0507 90	2000-2001
			0510 00	2000-2001
			Chapter 41, Chapter 42, Chapter 43	2000-2001
Anti egg	Anti egg	Anti egg	0511 99	2000-2001

Source: WCO (2014), ComTrade (2013), mod.

Source: WCO (2014) mod.



## Data quality

- **Production** data on NWFP are not usually collected by national statistical agencies (i.e. FAO-FRA)
- **Trade** data are registered daily among WTO countries because every state can apply a tax for the traded commodities (i.e. WCO)
- **Consumption** data are scarce and usually collected for specific reason (i.e. EFSA)



## Data quality on NWFP: where to look?

- NWFP production in Europe (few updates every decade):
  - 1.10 B € in 1995 (UNECE-FAO 2000)
  - 2.76 B € in 2007 (Forest Europe, UNECE, FAO 2011)
  - 4.53 B € in 2005 (FAO-FRA 2010) (re-estimation)
- Trade data are reported annually in formal report at international or country level; problem of commodity classification stiffness and double counting
- NWFP consumption is rarely reported by the national statistical agency; some information can be found by sector report or scientific paper





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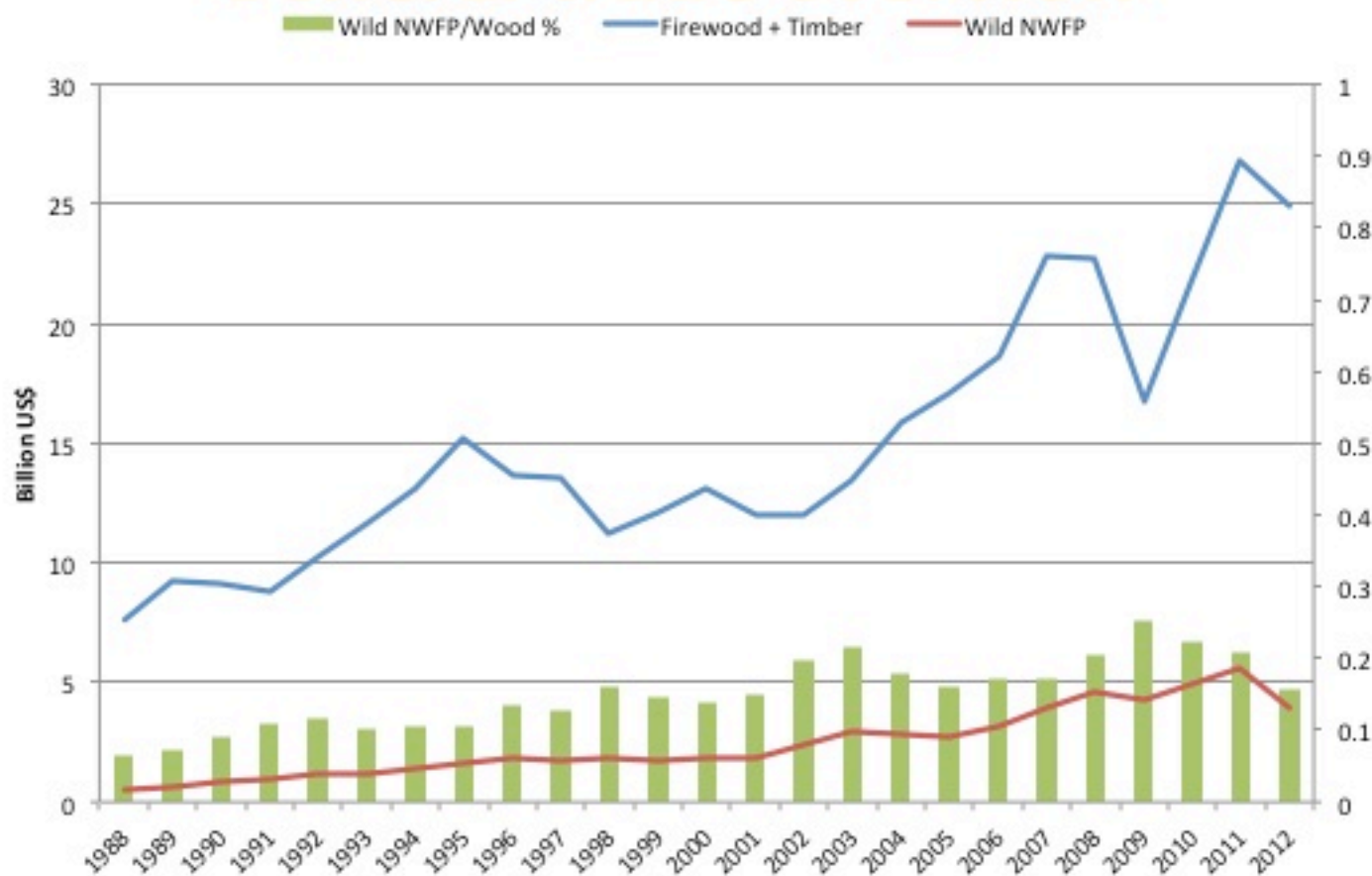


# Global trade overview for selected NWFP



# Wood Vs NWFP

## General trade overview



Wood codes: 4401, 4403

NWFP: only raw material collected in EU forest

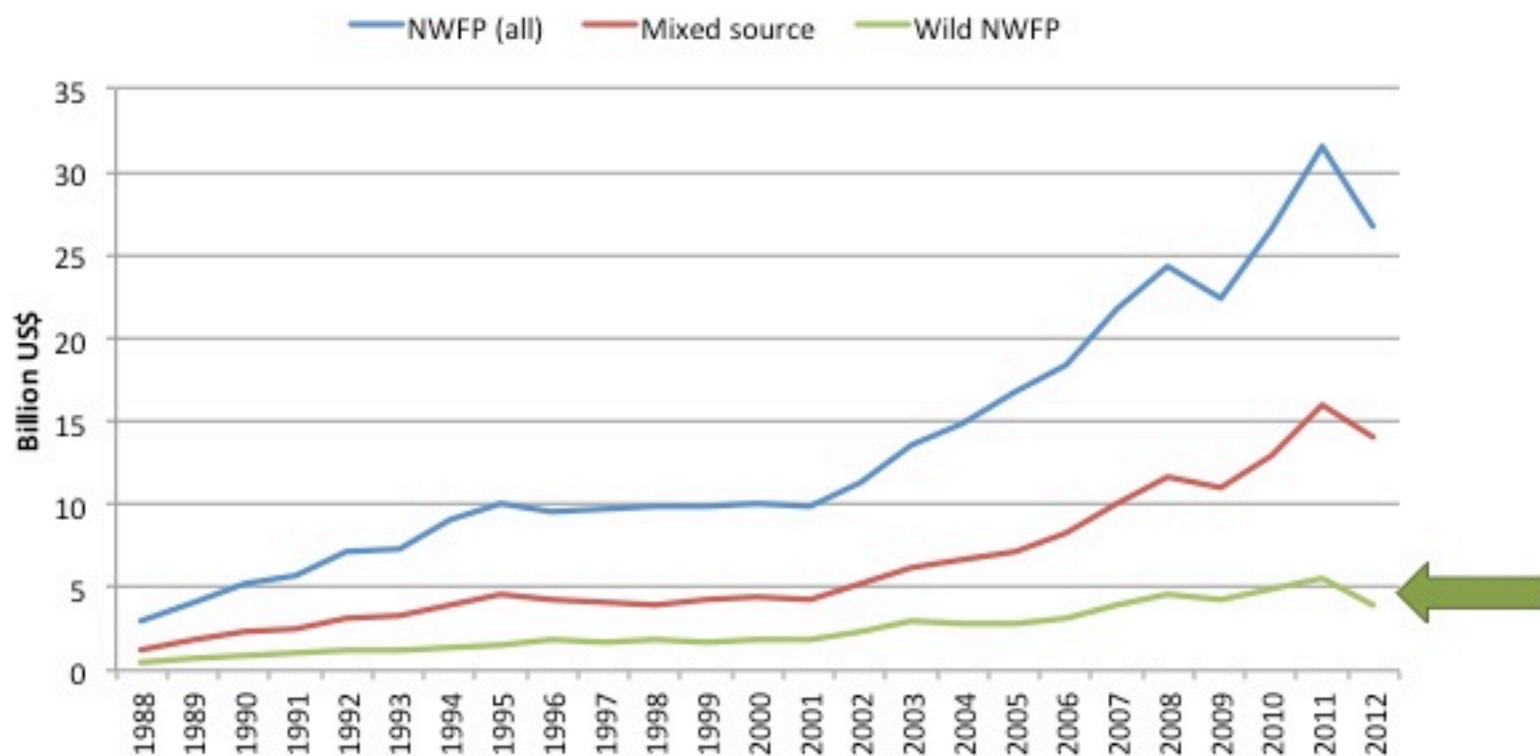
Multipurpose trees and non-wood forest products, a challenge and opportunity [www.star-tree.eu](http://www.star-tree.eu)



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# Strategic role of NWFP definition



Different definitions, different outputs!





# A focus to two Finn's NWFP



## Mushrooms



## Berries

NWFP type	Category	Commodity group	HS Code	
Wild mushrooms and truffles	Fresh or chilled	Mushroom of genus Agaricus	070951	
		Truffles	070952	
		Other mushrooms both wild & cultivated (and truffle from 2007)	070959	
	Provisionally preserved	Mushroom of genus Agaricus	071151	
		Other mushrooms	071159	
	Dried	Mushrooms	071230	
		Mushrooms of genus Agaricus	071231	
		Mushrooms of genus Auricularia	071232	
		Mushrooms of genus Tremella	071233	
		Mushrooms of other species	071239	
	Prepared or preserved	Mushroom of genus Agaricus	200310	
		Truffles	200320	
	Berries	Fresh Berries	Other mushrooms both wild & cultivated (and truffle from 2012)	200398
			Strawberries	081010
Raspberry, blackberry, mulberry and loganberry			081020	
Black, white or red currants and gooseberries			081030	
Cranberries, bilberries, similar fruits			081040	
Frozen Berries		Other fruits	081090	
		Strawberries, (uncooked steamed or boiled)	081110	
		Raspberries, mulberries, etc. (uncooked, steam, boil)	081120	
		Fruits and nuts (uncooked, steamed, boiled)	081190	
Provisionally preserved berries		Strawberries provisionally preserved	081220	
		Fruits and nuts, provisionally preserved	081290	
Dried berries		Fruits	081340	
		Mixtures of edible nuts, dried and preserved fruits	081350	
Berry jam		Entire and crushed	090950	
	Not crushed	090961		
	Crushed	090962		
Berry prepared or preserved	Homogenised jams, jellies, etc.	200710		
	Jams, fruit jellies, purees and pastes, except citrus	200799		
	Strawberries	200880		
Berry juice	Mixtures of edible parts of plants	200891		
	Cranberries (Vaccinium macrocarpon, V. oxycoccos, V. vitis-idaea)	200893		
	Mixtures	200897		
Berry juice	Other	200899		
	Single fruit juice (not fermented or in spirit)	200980		
	Cranberries (Vaccinium macrocarpon, V. oxycoccos, V. vitis-idaea)	200981		
	Other fruits juice	200989		
		Mixtures of juices	200990	

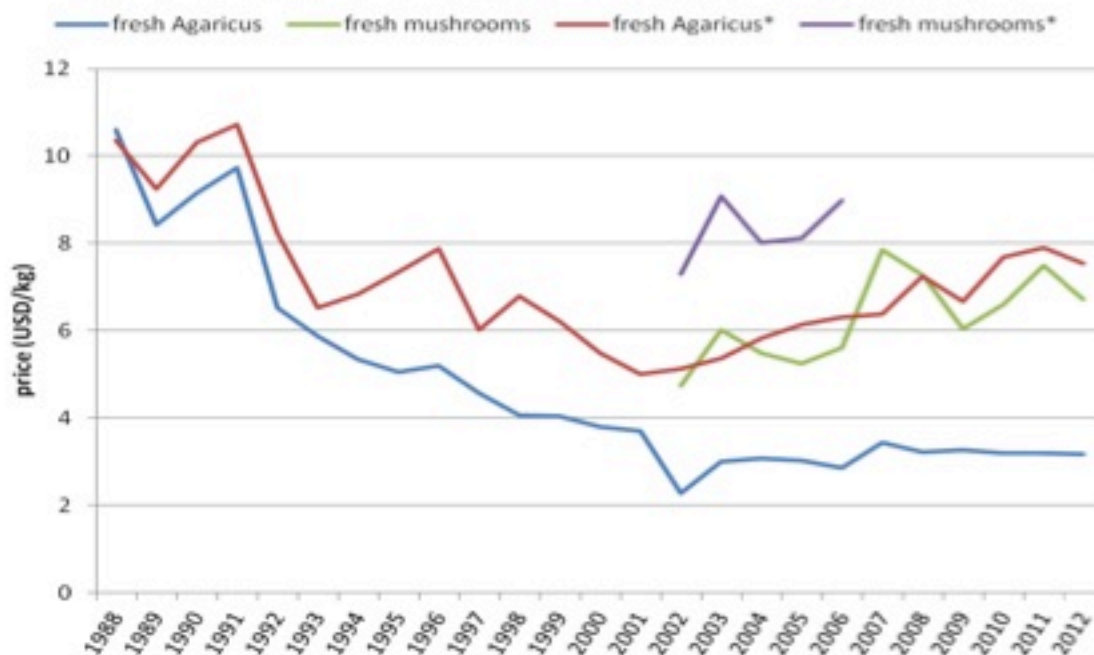
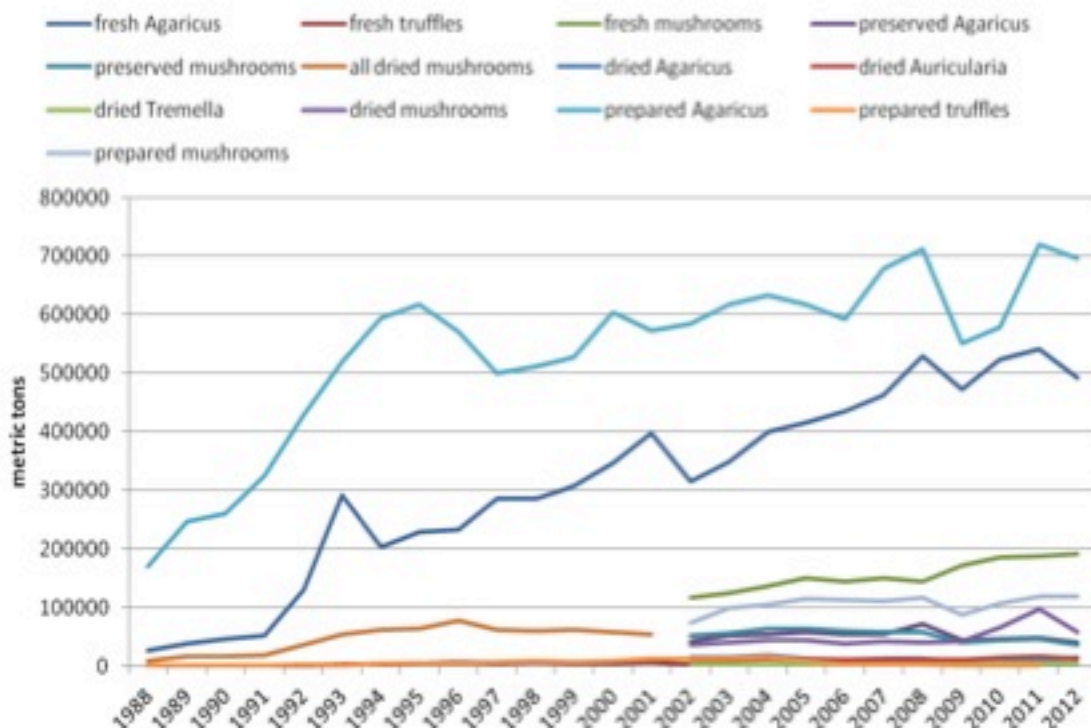


## Wild mushroom: sector overview

Domesticated mushrooms are the predominant part of the market in terms of bulk

Wild mushrooms cover the 26.4% of the total traded volume that worthies the 45.6% of the total value (4.98 B US\$ in 2011)

Boletes prices are approximately 6.15 €/kg at wholesaler level and chantarelles has been stabilized globally close to 5€/kg

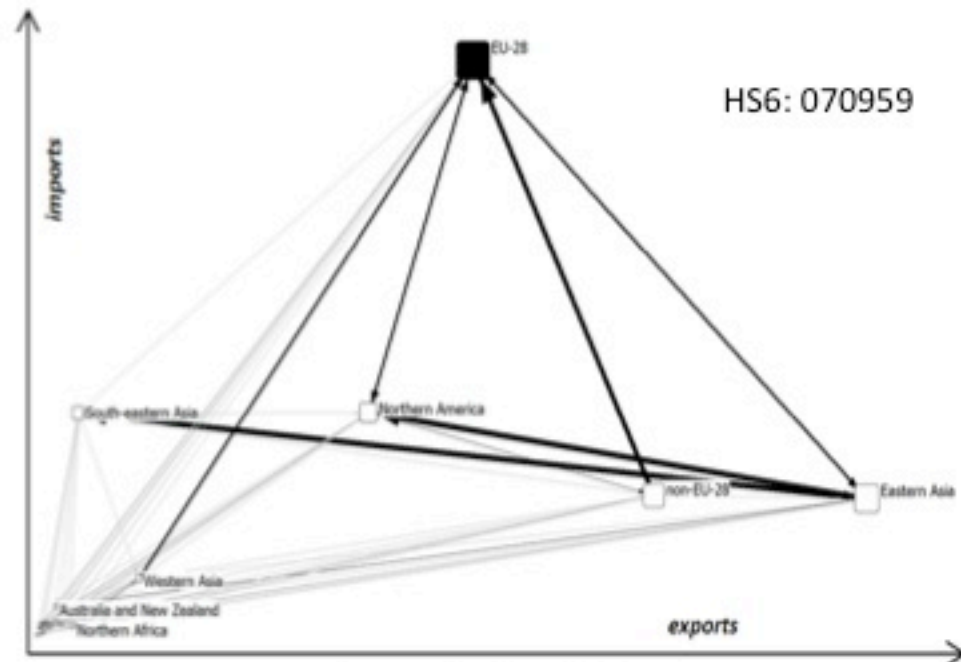


## Wild fresh mushroom: market structure

China is undoubtedly the largest fresh wild mushrooms exporter in the world, both in terms of quantity and economic value; alone, it accounted for the 21.2% of the export value in 2012

Poland and Nederland are the two main gate to EU market

Core global consumers are Japan, Germany, France, Italy and UK



HS6: 070959

Exports (million USD)

2005		2010		2012	
China	139,1	China	145,1	China	163,7
Netherlands	48,0	Netherlands	77,5	Poland	93,8
Poland	44,5	Poland	75,5	Netherlands	69,4
Romania	25,0	Italy	49,6	Italy	54,4
Russian Fed.	24,3	R. of Korea	44,7	R. of Korea	37,9

Imports (million USD)

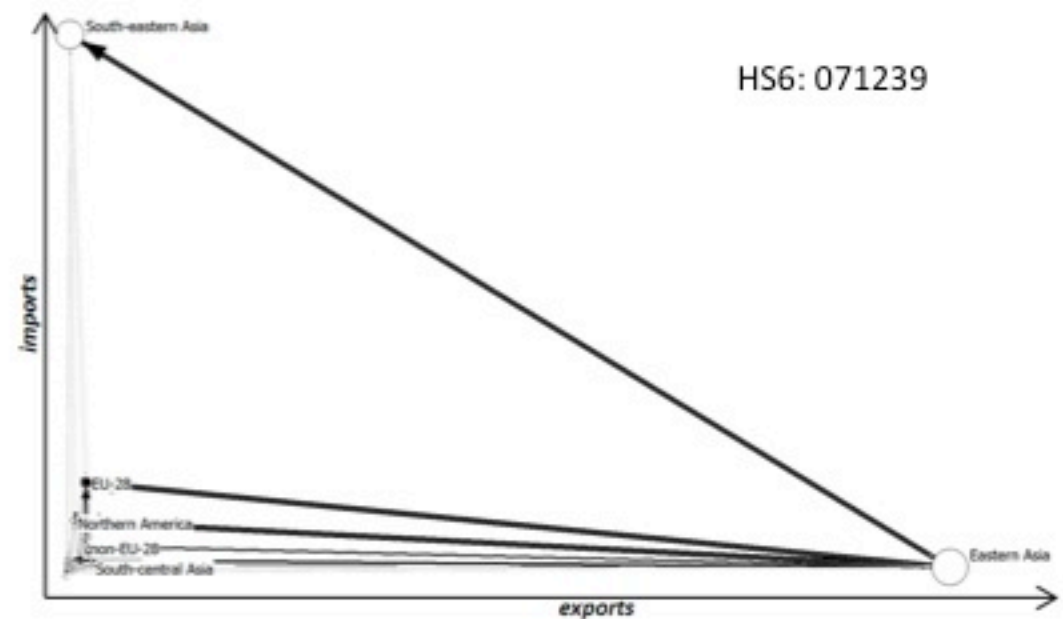
2005		2010		2012	
Japan	152,9	Japan	99,1	Germany	100,1
Germany	75,4	Germany	95,4	Japan	97,8
Italy	61,8	France	83,8	France	90,9
France	51,7	Italy	61,2	Italy	51,9
UK	34,5	UK	58,7	USA	51,1



## Wild dry mushroom: market structure

China holds also a monopolistic role in wild mushroom supply!  
China reached a peak in 2011 with the 85.1% of total value exported in the international market, accounting for 1.18 billion US\$

Despite common thought, South Eastern Asia represents today the reference market due to the high demand of shiitake (*Lentinus Edodes*) or oyster mushroom (*Pleurotus ostreatus*).



Exports (million USD)

2005		2010		2012	
China	231,1	China	751,6	China	585,8
Hong Kong	13,4	Hong Kong	19,4	Hong Kong	27,3
Bulgaria	12,6	Germany	17,3	Pakistan	18,7
Italy	11,8	Italy	15,5	Germany	16,6
Germany	11,5	Chile	11,9	Italy	14,2

Imports (million USD)

2005		2010		2012	
Hong Kong	66,2	Viet Nam	210,2	Hong Kong	120,0
Japan	63,5	Hong Kong	129,7	Viet Nam	117,6
Italy	53,9	Japan	103,3	Thailand	77,6
France	28,7	Thailand	65,7	Japan	76,8
Thailand	19,2	Malaysia	54,3	Malaysia	76,5

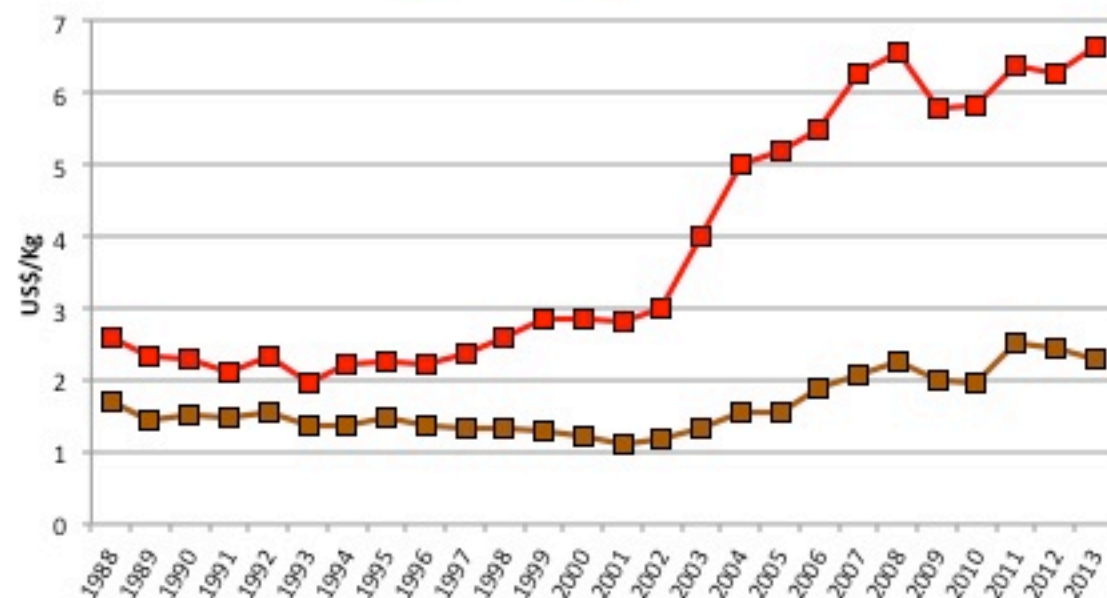
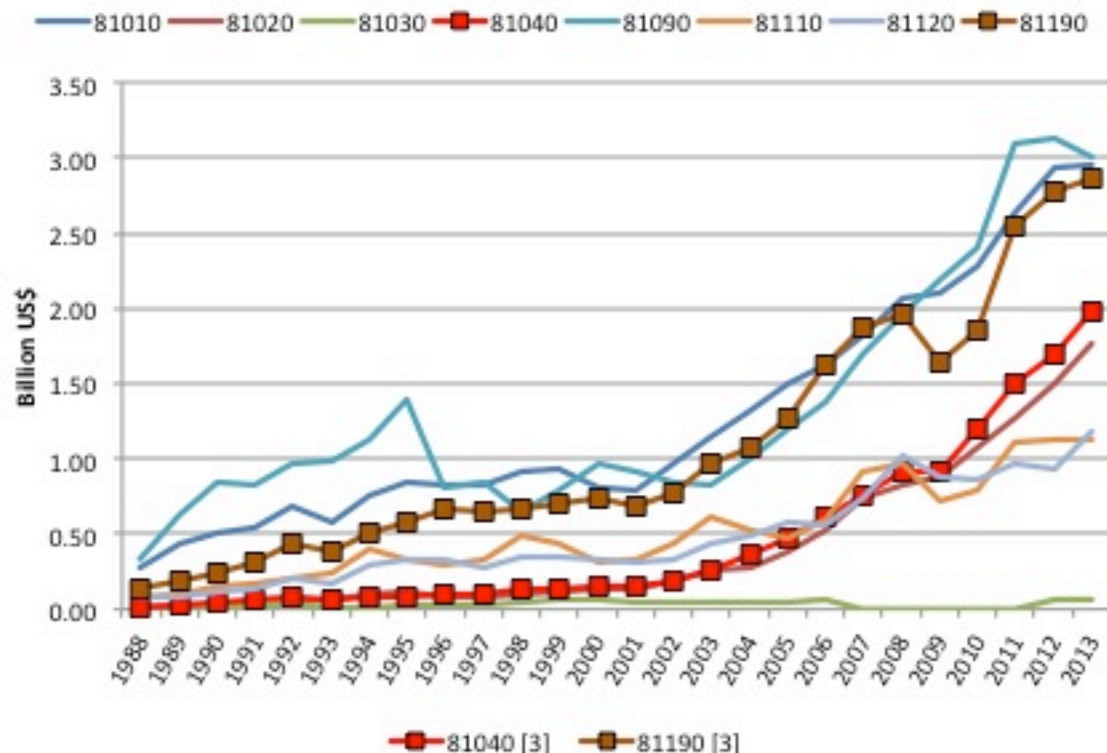


## Wild berries: sector overview

The demand of forest berries is evidently increased in the last 10 year.

Vaccinium species are a consistent part in the berries sector, traded fresh (081040) or frozen (081190).

The recent innovation on production system, allowed to move part of the production out to the forest.



## Wild berries: fresh and frozen

Despite the high increment on the demand, the importers and exporters hold a stable position, with some little change over time.

The organization of the entire supply chain could contribute to a higher stability

Export **fresh** vaccinium (million US\$)

2005		2010		2011		2012	
Chile	117.8	Chile	363.4	Chile	475.6	Chile	468.0
USA	89.4	USA	241.1	USA	302.6	USA	321.0
Canada	87.8	Argentina	130.7	Argentina	143.8	Canada	189.4
Argentina	31.1	Canada	115.0	Canada	141.9	Argentina	156.6
Spain	22.7	Spain	74.6	Spain	107.8	Spain	133.1

Import **fresh** vaccinium (million US\$)

2005		2010		2011		2012	
USA	191.3	USA	429.8	USA	531.5	USA	570.4
Canada	71.1	Canada	268.3	Canada	336.2	Canada	341.9
UK	63.4	UK	149.3	UK	180.7	UK	202.1
Japan	21.2	Germany	53.0	Netherlands	79.9	Netherlands	96.8
Netherlands	18.3	Netherlands	52.9	Germany	70.3	Germany	88.6

Export **frozen** vaccinium (million US\$)

2005		2010		2011		2012	
Canada	191.9	Canada	218.2	Canada	321.5	Canada	377.2
Poland	120.3	Poland	157.8	Poland	197.6	Poland	287.3
USA	78.3	USA	133.4	USA	167.2	USA	199.6
China	68.9	China	110.9	Netherlands	156.9	Netherlands	156.7
Netherlands	57.2	Netherlands	92.1	Chile	137.1	Chile	145.0

Import **frozen** vaccinium (million US\$)

2005		2010		2011		2012	
Germany	238.2	Germany	283.4	Germany	368.4	USA	451.7
USA	177.2	USA	243.5	USA	341.2	Germany	367.1
Japan	112.4	France	149.9	Netherlands	193.6	France	199.7
France	97.5	Netherlands	139.2	France	188.2	Netherlands	191.9
Netherlands	90.9	Japan	98.5	Japan	129.5	Canada	169.2



## “Wild” berries? A slow and constant moment from forest to other land. Domestication

Wild harvest has high risk on production in terms of quantity.

The industry continuously asks designed quantity and cheaper products, which the traditional forest harvesting is not able to maintain.

Wild production hardly competes with the cultivation.



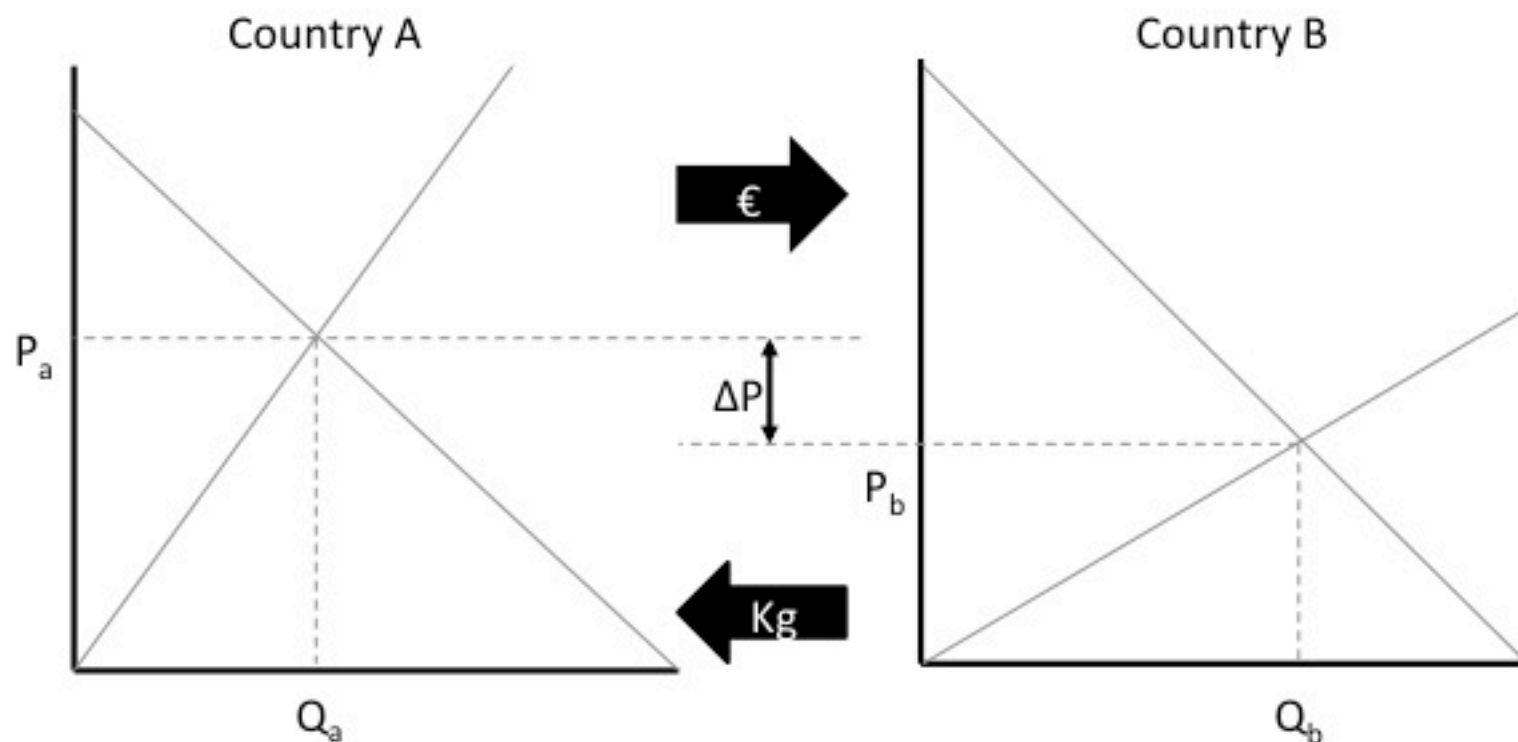
Vaccinium oxycoccos & V. microcarpum production in US

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# The engine of international trade is the price differences





## Quantity or Quality policy?

- Quantity and quality cannot coexist easily, though a good mixture might be the optimal strategy:
  - Quantity production policy requests large surfaces and few large actors with a deep knowledge of the market (target: lowest price possible)
  - Quality production policy request a well planned marketing strategy plan based on the product differences (conventional vs special products) and customer's culture & awareness





# Quantity or Quality policy?



Product for Mass Market (FIN-IT)



Product for Niche Market (IT-IT)

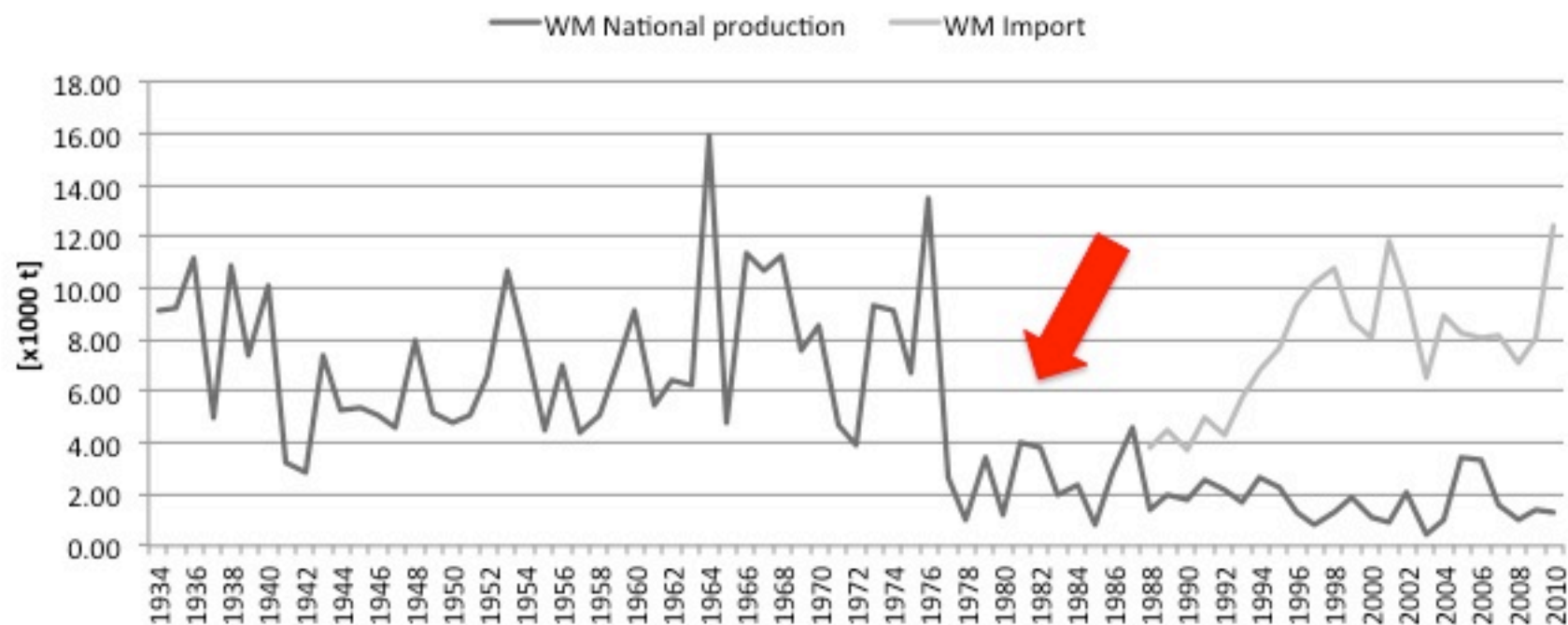
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# Wild mushroom Supply Chain

## a case of transboundary effect of laws



Reduction of trade boundaries in the early '80s

Source: ISTAT (2012), EuroSTAT (2012) modif.



Multipurpose trees and non-wood forest products, a challenge and opportunity [www.star-tree.eu](http://www.star-tree.eu)

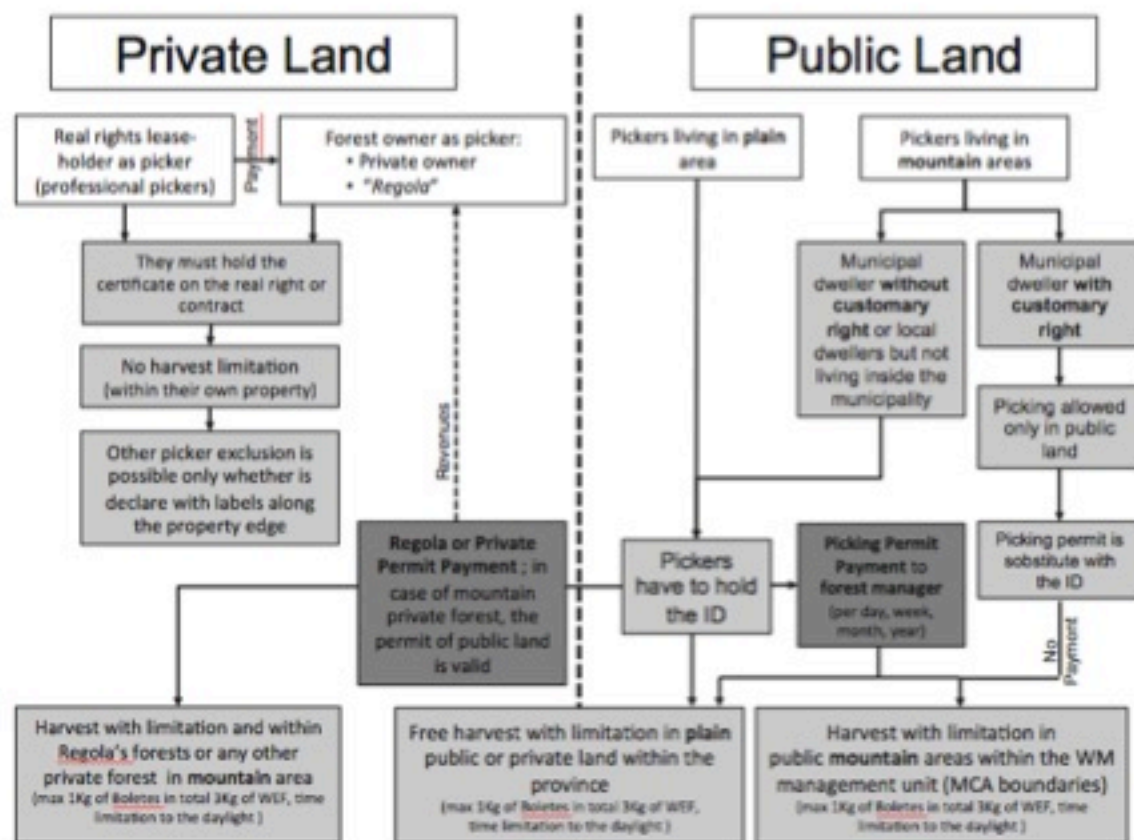


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# Wild mushroom Supply Chain



...more over the implementation of a complex legislative system allowed to transfer property rights of wild mushroom ownerships to the forest owner

The consequences was the introduction of payment scheme for recreational wild mushroom picking

The effect with the internal supply was quite dramatic.





# Wild mushroom Supply Chain



Product for Mass Market (FIN-IT)  
pickers price 1<sup>st</sup> cl. 3-6€/Kg  
retail price 1<sup>st</sup> & 2<sup>nd</sup> cl. 11-20€/Kg

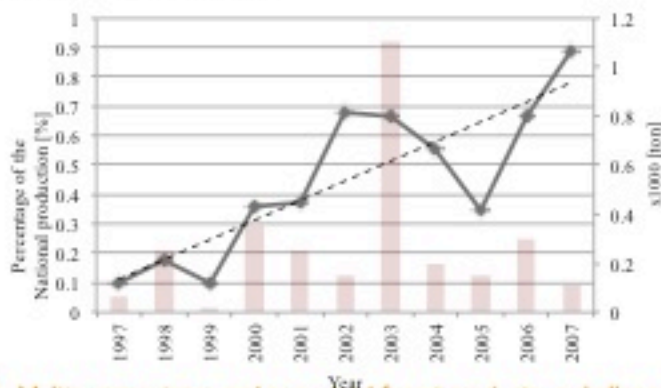


Product for Niche Market (IT-IT)  
picker price 1<sup>st</sup> cl. 5-23 €/kg  
L retail price 1<sup>st</sup> & 2<sup>nd</sup> cl. 9-28 €/kg  
C retail price 1<sup>st</sup> & 2<sup>nd</sup> cl. 20-45 €/kg

# Wild mushroom Supply Chain



- Large collecting area
- Seasonal employment and thousand pickers
- Fair fiscal system
- Vertical integration approach
- Large quantities of products with low marginal utility



- Small collecting area (330 Km<sup>2</sup>)
- Seasonal, permanent employment
- Thousands pickers paying harvesting permits
- Complex legislation and fiscal system
- Horizontal integration approach
- Small quantities of products with low-medium marginal utility

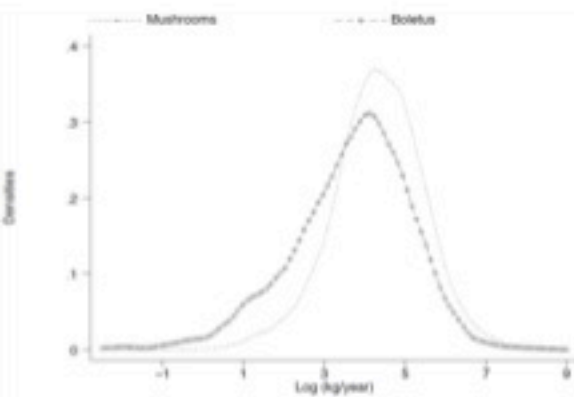




# Wild mushroom Supply Chain



- Source of income complementary in rural area
- Needs of investment in market intelligence and innovation to be competitive in the international market
- High business risks due to seasonal condition but short financial cycle



Occupation	%
Service	19.98
Industry	20.73
Agriculture	4.23
Retired	33.30
Unemployed	10.78
Other	10.98



- Source of employment in rural area
- Constant need of touristic flux and investments in marketing
- The income is generated by
  - Permit selling (0.3-0.4 M€)
  - Tourism in loco (>1M€)
  - Mushroom shops & events (>1M€)
- Complex network of SME to enhance the economic resilience

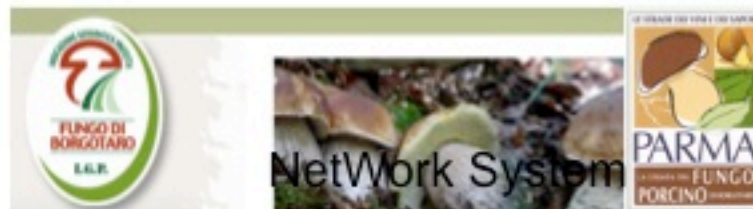
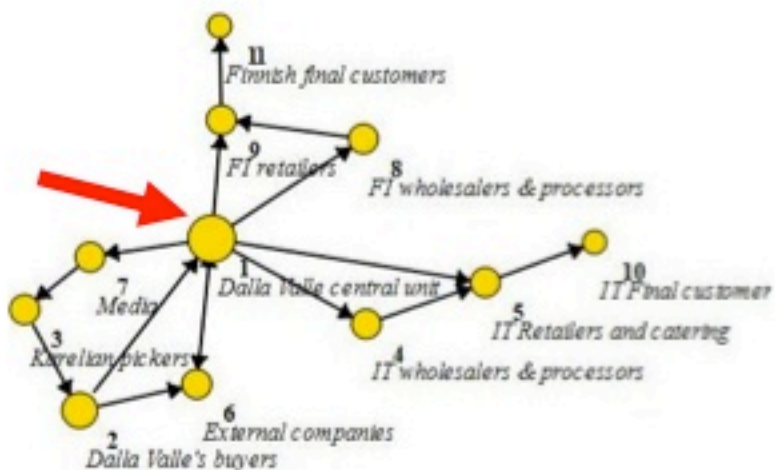


- Strong branding and application of certification schemes

[www.bottegadelfungo.it](http://www.bottegadelfungo.it)

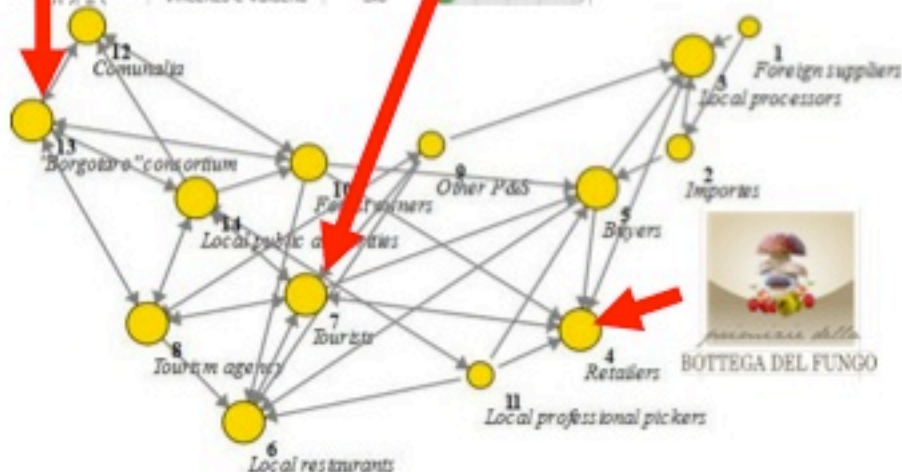
[www.fungodiborgotaro.com](http://www.fungodiborgotaro.com)

# Wild mushroom Supply Chain



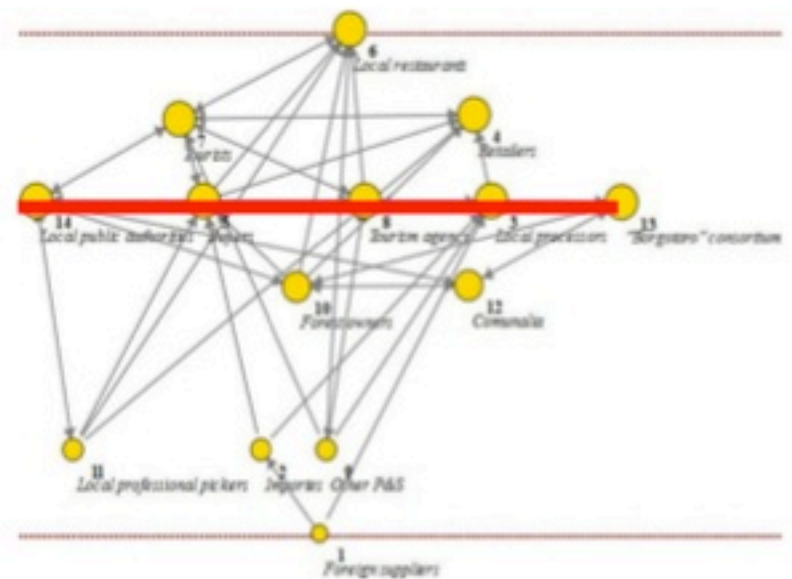
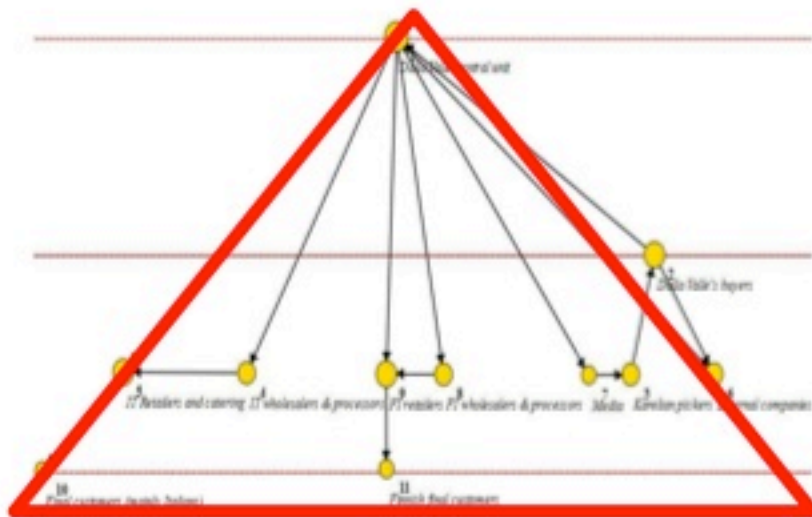
Ultimo aggiornamento: 17-9-2014

COMUNE	ZONA	TESSERINO	CRESCITA
Albareto (I.G.P.) Giovedì riserva chiusa	Comunale di Groppo, Tombeto e Boschetto, zona Monte Gottero	Verde	
Albareto (I.G.P.) Giovedì riserva chiusa	Comunale di Gotra e Buzzò, Consorzio La Rocchetta e Consorzio Monte Scheggia, zona Passo dei Due Santi	Verde	
Borgo Val di Taro (I.G.P.)	Comunale di Basilica, Pontalo (zona di Monte Molinatico)	Blu	
Borgo Val di Taro (I.G.P.)	Comunale di San Vincenzo e Valdena	Blu	





# Wild mushroom Supply Chain



## Final remarks

- The **analysis** of international trade allows to design better target policies to drug or pull even a small sector.
- The asset of NWFP **property rights** plays a fundamental role in the economy (local and global)
- Considering the **scale** of the production, niche products may be use as **image product** for local economy; where the local production lack on the supply there is always the opportunity to buy product from the international market.
- A strong **marketing** strategy should be plan whenever a certain production step from mass to niche products.
- Investment in **production innovation** may be crucial in the short-mid time, both for mass and niche production





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