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**NETWORKS AND PES SCHEMES
AS INCOME-GENERATION TOOLS FOR THE
DEVELOPMENT OF THE ITALIAN FOREST SECTOR**

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List of acronyms

AP	Adventure park
A*WOT	Analytical hierarchy process in SWOT analysis
BC	Biodiversity conservation
CS	Carbon sequestration
ES	Environmental services
ISTAT	National Institute of Statistics
NGO	Non-governmental organization
NWFP	Non-wood forest products
NWFP&S	Non-wood forest products and tourist and recreational services
NWFS	Non-wood forest tourist and recreational services
PES	Payments for environmental services
PGI	Protected Geographical Indication
SME	Small medium enterprise
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEV	Total economic value

Riassunto

Circa un terzo del territorio italiano è coperto da boschi (INFC 2005, Pettenella 2008). Il 40% di tale superficie è di proprietà privata (ISTAT 2008) caratterizzata da un'assai ridotta estensione media per singolo proprietario: circa 7,5 ha (Firusbakht 2008, Pettenella 2008). Anche in conseguenza della struttura della proprietà fondiaria, il ricavo ottenibile dalla vendita del legname ad uso industriale è nel complesso decrescente e ciò riduce la convenienza di una così tradizionale produzione forestale (Ciotti e Pettenella 2005, ISTAT 2008). Gli altri prodotti forestali (quali legna da ardere e prodotti forestali non legnosi¹) contribuiscono in modo estremamente variabile alla formazione del reddito dei proprietari forestali. Recentemente, proprio a causa della necessità di incrementare tali redditi, si è cominciata ad esplorare la commercializzazione di nuovi beni derivanti dalle foreste. Tra questi beni vi sono i servizi turistico-ricreativi (che già stanno cominciando a essere commercializzati con successo dimostrandosi delle buone fonti di reddito) e i servizi ambientali (che sembrano molto promettenti ma la cui commercializzazione è ancora a un livello quasi esclusivamente teorico). La commercializzazione di molti di questi servizi è condizionata dalla presenza di forme di integrazione (orizzontale e verticale) tra diversi soggetti economici, ovvero dalla presenza di network.

In questo lavoro di ricerca un potenziale strumento per la commercializzazione dei servizi ambientali viene proposto e indagato tramite l'analisi di due casi di studio riguardanti due network di piccole e medie imprese. Un caso riguarda il "Parco Avventura Agility Forest", ossia un network incentrato su una piccola impresa che offre un servizio turistico-ricreativo in bosco (il parco avventura appunto); il secondo caso riguarda la "Strada del Fungo di Borgotaro", ossia un network basato su imprese che offrono un prodotto forestale non legnoso e un servizio turistico-ricreativo in bosco (rispettivamente il fungo porcino di Borgotaro e l'attività di raccolta dei funghi). L'obiettivo è quello di verificare se le difficoltà che normalmente sorgono quando si cerca di mettere in atto uno schema di pagamento per servizi ambientali siano superabili tramite l'inserimento in opportune organizzazioni a network. Le due tecniche di analisi *SWOT*² (Analoui e Karami 2003, Stapleton e Thomas 1998) e *A'WOT*³ (Weiss *et al.* 2007) sono state quindi applicate ai due casi di studio dopo

¹ La FAO (1999) definisce i prodotti forestali non legnosi (NWFP) come: "beni di origine biologica diversi dal legno, derivanti da foreste, altri terreni boscati e alberi fuori foresta".

² SWOT: acronimo inglese per *Strengths* (Forza), *Weaknesses* (Debolezza), *Opportunities* (Opportunità) e *Threats* (Minaccia).

³ *Analytical Hierarchy Process* (AHP) applicato all'analisi SWOT.

aver ipotizzato l'inserimento di alcuni servizi ambientali tra i beni già commercializzati da questi due tipi di network. In sostanza si è messo in pratica uno schema di pagamento per servizi ambientali basato su strutture a network. I risultati ottenuti indicano fondamentalmente che il livello delle *Opportunità* aumenterebbe, mentre quello delle *Minacce* e *Debolezze* cambierebbe in modo variabile. Inoltre, si registrano delle reazioni in parte diverse nei due casi di studio. Tali differenze sono dovute ai diversi stadi di evoluzione che caratterizzano i due network considerati. In particolare, in strutture a network più complesse (quale quella della “Strada del Fungo di Borgotaro”), l'incremento del livello delle *Opportunità* è superiore a quello registrato in network meno evoluti (come quello del “Parco Avventura Agility Forest”) mentre il livello dei punti di *Forza* diminuisce. Per quanto riguarda le *Debolezze*, diminuiscono in modo più consistente nel caso meno evoluto. Le *Minacce*, infine, aumentano maggiormente nel caso del network più evoluto.

Si può alla fine concludere che, almeno a livello teorico, lo sviluppo di schemi di pagamento per servizi ambientali basati su network di piccole o medie imprese operanti con beni di origine forestale in senso lato sembra dare risultati positivi. Dovrebbe così essere possibile il miglioramento dei risultati dell'economia forestale tramite la commercializzazione dei servizi ambientali.

Summary

Around one third of Italian territorial extension is covered by forest (INFC 2005, Pettenella 2008). The 40 % is privately owned (ISTAT 2008) with a very limited mean extension, around 7.5 ha (Firusbakht 2008, Pettenella 2008). The income from timber sales is on the whole decreasing thus reducing profitability of such a traditional forest production (Ciotti and Pettenella 2005, ISTAT 2008). Other forest products (such as fuel wood and non-wood forest products⁴) contribute in a highly variable measure to forest owners revenues. Recently, due to the need of increasing the revenues from forests, the commercialization of new forest-based goods is being explored. Among these there are tourist and recreational services (that start to be successfully commercialized and are demonstrating to be good income sources) and environmental services (that look very promising but whose commercialization is still at a very theoretical level).

A suitable tool for the commercialization of environmental services (ES) is proposed and discussed through the analysis of two case studies based on network structures: the “Agility Forest adventure park”, i.e. a SME network based on a NFWS (the adventure park); and the “Road of Borgotaro mushroom”, i.e. a network based on a NWFP and a NWFS (the Borgotaro *Boletus* and the mushroom picking activity). The purpose is to verify if the difficulties that usually arise while implementing payments for environmental services (PES) schemes can be overcome through the insertion in consolidated network structures. SWOT⁵ (Analoui and Karami 2003, Stapleton and Thomas 1998) and A’WOT⁶ (Weiss *et al.* 2007) analysis have been applied after assuming the insertion of some ES among the forest-based goods commercialized by the two network cases. The results of the application of such a SME network-based PES scheme indicate that the level of *Opportunities* would increase while those of *Threats* and *Weaknesses* would variably decrease. Furthermore, partially different reactions emerge between the two case studies due to differences in network evolutionary level characterizing them. In more complex network structures (i.e. the Road of Borgotaro mushroom) *Opportunities* increase is higher than in less evolved networks (i.e. the Agility Forest adventure park) while *Strengths* decrease. For what concerns *Weaknesses*, the level decreases more in the less evolved case. Finally, *Threats* increase more in the case of the more evolved network.

⁴ NWFP: according to FAO (1999) “non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests”.

⁵ SWOT: acronym for Strengths, Weaknesses, Opportunities and Threats.

⁶ A’WOT means Analytical Hierarchy Process (AHP) applied to SWOT analysis.

It can be concluded that, at least on a theoretical level, the development of SME network-based PES scheme seems to have positive results for what concerns the final main purpose of improve forest-based economy through ES commercialization.

Introduction

The starting point of this research work is the concept that PES schemes make possible the internalization of part of the total economic value (TEV) of forests. The main issue than is how to translate into practice PES schemes as a real and effective market mechanism. Evidences prove that starting a PES scheme responding to its original definition is very difficult. Consequently, most of the PES schemes actually going on have been planned as poverty alleviation measures. Moreover, they are based on strong governments' interventions in the management and get relevant funding from taxes, donations from non-governmental organizations (NGO) and other institutions, etc. Because of this, they can not always be considered to be sustainable financial mechanisms and schemes, self-sufficient and destined for lasting in time after funding is finished.

The purpose of this work is to see how PES schemes can be realized as durable income sources for forest owners in developed countries such as Italy.

On the basis of the relevant characteristics of the Italian forest sector, this work tries to propose a strategy to increase the part of the TEV of forests recognized in the market. Succeeding in this would mean to improve the economical situation of forest owners (and consequently that of rural areas in general) through a stable and constant monetary recognition of their land management.

In the first chapter of this thesis the main characteristics of the Italian forest sector are illustrated. It emerges that around one third of Italian territorial extension is covered by forest (INFC 2005, Pettenella 2008). The 60 % of these forests is publicly owned, while the 40 % is privately owned (ISTAT 2000) and the mean extension of private forest ownership is very limited, around 7.5 ha (Firusbakht 2008, Pettenella 2008). Finally, in the last years the income from timber is on the whole decreasing thus reducing profitability of such a traditional forest production (Ciotti and Pettenella 2005, ISTAT 2008). Other forest products (such as fuel wood and non-wood forest products) are actually used and can contribute in a highly variable measure to forest owners revenues. Also tourist and recreational services are being explored and start to be successfully commercialized.

In order to increase the part of TEV by correct market prices, attention is actually directed towards environmental services.

The second chapter is dedicated to the two main theories that this work tries to combine and integrate with the aim of proposing a new market-based tool suitable of relaunching the economy of forest (rural) areas independently from subsidies, etc.

The first theory analysed is that of payments for environmental services schemes. It concerns the commercialization of environmental services in order to compensate land managers for the role they play. Unfortunately this theory faces high difficulties in being put into practice in many Italian local contexts under the present regulative framework. To overcome this difficulty while taking into account the context of Italian forest entrepreneurship characterized by small forest ownerships that translate themselves into small and medium forest-based enterprises, a second theory is proposed. This theory is that indicating network structures as the most efficacious organizations to be developed among small medium enterprises (SME). After an analysis of network's characteristics and of requirements for network establishment, an introduction to the integration of these two theories is proposed. Network structures are thought to be an efficacious framework to succeed in PES schemes implementation.

In Chapter 3 some introductive information on SME networks actually existing in Italy are given. Two case studies of forest-based SME network structures are then presented and analyzed. The first one concerns an Adventure Park, while the second one concerns the Road of Borgotaro mushroom. A final paragraph is then dedicated to the description of the proposed theoretical model for the integration of the two theories of PES schemes and networks.

In Chapter 4 the SME network-based PES scheme is applied both to the general theoretical cases and to the two case studies. The application is made through the definition of the SWOT analysis. Successively an evaluation is carried out through the A'WOT analysis of each discussed case.

Finally conclusions follow, where the results obtained in Chapter 4 are discussed. On that basis it is then possible to affirm that the proposed development of a "SME network based PES scheme" promises to be an useful organization for facilitating the commercialization of environmental services originating from Italian forests. All this should allow a new impulse to Italian forest economy, thus freeing it from some actual difficulties.

1. Present situation of Italian forest area and production

In this chapter the current situation of the forest area and of the forest production in Italy will be presented. It is organized in two paragraphs. In the first one data are provided concerning the extension of forests in Italy and the characteristics of the forest property. The second paragraph presents the available information on Italian forest production and it is subdivided in four parts regarding timber, fuel wood, NWFP and tourist and recreational services.

1.1. Forest area

Since from the '40s, the Italian forest area experienced a gradual and continuous expansion. This process can be brought back to two main causes: the reforestation activity and, probably more important, the spontaneous re-colonization of abandoned farm land (Pettenella 2008).

According to IFNC (2005) the Italian forest area is 8.7 M ha. Including the area of the so-called “other forest lands”, i.e. 1.7 M ha (IFNC 2005), the total extension is 10.4 M ha (table 1.1.1).

Table 1.1.1. Actual Italian forest area

Territorial district	Forest	Other forest lands	Total forest area	Total area
	Area (ha)	Area (ha)	Area (ha)	Area (ha)
Piedmont	870 594	69 522	940 116	2 539 983
Val d'Aosta	98 439	7 489	105 928	326 322
Lombardy	606 045	59 657	665 703	2 386 285
Alto Adige	336 689	35 485	372 174	739 997
Trentino	375 402	32 129	407 531	620 690
Veneto	397 889	48 967	446 856	1 839 122
Friuli V.G.	323 832	33 392	357 224	785 648
Liguria	339 107	36 027	375 134	542 024
Emilia R.	563 163	45 555	608 818	2 212 309
Tuscany	1 015 728	135 811	1 151 539	2 299 018
Umbria	371 574	18 681	390 255	845 604
Marche	291 394	16 682	308 076	969 406
Lazio	543 884	61 974	605 859	1 720 768
Abruzzo	391 492	47 099	438 590	1 079 512
Molise	132 562	16 079	148 641	443 765

Campania	384 395	60 879	445 274	1 936 580
Puglia	145 889	33 151	179 040	1 935 580
Basilicata	263 098	93 329	356 426	999 461
Calabria	468 151	144 871	612 931	1 508 055
Sicily	256 303	81 868	338 171	2 570 282
Sardinia	583 472	629 778	1 213 250	2 408 989
Italy	8 759 200	1 708 333	10 467 533	30 132 845

Source: ISAF-A-MIPAF- CFS (www.sian.it/inventarioforestale)

As it can be seen, these 10.4 M ha are more or less one third of the Italian total area (30.1 M ha).

More specific data concerning the main characteristics of the Italian forests are presented in table 1.1.2.

Table 1.1.2. Characteristics of the Italian forests (year 2004)

Territorial district	Forest						
	Total	of which timber arboriculture	of which under nature protection restriction	of which available for timber harvesting	of which privately owned	Current increment	
	ha	ha	ha	ha	ha	1000 m ³	m ³ /ha
Piedmont	870 594	28 548	107 738	798 410	628 395	3 966	4.6
Val d'Aosta	98 439	0	6 550	65 085	61 482	298	3.0
Lombardy	606 045	26 837	150 240	535 618	401 419	3 143	5.2
Alto Adige	336 689	0	57 897	300 553	237 687	1 856	5.5
Trentino	375 402	0	69 718	265 973	104 770	2 302	6.1
Veneto	397 889	2 090	150 964	362 365	267 590	2 211	5.6
Friuli V.G.	323 832	7 608	73 791	195 630	193 401	1 822	5.6
Liguria	339 107	366	85 715	319 071	292 692	1 576	4.7
Emilia R.	563 263	9 746	116 029	508 484	476 888	2 484	4.4
Tuscany	1 015 728	5 495	228 960	968 009	864 680	4 155	4.1
Umbria	371 574	3 388	79 998	360 589	272 873	814	2.2
Marche	291 394	1 215	91 014	285 820	238 998	790	2.7
Lazio	543 884	1 704	171 265	484 307	275 880	1 548	2.9
Abruzzo	391 492	1 123	207 680	316 440	167 308	1 317	3.4
Molise	132 562	891	48 862	128 142	80 121	422	3.2
Campania	384 395	1 156	236 016	295 594	208 409	1 566	4.1
Puglia	145 889	877	97 824	141 596	93 572	408	2.8
Basilicata	263 098	1 864	78 265	249 675	156 557	739	2.8
Calabria	468 151	2 639	146 638	396 869	270 611	2 524	5.4
Sicily	256 303	1 137	144 759	234 318	127 086	756	3.0
Sardinia	583 472	25 567	145 488	528 628	377 297	1 173	2.0
Italy	8 759 200	122 252	2 495 409	7 741 176	5 797 715	35 872	4.1

Source: Pettenella 2008, modified

Due to problems of sources' quality and to differences in the definition of "forest", it is not possible to precisely compare figures related to previous surveys. Anyway it can be broadly affirmed that national forest area triplicated since from the '20s of the last century (Pettenella 2008).

These figures suggest the huge importance that the forest land use, and consequently the forest management, should have even under a mere "spatial extension" point of view.

The INFC (2005) measures in 81.3 % the forest area suitable for timber production. This production is not only theoretical: the 77.4 % of areas included in "forest" category is served by normal or forest roads within a 500 m distance and in more than 80 % of these areas the roads are placed within a 100 m gradient (Pettenella 2008).

More in detail, among "high forests"⁷ the 41.8 % (3 663 143 ha) is coppice, of which the 28 % is sapped coppice (INFC 2005).

The high forests occupy 3 157 965 ha, corresponding to the 36.1 % of forest area, and contemporary forests slightly prevail on disetaneous ones (INFC 2005).

Analyzing forest area according to their evolutionary level it emerges that the 89.0 % of the whole coppice area is included in the "fully-grown" and in the "aged" stages. Moreover, the 35.1 % of the high forests is in the "aged" and "over-aged" stage (INFC 2005).

These data are symptomatic of a consistent reduction of the active silvicultural interventions in the management of the forest resources (Pettenella 2008).

The following aspects should be taken into consideration when thinking to the economical opportunities of exploiting the forest:

- the 59.4 % of forest area (6.9 M ha) is located in mountain areas, only the 5 % stays in plain areas (INFC 2005)
- the 86.6 % of forest area is subject to some regulations, in most of cases the "*Prescrizioni di Massima e Polizia Forestale*"⁸; the 27.5 % is protected by a naturalistic bond (Pettenella 2008)
- only the 15.7 % of the "forest" category (1.3 M ha) is subject to a detailed management plan (Pettenella 2008).

Beside these "natural forest" areas, there are also 122 252 ha of plantations (including timber arboriculture and fast growing plantations) to be included into the Italian forest area (INFC 2005). This area is concentrated in Lombardy and Veneto regions (Pettenella 2008).

⁷ According to INFC's definition these are forests including trees higher than 5 m.

⁸ Body of laws that regulates the utilization of especially vulnerable areas that are, because of this characteristic, subjected to hydrogeological restriction.

Other special forest formations to be considered are: chestnut woods (788 000 ha) and cork plantations (169 000 ha) (INFC 2005).

On the basis of these figures, it would be expected that such a consistent land use should be very important under an economical point of view.

Characteristics of forest property in Italy

The INFC (2005) only provides some information on the distribution of forest ownership among public and private subjects. Such data are presented in Box 1.1.1.

BOX 1.1.1. Distribution of forest ownership of the macrocategory “Forest”

Source: IFNC 2005

Macrocategory “forest”

- private ownership:	5 797 725 ha	i.e.	66.2 %
- public ownership:	2 931 688 ha	i.e.	33.5 %
- unclassified:	29 798 ha	i.e.	0.3 %

“Private ownership” is divided into:

- individual private ownership:	4 583 893 ha	i.e.	79.06 %
- societies, enterprises, industries:	358 705 ha	i.e.	6.19 %
- other private owners:	258 792 ha	i.e.	4.46 %
- unknown type:	596 325 ha	i.e.	10.29 %

According to the Census of the Agriculture 2000 carried out by the National Institute of Statistics (ISTAT), the 60 % of Italian forests is privately owned, while the 40 % is publicly owned⁹.

In table 1.1.3 the data concerning the farms including forests and arboriculture plantations in year 2000 are presented.

⁹ The differences among data from INFC and ISTAT Census are due to the different universe of reference they consider.

Table 1.1.3. Farms including forests and arboriculture plantations in 2000 and variation 2000-1990

	Farms		Invested area				
	Absolute values (2000) (ha)	Percentage fluctuations 2000-1990 (%)	Absolute values (2000) (ha)	Percentage variations 2000-1990 (%)	Average values		
					2000 (ha)	1990 (ha)	Absolute variations 2000-1990 (%)
Total UAA*	2 551 822	-14.2	13 212 652	-12.2	5.18	5.06	0.12
Timber arboriculture plantations**	54 672	33.7	162 652	54.1	2.98	2.58	0.39
Of which:							
Poplars	24 926	-39.1	82 950	-21.4	3.33	2.58	0.75
Others	31 559	..	79 701	..	2.53	-	..
Forests	605 222	-22.1	4 548 158	-17.5	7.51	7.09	0.42
Of which: High forests	155 142	-39.2	1 837 122	-24.5	11.84	9.54	2.30
Coppices	427 265	-17.6	2 272 213	-13.5	5.32	5.07	0.25
Maquis	62 598	1.9	438 823	-2.3	7.01	7.32	-0.31
Total	2 590 674	-14.2	19 607 094	-13.6	7.57	7.52	0.05

* UAA: Utilized Agricultural Area

** in 1990 only poplars plantations were recorded

Source: ISTAT 2000, modified

It can be seen that the 22 % of farms includes forest lands, for a total of 4.5 M ha more or less. This corresponds to a mean value of 7.51 ha of forest land per farm in year 2000.

Further data concerning the number of farms including arboriculture are presented in table 1.1.4.

Table 1.1.4. Farms including arboriculture plantations in 2000

Type of arboriculture	Total		Total %	
	n° of farms	Area (ha)	n° of farms	Area (ha)
Poplars	24 926	82 950	33.3%	38.0%
Other timber arboriculture types	31 559	79 702	42.1%	36.5%
Timber arboriculture TOTAL*	56 485	162 652	75.4%	74.6%
For Christmas trees production	940	763	1.3%	0.3%
For energy production	7 066	7 071	9.4%	3.2%
For industrial production	10 454	47 585	13.9%	21.8%
Fast growing plantations*	18 460	55 418	24.6%	25.4%
TOTAL	74 945	218 070	100.0%	100.0%

* some farms cultivate at the same time poplar plantations and other types of timber arboriculture

Source: Pettenella 2008, modified

The most recent available data from the “ISTAT survey concerning farms structure and productions” of 2005 (table 1.1.5) state that the mean area of forest land per farm corresponds to 10.2 ha in 2005 (360 638 farms including forests and 29 365 including arboriculture plantations with 3 648 349 and 121 873 ha respectively). Anyway it must be taken into account that the considered universe excludes the farms with very small areas and that mean areas data are highly influenced by small farms (Pettenella 2008)¹⁰.

Table 1.1.5. Farms and respective area of land per land use and total surface class

Total area*	Total with UAA	Timber arboriculture	Forests	Non utilized areas	Other areas	General total
Farms (number)						
Less than 1 hectare	390 778	1 975	19 242	46 670	187 912	390 992
1 to 2 ha	355 562	3 552	41 732	60 910	222 265	355 659
2 to 3 ha	197 325	757	43 500	36 492	130 993	197 414
3 to 5 ha	240 260	4 476	57 691	46 161	170 145	240 295
5 to 10 ha	240 018	5 764	78 589	49 730	181 864	240 094
10 to 20 ha	149 976	5 226	52 048	30 005	122 269	149 986
20 to 30 ha	54 505	2 132	23 095	12 219	46 887	54 508
30 to 50 ha	47 171	1 665	18 978	11 530	41 089	47 173
50 to 100 ha	31 047	2 152	14 094	8 052	26 434	31 054
More than 100 ha	18 946	1 667	11 669	5 991	16 452	18 955
Total	1 725 589	29 365	360 638	307 761	1 146 310	1 726 130
<i>of which</i> Public Bodies	2 351	116	2 074	763	1 609	2 352
Areas (ha)						
Less than 1 hectare	185 549	612	4 660	5 767	14 386	210 973
1 to 2 ha	427 689	1 735	22 806	16 203	31 699	500 133
2 to 3 ha	397 206	382	36 654	16 986	27 119	478 347
3 to 5 ha	764 752	4 256	68 294	33 068	48 788	919 158
5 to 10 ha	1 374 195	9 283	159 796	46 441	78 921	1 668 636
10 to 20 ha	1 727 326	15 908	224 215	47 019	89 270	2 103 737
20 to 30 ha	1 070 885	7 849	157 382	29 803	53 165	1 319 084
30 to 50 ha	1 466 332	8 056	203 275	38 182	62 851	1 778 696
50 to 100 ha	1 734 275	19 117	274 984	43 861	72 442	2 144 679
More than 100 ha	3 559 637	54 676	2 496 283	284 072	284 902	6 679 571
Total	12 707 846	121 874	3 648 349	561 402	763 543	17 803 014
<i>of which</i> Public Bodies	926 252	28 361	1 602 901	136 705	116 396	2 810 615

* Note that the surface classes refer to total farm area, not to forest area

Source: ISTAT 2005, modified

¹⁰ It is important to remember that the INFC of 2004 used a different definition for the universe of reference. With respect to the Italian forest national inventory the threshold of minimum cover passed from the 20 to the 10 % and the minimum extension from 2 000 m² to 5 000 m².

It can be seen that, on the basis of the data presented in table 1.1.5, private farms have a mean forest area of 5.7 ha, while public ones have a mean forest area of 772.9 ha. An important dualism can thus be identified: the public sector (i.e. 0.6 % of the forest enterprises) controls the 43.9 % of the forest area, while the private sector (i.e. 99.4 % of the forest enterprises) controls the 56.1 % of the forest area.

Firusbakht (2008) reports also the following more detailed data concerning private forest owners: about 736 000 forest enterprises own 1 875 000 ha of forest (i.e. a mean forest area of slightly larger than 2.5 ha) and about 15 000 owners own 3 634 000 ha of wood (i.e. a mean forest area of about 250 ha per each owner).

It emerges that private owners usually do not own forest areas large enough to be exploited in an economically valuable way, at least for timber production. Furthermore in Italy, unlikely other countries, strong associations and service enterprises are still missing thus discouraging the association among small forest owners. On the other side, public owners own large forest areas, often even too large to be able to pay for their management.

The areas used for timber arboriculture plantations are not considered in this work because they have a well defined objective (timber production) and management plan aiming to that (a clear sequence of silvicultural procedures). In other words, they are (at least in theory) intentionally established after a profit evaluation in areas (in most cases plains) suitable for maximizing production and profit.

1.2. Forest production

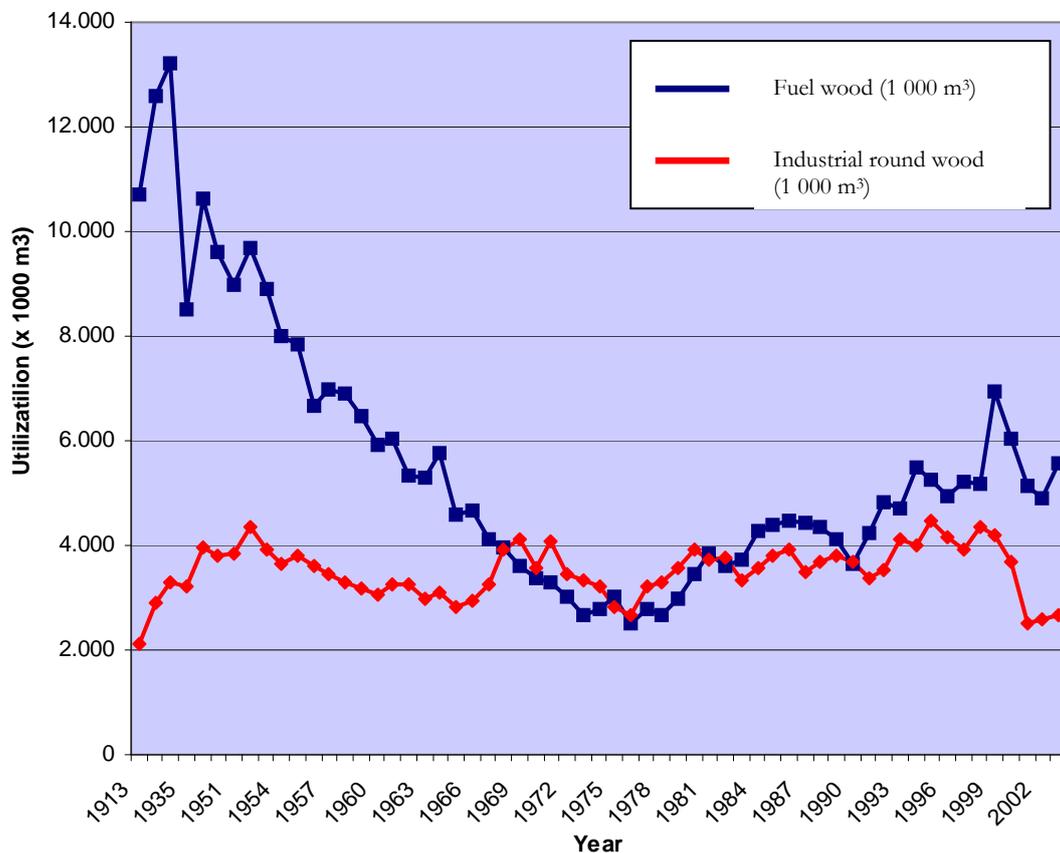
Forest production is commonly identified with timber production for industry. This approach is the one followed also by the National Institute of Statistics (ISTAT), and this is why data sources are focused mainly in this sense.

Despite the scarcity of a broader and more complete data source, it can be affirmed that in Italy we are experiencing: a stagnation of industry wood drawings on very low levels, an increase in the low-value assortments (i.e. fuel wood), and a significant interest renewal concerning non-wood forest products (Pettenella 2008).

Timber

Analyzing figure 1.2.1, it can be seen that the trend of harvesting for industrial round wood production remained quite constant during the last century. Moreover, except during the periods 1969-1975 and 1978-1982, the use of industrial round wood remained below that of wood for fuel. According to Pettenella (2008) the ostensible contradiction among this trend and the increase in industrial consumption has an important cause in the growing of forest labour costs and in the decreasing of the real prices of industry round wood, occurring in a situation of stability of labour productivity.

Figure 1.2.1. Forest takings for industrial round wood and fuel wood in Italy



Source: Pettenella 2008, adapted on ISTAT data

The latest data available from the ISTAT concern the amount of utilization of industrial round wood and fuel wood both inside and outside the forests. Table 1.2.1 shows that the total utilization for industry round wood was around 1.7 M m³ “inside the forest”¹¹, while that of fuel wood was around 3.2 M m³ (for a total wood utilization of 4.9 M m³).

¹¹ Wood mass, expressed in cubic meters, obtained from harvesting activities that take place in areas defined as forests.

If we include also the wood “outside the forest”¹² (table 1.2.2), we find that in 2007 the total amount of wood utilization has been around 5.6 M m³, the 65.3 % of which was fuel wood.

Comparing these amounts with that of years 2005 and 2006 it emerges that the harvestings of fuel wood remained around the 65 % of the total in the three years, while the total amount of utilizations decreased from around 8.7 M m³ in both 2005 and 2006 to the 5.6 M m³ of 2007.

Table 1.2.1. Timber utilizations per assortment (in cubic meters) – Inside the forest (a)

Periods	Industrial round wood – in the rough							Wood fuel (e)	Total	Processing loss	Felled timber mass (f)	
	Beams, poles, and stakes (b)	Shear rounds	Veneer logs	Saw logs	Grinding logs (c)	Other industrial round wood (d)	Total					
CONIFERS												
2005	179 639	5 866	14 031	452 545	349 778	168 995	1 170 854	386 656	1 557 510	123 523	1 681 033	
2006	184 766	8 279	7 335	465 695	476 597	223 923	1 366 595	526 337	1 892 932	156 949	2 049 881	
2007	Jan-Mar	34 554	1 495	2 791	71 435	107 132	46 707	264 114	75 979	340 093	23 331	363 424
	Apr-Jun	31 915	930	1 943	95 372	68 922	47 308	246 390	81 043	327 433	20 532	347 965
	Jul-Sep	37 923	329	2 706	109 835	109 073	58 241	318 107	93 796	411 903	32 202	444 105
	Oct-Dec	62 171	1 374	1 525	79 362	112 869	78 022	335 323	147 855	483 178	40 076	523 254
	2007 total	136 573	4 128	8 965	356 004	397 996	230 278	1 163 934	398 673	1 562 607	116 141	1 678 748
BROADLEAVES												
2005	283 968	113 810	151 698	287 890	262 873	215 049	1 315 288	4 830 928	6 146 216	232 705	6 378 921	
2006	233 967	55 501	249 950	174 854	168 762	237 078	1 120 112	4 615 065	5 735 177	163 016	5 898 193	
2007	Jan-Mar	127 071	5 802	17 981	44 368	44 344	67 202	306 767	1 594 525	1 901 292	57 807	1 959 099
	Apr-Jun	29 144	3 141	1 495	15 061	17 118	20 673	86 632	683 526	770 158	22 496	792 654
	Jul-Sep	2 243	4 045	2 309	16 550	5 649	3 030	33 826	160 512	194 338	4 043	198 381
	Oct-Dec	29 144	2 340	1 297	7 831	6 370	20 557	67 539	431 749	499 288	15 308	514 596
	2007 total	187 602	15 328	23 082	83 810	73 481	111 462	494 764	2 870 312	3 365 076	99 654	3 464 730

(a) since 2005 ISTAT reviewed the timber assortment categories. Because of this some longitudinal comparisons cannot be done except through clusters

(b) timber to be used just the same

(c) pulpwood, round and split

(d) timber for minute poles and stakes, tannins, staves, for splitting, and non predictable assortments

(e) wood fuel, sticks, and wood for charcoal

(f) share of felled timber mass that will remain into the forest after felling, processing, and taking out (bad timber, bark, splinters, sawdust, etc.)

Source: ISTAT 2008, adapted

¹² Wood mass, expressed in cubic meters, obtained from harvesting activities that take place in areas and non-wood forest cultivations defined as: a) areas minor than 0.5 ha with woody forest plants; b) areas larger than 0.5 ha where the present woody forest plants, once mature, do not reach an area of incidence (projection of crowns on the ground) superior to the 50 %; c) areas with rows of plants having a width minor than 10 m or that occupy less than 0.5 ha area; d) areas with scattered forest species.

Table 1.2.2. Timber utilizations per assortment (in cubic meters) – Outside the forest (a)

Periods	Industrial round wood – in the rough							Wood fuel (e)	Total	
	Beams, poles, and stakes (b)	Shear rounds	Veneer logs	Saw logs	Grinding logs (c)	Other industrial round wood (d)	Total			
CONIFERS										
2005	7 089	1 218	2 010	22 661	8 745	8 487	50 210	20 975	71 185	
2006	7 985	656	1 129	14 565	13 610	8 076	46 021	15 702	61 723	
2007	Jan-Mar	793	179	65	4 967	20 202	895	27 101	3 026	30 127
	Apr-Jun	803	155	14	388	718	7 452	9 530	1 964	11 494
	Jul-Sep	1 281	24	6	4 925	3 796	748	10 780	1 938	12 718
	Oct-Dec	567	389	185	2 402	16	474	4 033	2 556	6 589
2007 total	2 744	747	270	12 682	24 732	9 569	51 444	9 484	60 928	
BROADLEAVES										
2005	17 657	137 127	50 007	101 307	145 223	29 719	481 040	434 905	915 945	
2006	24 569	128 629	93 370	107 798	150 565	26 141	531 072	499 228	1 030 300	
2007	Jan-Mar	7 355	5 446	27 445	19 017	28 356	7 943	95 562	201 799	297 361
	Apr-Jun	3 111	5 881	10 490	9 781	12 474	4 326	46 063	90 393	136 456
	Jul-Sep	944	2 898	10 731	8 253	11 429	4 149	38 404	25 211	63 615
	Oct-Dec	6 254	5 272	3 570	9 995	10 222	6 433	41 746	36 777	78 523
2007 total	17 664	19 497	52 236	47 046	62 481	22 851	221 775	354 180	575 955	

(a) since 2005 ISTAT reviewed the timber assortment categories. Because of this some longitudinal comparisons cannot be done except through clusters

(b) timber to be used just the same

(c) pulpwood, round and split

(d) timber for minute poles and stakes, tannins, staves, for splitting, and non predictable assortments

(e) wood fuel, sticks, and wood for charcoal

Source: ISTAT 2008, adapted

Taking into consideration the prices of wood recorded by ISTAT (table 1.2.3) it can be noted that, not considering the case of conifer veneer log, the mean prices for industrial round wood decreased from 2005 to 2007. The prices of fuel wood slightly increased for conifer wood and slightly decreased for broadleaved one.

Table 1.2.3. Commercial retail prices of timber (Euros per cubic meter) (a)

Periods	Industrial round wood – in the rough						Wood fuel (e)	
	Beams, poles, and stakes (b)	Shear rounds	Veneer logs	Saw logs	Grinding logs (c)	Other industrial round wood (d)		
CONIFERS								
2005	59.93	49.77	55.12	62.02	20.93	45.76	20.79	
2006	67.85	60.11	43.73	69.10	25.34	62.47	21.38	
2007	Jan-Mar	57.55	56.04	37.80	64.52	24.69	42.37	29.56
	Apr-Jun	49.35	67.32	65.71	64.47	23.95	38.00	23.16
	Jul-Sep	82.62	66.22	79.18	63.69	21.34	48.96	20.39
	Oct-Dec	47.56	68.51	105.58	82.49	22.63	80.17	18.61
BROADLEAVES								
2005	68.52	77.66	57.61	76.30	33.47	52.86	53.18	
2006	86.96	90.14	26.50	72.69	36.55	54.80	55.43	
2007	Jan-Mar	93.97	57.50	74.97	91.25	31.05	51.78	49.80
	Apr-Jun	107.93	104.91	49.09	59.05	35.12	53.51	53.72
	Jul-Sep	37.71	85.34	58.53	64.31	31.40	29.57	55.43
	Oct-Dec	111.31	63.92	58.72	68.19	41.04	48.65	50.06

(a) mean prices weighted by respective amounts

(b) timber to be used just the same

(c) pulpwood, round and split

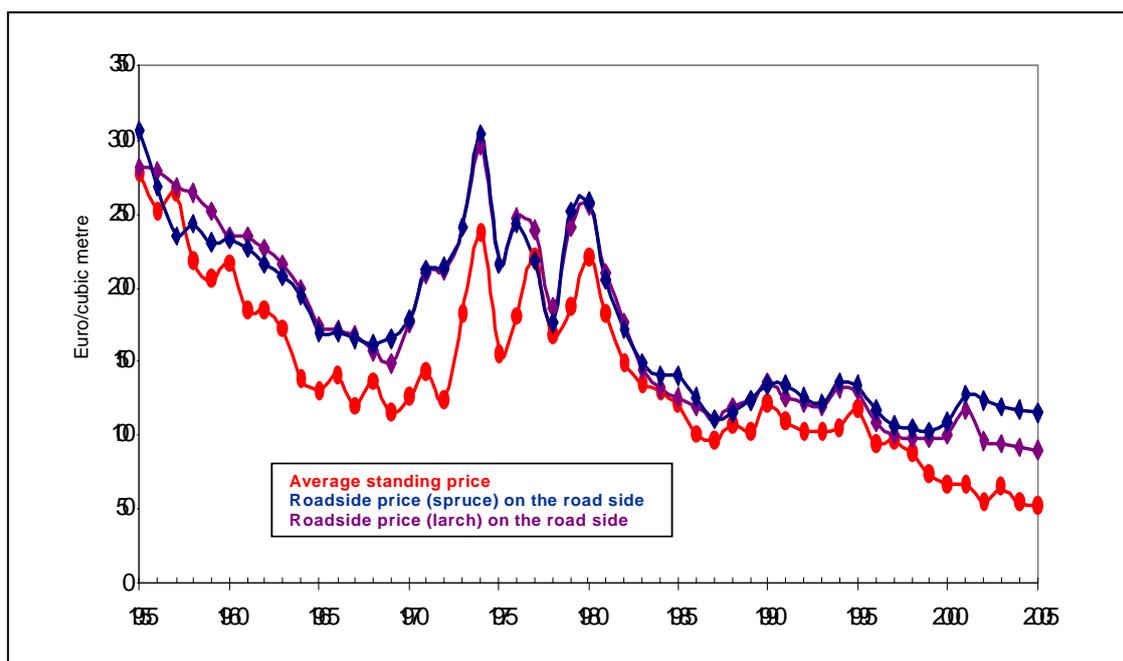
(d) timber for minute poles and stakes, tannins, staves, for splitting, and non predictable assortments

(e) wood fuel, sticks, and wood for charcoal

Source: ISTAT 2008, adapted

Especially for what concerns the Italian part of the Alps, figure 1.2.2 shows a relevant decrease in timber (both at roadside and standing) prices that is happening since from the '90s.

Figure 1.2.2. Average real prices of conifer industrial round wood in the Southern Alpine region (1955-2005)



Source: Ciotti and Pettenella 2005

Pettenella (2008) proposes four main factors that can explain, together with a less negative prices dynamic, the actual trend of fuel wood: a) the possibility of using lots of coppices privately owned or forests subject to “civic use”¹³; b) the very easy processing systems and yard organization; c) the huge use of illegal work; d) the existence of a local demand and consequently of “short-chains” supported by the diffusion of highly efficient domestic systems.

A very important aspect when analyzing the utilizations for fuel wood production is that of the underestimation. It is a common opinion of many analysts that official data are, due to various reasons, highly underestimated, furthermore another conservative estimate¹⁴ supposes an internal taking out of 26.7 – 33.4 M m³, i.e. 6 – 8 times ISTAT data (Pettenella 2008).

From the data presented until now, it can be seen that timber production from Italian forests, especially industry round wood, is a decreasing activity. The main reasons are:

- decreasing prices of timber and increasing costs of labour (this makes often timber import more moderate than locally produced one);

¹³ Civic uses are old rights of common use of forest resources entitled to the right holder only for the household needs.

¹⁴ This estimate comes from the data of consumption of internal resources only.

- the prevailing small size of private forest properties that impede the establishment of scale economies in timber harvesting and processing;
- an extended period of time during which there was (and still there is) a reduced forest management that led (and leads) to low quality timber;
- a broad area of forest subject to nature protection restrictions and to “*Prescrizioni di Massima e Polizia Forestale*”.

Fuel wood

As emerged from the tables previously presented, besides round wood another important wood product is fuel wood. With respect to this, and as it has been said before, there are not certain official data concerning the amount of the Italian production of fuel wood. This depends from the fact that a lot of fuel wood commercialization is carried out through shadow markets. It is consequently difficult also to know how much of the production is for private self-consumption (mainly for domestic heating). As a very synthesis of the different available data and estimations, Pettenella (2008) proposes a prudential estimation of 20-25 M tons consumption of internal resources only, corresponding to an internal harvesting of 26.7-33.4 M m³ (around 6-8 times ISTAT forest statistics data).

Non-wood forest products

Besides wood products, another group of products coming from forests is that of non-wood forest products (NWFP). As already anticipated in the introduction, FAO (1999) states that “non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests”.

In this definition the term “non-wood” excludes all woody raw materials (e.g. fuel wood). The term “products” “corresponds to goods that are tangible and physical objects of biological origin such as plants, animals and their products. Forest services (e.g. ecotourism, grazing, bio-prospecting) and forest benefits (e.g. soil conservation, soil fertility, watershed protection) are excluded” (FAO 1999).

For what concerns non-wood forest products it is not possible to have an exact measure of their economic role for forest owners or managers in Italy. Some figures concerning twelve NWFP are provided by the ISTAT (table 1.2.4). Anyway, these figures can not be

considered very reliable for various reasons: the economy of many NWFP is mostly informal and commercialization is often unregistered; some products such as acorns are obsolete and others would better be included among fruit-growing (Pettenella 2008); some other NWFP are not included in the table (i.e. are not recorded by ISTAT).

Table 1.2.4. Collection of the main NWFP

Periods		Chest-nuts	Pine nuts with shell	Mush-rooms (b)	White truffles	Black truffles	Hazel-nuts (c)	Blue-berries	Straw-berries	Rasp-berries	Acorns	Female cork (d)	Male cork (d)	
2005	A*	575 274	12 749	34 658	188	817	368 190	1 207	411	432	31 513	52 052	9 555	
	V**	84 943	1 363	42 888	12 199	10 651	99 580	845	346	283	2 666	8 765	264	
2006	A	526 151	9 684	33 067	193	688	475 347	2 016	416	334	34 493	93 240	11 815	
	V	55 515	1 816	39 985	15 370	10 804	70 378	1 714	376	252	3 287	17 326	300	
2007	Jan-Mar	A	-	2 636	58	32	143	-	-	-	238	-	-	
		V	-	577	72	811	3 129	-	-	-	15	-	-	
	Apr-Jun	A	210	425	564	14	215	-	3	103	21	13 007	4 356	
		V	42	66	805	153	2 334	-	9	119	13	1 972	127	
	Jul-Sep	A	1 449	514	3 561	20	188	408 694	974	266	242	387	28 667	6 207
		V	203	126	4 100	254	1 781	88 452	585	234	165	27	5 465	211
	Oct-Dec	A	135 914	423	2 445	31	89	3 052	39	7	9	7 894	-	-
		V	18 504	54	3 071	6 271	2 195	524	22	12	16	263	-	-
2007 total	A	137 573	3 998	6 628	97	635	411 746	1 016	376	272	8 519	41 674	10 563	
	V	18 839	823	8 048	7 489	9 439	88 976	616	365	194	305	7 437	338	

* A = amount in quintals

** V = value in thousand Euros

(b) excluded the artificially cultivated ones

(c) dried

(d) in the commercial rough

Source: ISTAT 2008, adapted

The importance of NWFP is not limited to Italy but is extended to Europe in general. Unfortunately, also in this case statistical data are very poor and a large part of the amount and value escapes from recordings. Some of the available data are reported in Box 1.2.1.

BOX 1.2.1. Amount and value of some NWFP in the whole Europe

Source: Mitchell-Banks 2006

Forest fruit and berries production is estimated to be of the order of 211 thousand tonnes, with an average annual value of production of about EUR 350 million.

The importance of mushroom and truffle gathering varies across Europe according to cultural traditions, growing conditions and the intensity of any management intervention. As with fruits and berries, the statistics create challenges, but an estimated production of 77 000 metric tonnes with a real value of EUR 263 million is one such estimate.

Honey production is again statistically difficult to estimate with the challenges of differentiating between honey production and domestic plants or that dependent on forests. An estimate of 31 000 metric tonnes with a 2000 value of EUR 34 million exists but given the amount of information missing from a number of countries, the level of production and total value is far higher.

Medicinal plant use varies tremendously over Europe, with some countries in the Eastern Europe having significant production, and with Germany and Italy being the significant consumers in Western Europe. Statistics are poor and while an estimate of 33 000 tonnes with a value of EUR 118 million is available, the figures are in all likelihood a huge underestimation of the market.

Bark, foliage and vegetation (including cork and cork products) are another important NWFP sector. Annual production of cork is around 296 000 metric tonnes with a value of approximately EUR 209 million. Numbers for decorative foliage use are very poor quality, but an estimate of 45 000 metric tonnes and a 2000 value of EUR 49 million has been proposed, though this expected to be conservative.

Despite the already mentioned scarcity of official data, some cases of NWFP production and commercialization show that these products can provide even significant sources of income. The most important characteristic of the successful cases is that they are niche productions. This means that even if the NWFP amounts are small, they are commercialized as high quality products for a reduced segment of customers with good willingness to pay, and than the income for the producer can be consistent.

Tourist and recreational services

Finally, among other goods that are originated by forests, there are services. With respect to them, only some spot and indicative figure can be given, since no official records are made until now.

Croitoru *et al.* (2000) estimated that “a minimum 120 000 000 EURO and a maximum 420 000 000 EURO values are reported to give an idea of the recreation value of Italian forests”. These figures are obviously purely indicative. Data for single service and single area would be much more useful, unfortunately they are available only in very few cases and, beside this, consistent differences may be noted among figures. Obviously, this is a consequence both of the different methodologies used and of the diversity of the forests they have been estimated for. For Lombardy region some estimation was carried out by Pettenella and Baiguera (1997) with respect to year 1995. The results are presented in table 1.2.5 and in table 1.2.6.

Table 1.2.5. Forest area concerned by tourist and recreational service on the total mountain and hill forest area of Lombardy region (anticipatory data to 1995)

Year	Total considered forest area	Forest area concerned by tourist and recreational service	% of concerned area per fruition degree			% of total area
			minimum	medium	maximum	
	ha	ha	%	%	%	%
1970	404 000	60 991	71.86	25.83	2.31	15.09
1985	404 000	79 807	67.00	30.00	3.00	19.75
1995	422 689*	96 584	63.76	32.78	3.46	22.85

* mountain and hill forests

Source: Pettenella and Baiguera 1997, modified

Table 1.2.6. Total value of the tourist and recreational service of the mountain and hill forests of Lombardy region according to fruition degree (values in million of lire)

Fruition degree	Unit value	Total value
Minimum	1	61 582
Medium	1.7	53 822
Maximum	2	122 088
Total	-	237 492

Source: Pettenella and Baiguera 1997, modified

In Goio *et al.* (2008) some figures concerning other Italian regions are provided for what concerns the average landscape–recreational value per year per hectare of forest: 40.47 €/ha for the Autonomous Province on Trento; 55 €/ha for Piedmont region; 159 €/ha for Friuli Venezia Giulia region.

Other specific values can eventually be calculated in a quick way when some access fee to a service is required (i.e. entrance ticket for an adventure park or an art exhibition, payment permits for mushroom picking, etc.) and the amount of customers is adequately monitored and recorded. As an example in 2005 the sales of mushrooms picking permits reached a total of 250 000 € in the municipality of Asiago, in Veneto region (Rigoni 2006). In the “Comunità Montana Valli Taro e Ceno” (Emilia Romagna region) the incomes from picking permits were 418 310 € in 2005 and 675 105 € in 2006 (Sommacampagna 2007). Anyway, in this cases concerning mushrooms picking, it is important to notice that the estimated value is comprehensive both of the tourist and recreational service value (i.e. the walking and picking activities) and of the NWFP (i.e. the picked mushrooms).

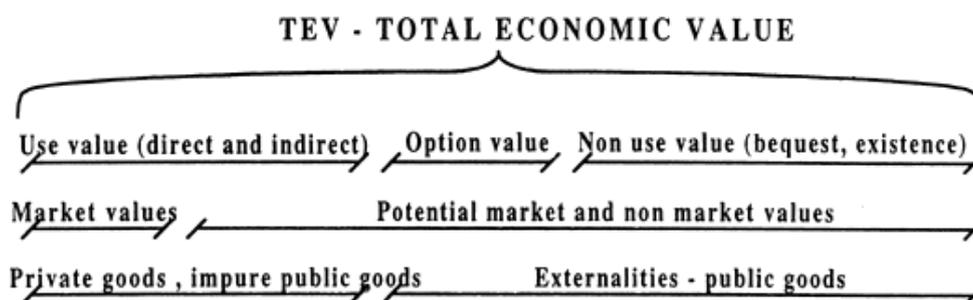
2. Theoretical framework

The fundamental concept this work relies on is that of total economic value (TEV) of forests. On the basis of this, we assume that the value of a forest includes: direct and indirect use values, option values, non-use bequest values, and existence values.

Turner *et al.* (2004) use the following definitions for the components of the total economic value of the environment: the use value derives from the actual use of the environment; the option value is a value expressed through options to use the environment in the future (it can be a component either of use or of non-use values: it depends on whether actual generations decide to use the environment or not); the bequest value represents the willingness to pay to preserve the environment for the benefit of one's descendents (i.e. it corresponds to a potential use or non-use value for a future user); the existence value is also part of non-use values being not associated neither with actual use of environment nor with the option to use it in the future. Turner *et al.* (2004) define the non-use value as “non-instrumental values which are in the real nature of the thing but unassociated with actual use, or even the option to use the thing”.

In general, the TEV is considered to be composed of use, option, and non-use value. A good representation of TEV concept is that of figure 2.1.

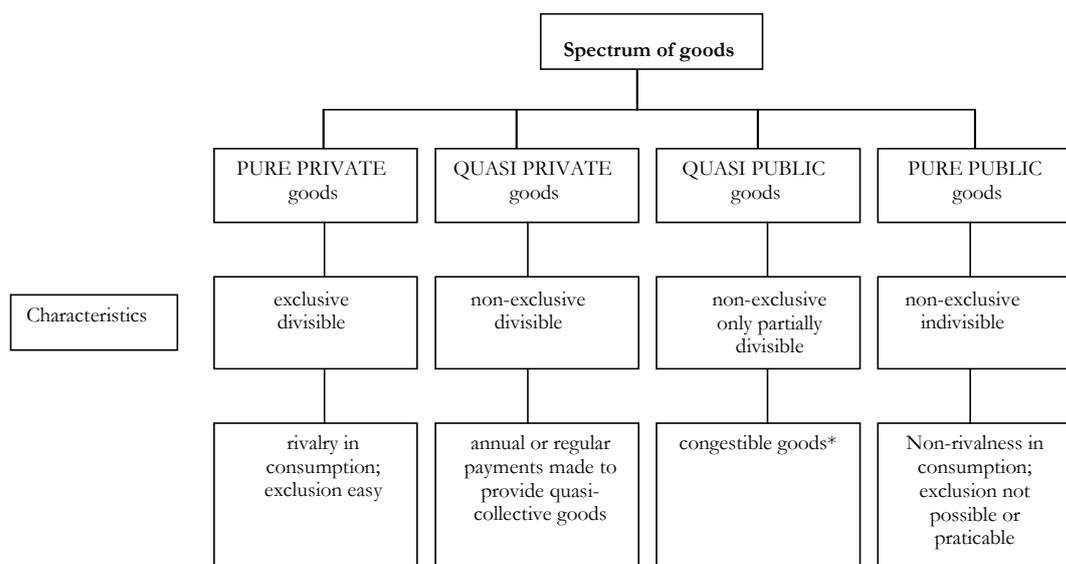
Figure 2.1. Possible pragmatic approaches to the Total Economic Value (TEV)



Source: Croitoru *et al.* 2000

This figure introduces also the concepts of private, impure, and public goods. These concepts are especially relevant when dealing with environmental services. Turner *et al.* (2004) provide a useful representation of the spectrum of private and public types of goods which is reported in figure 2.2.

Figure 2.2. Spectrum of public and private-type goods



* goods that become more similar to private goods as carrying capacity is reached and they become too full (e.g. public beaches, parks, etc.)

Source: Turner *et al.* 2004, modified

Markets used to work properly when they deal with private goods (Turner *et al.* 2004). These goods are characterized by “exclusivity” and “rivalry in consumption”. “Exclusivity” means that who is unwilling to pay for a certain private good is excluded from using it. “Rivalry in consumption” is a characteristic according to which a good, i.e. a resource, can be divided in such a way that the use by a subject can reduce the availability for another subject interested in it or even exclude him from the use of the good.

While moving to public goods (e.g. environmental services) market malfunctioning increases because of a change in goods’ characteristics. They become non-exclusive and divisible, or exclusive and non-divisible, or non-exclusive and non-divisible.

Another classification based on the concepts of rivalry and excludability that is worthwhile to be remembered here is that distinguishing between common goods and club goods which is synthetically represented in figure 2.3. Common goods are goods that are rivalrous and non-excludable (e.g. fish, air, etc.). Club goods are non-rivalrous and excludable (e.g. swimming pools, etc.). Club goods and common goods can also be included in the definition of public goods.

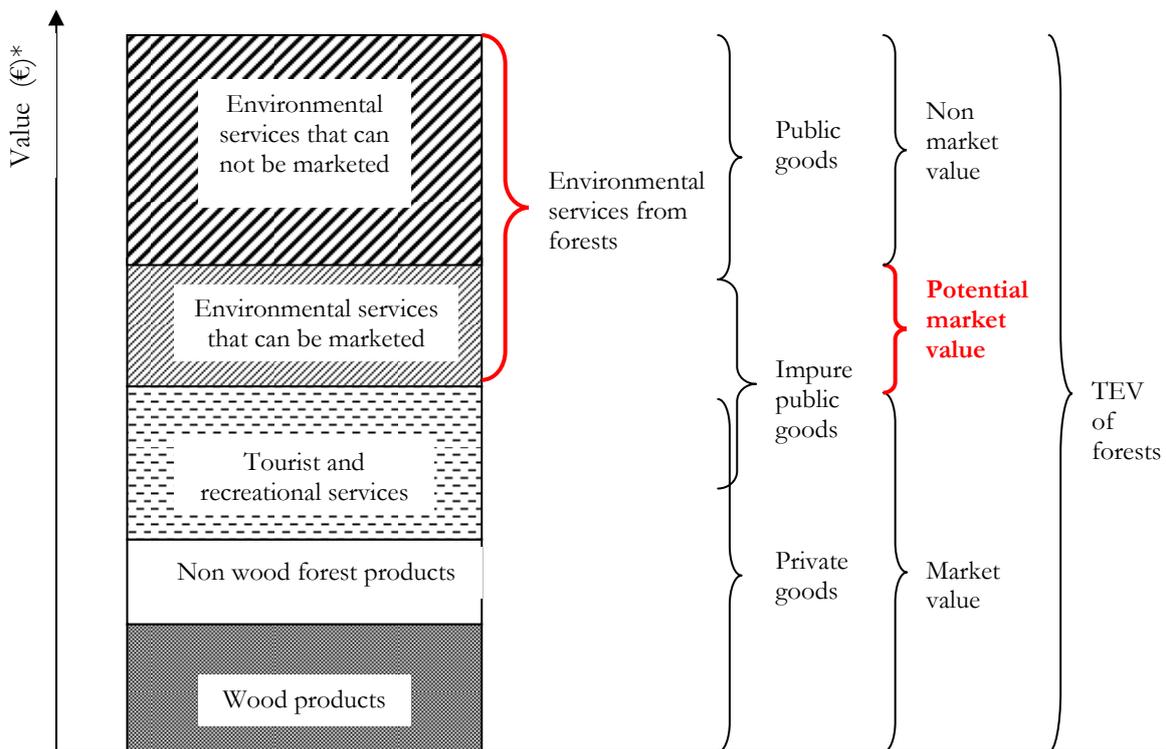
Figure 2.3. Common and Club goods

	<i>Excludable</i>	<i>Non-excludable</i>
<i>Rivalrous</i>	Private goods	Common goods
<i>Non-rivalrous</i>	Club goods	Public goods

Source: author's elaboration

The classifications of figures 2.1 and 2.2 were originally made for the environment products and services in general. Anyway they can be applied also to the specific case of forests and to the goods they provide. Within this context, a further elaboration of these concepts applied to the case of forest goods is proposed in figure 2.4.

Figure 2.4. The Total Economic Value (TEV) applied to forests' goods



* The values assigned in the figure are purely indicative, they refer to a general hypothetical case and are use with the only aim of providing an example. They need to be adapted for any different specific case and use.

Source: author's elaboration

Forest goods can be divided in three groups: private, impure public, and public goods¹⁵. The first group includes wood and non-wood forest products and also a large part of tourist and recreational services offered by forests and marketed through established market values in well functioning markets. The other two groups concern forest goods which are characterized by different degrees of non-excludability and non-divisibility and consequently have not yet a well defined market value. These goods correspond to environmental services from forests. With respect to these characteristics a very interesting key point emerges from figure 2.4. It is the possibility of splitting the environmental services of forests in two parts. At one side the environmental services that are pure externalities and cannot be marketed and commercialized (i.e. the ones characterized by non-excludability and non-divisibility), and on the other side the environmental services that can be marketed and then become sources of income (i.e. the ones characterized by different degrees of excludability and divisibility). This is possible because many forest outputs are not pure public or private goods. That implies that they can be regarded as “mixed impure public goods” characterized by various degrees of rivalry and potential excludability (Croitoru *et al.* 2000).

It is important to underline that any classification needs to be flexible when is applied to the real world. In fact, in different contexts a same tourist service can vary from being classified as pure private good to quasi private and even to pure public good. This also implies a difficulty in generalizing concepts and the need of clearly specifying the investigation context in order to rightly classify the analyzed tourist and recreational service.

In general, environmental services that can be marketed are especially interesting for the development opportunities they offer to the economy of forest (and rural) areas because of their potential market value. They represent the way for increasing the “marketed part” of the TEV of forests. On the other side, it can be seen that they are at some level public goods and this can lead to various difficulties in the realization of economic transaction based on them.

Table 2.1 proposes an example of classification of the forest goods according to the categories presented in figure 2.4.

¹⁵ It is worthwhile to underline that, as emerges in figure 2.3, an overlapping exists between impure public goods and private goods. Some services (and eventually also some NWFP) could be included in both groups according to specific cases.

Table 2.1. Examples of forest goods for each considered category

Category of forest goods	Examples
Wood products	Timber (beams, veneer logs, grinding logs, saw logs, etc.), firewood
Non wood forest products	Cork, resin, decorative plants, foliage, mushrooms, berries, truffles, medicine plants, honey, etc.
Tourist and recreational services	Mushrooms picking, art exhibitions, hunting, etc.
Environmental services that can be marketed	Water quality and purification (including capture of nutrients and pollutants), carbon storage, landscape, etc.
Environmental services that cannot be marketed	Watershed management (i.e. soil conservation, avalanche prevention, flood prevention, etc.), micro-climate regulation, etc.

Source: author's elaboration

The first two groups include products that are commercialized since a long time. They are already known by consumers and the marketing techniques concerning them are usually well established. Innovations and improvement are always possible, especially with respect to marketing strategies for NWFP and to the increase of their demand. Wood and non-wood forest products can be considered as consolidated sources of income for forest owners.

The third group, “tourist and recreational services”, includes both traditional and new services offered to people inside the forest areas. Here is still place for improving the incomes working both on services supply (product definition and marketing strategies) and on payment systems.

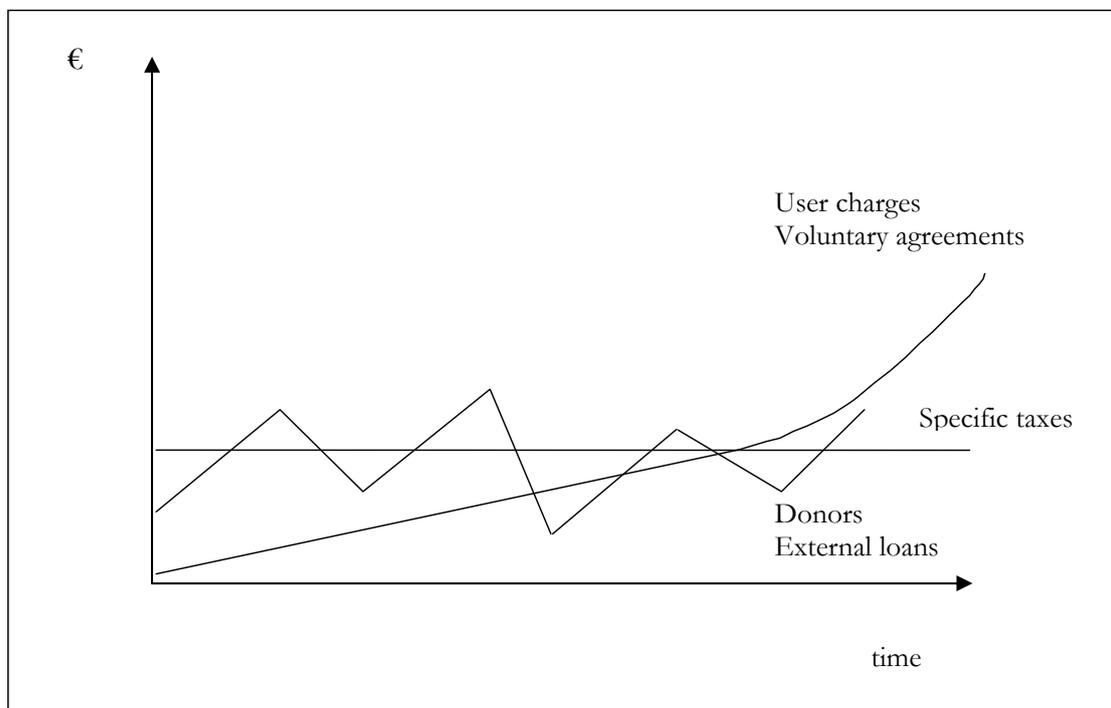
The last two groups could be better seen as two sub-groups of the unique group of the “environmental services”¹⁶. One sub-group includes the services that are classified as pure public goods and than can not be marketed. The other one includes those services that forests provide and that could, in some way, be marketed. Here is where research and new market tools are needed.

The trend of the various existing groups of money sources concerning environmental services can be roughly schematized as in figure 2.5. It can be seen that money coming from donors and/or external loans is highly variable in time, it is no possible to predict its amount and consequently it is impossible to plan long-term economic activities in forests

¹⁶ See Chapter 2, paragraph 2.1, for a definition of environmental service.

mainly based on this income. Incomes from taxes are usually constant and predictable. In this case a strong government intervention is essential for organizing the payment system and then the distribution of the collected money among the different applicants. This means that this money will be managed like any other government fund and than it would be probably distributed according to current situations and needs. Moreover, the money will not be generated by a specific environmental service and used to pay for that service. In most of cases it will be collected as a sort of compensation for environmentally incorrect or environment-damaging behaviours and than distributed for financing programs and activities not necessarily regarding the same environmental service. User charges and voluntary agreements are quite new money incomes related to environmental services/forest-based activities. Since they were not existing in the past, they are still experimental and so have not yet reached the optimal performances. Their trend is growing and they are the most promising money sources related to environmental services. In fact in this case the money will be paid exactly for a determined environmental service and than it will be used to finance and develop the economic activities associated with the provision of that service.

Figure 2.5. Trends of the main different kinds of money sources for environmental services



Source: author's elaboration

According to Gutman and Davidson (2007) financial mechanisms for biodiversity conservation can be divided in three groups on the basis of money source: 1) government sources (e.g. government funds, including incomes from taxes); 2) voluntary sources (i.e. donations); 3) markets and businesses sources (e.g. fundraising, commercialization of products and services, etc.). Biodiversity conservation is a classic example of environmental service provided by forests, and financial mechanisms the two authors identified for it can easily suit also for most of the other ES. It is with this broader focus towards ES in general that Gutman and Davidson's (2007) main types are presented in table 2.2. The main financial mechanisms for each of these three groups are listed together with short comments concerning some important aspects such as current importance, recent trend and future prospect.

Table 2.2. Traditional and innovative financial mechanisms concerning environmental services

INNOVATIVE FINANCIAL MECHANISMS		COMMENTS
Government Sources		
more used/traditional ↓ ↑ Innovative/never used	High income countries budgetary allocation - contributions to a global environmental fund, etc. - Joint implementation (developed + developing country)	Current importance: none or minimal Recent trend: technical and policy discussion Future prospect: moderately good
	Earmarking of domestic or international taxes on activities that use or deteriorate the global environment - a tax on international aviation - a tax on international navigation - a tax on trade of tropical woods - a tax on greenhouse gasses emissions - national (or international) auctions of (some) carbon credits or other cap-and-trade permits	Current importance: low Recent trend: some country implemented some of these mechanisms, at least to finance biodiversity conservation Future prospect: slow progress
	Earmarking of domestic taxes not related to the environment - a surcharge on domestic taxation - earmarking part of national or local taxes - a voluntary local tax paid to a global agency	Current importance: none Recent trend: some country implemented some of these mechanisms, at least to finance biodiversity conservation. Mostly limited to academic and technical discussions Future prospect: low
	Earmarking of international taxes not related to the environment - a tax on currency transactions (CTT/Tobin tax) - a tax on international trade - ...	
Sharing the costs with future generations - a long term Green Bond		
Voluntary sources		
Innovative/never used ↔ more used/traditional	Traditional fund raising and funds granting - NGOs fundraise from their constituency - NGO merchandizing and good causes marketing - Foundations' grants - NGO-driven public or private debt for nature swaps	Current importance: medium to high Recent trend: flat or slightly growing Future prospect: may increase through innovative approaches
	Tapping on people's betting drive - green lotteries	Current importance: low Recent trend: growing Future prospect: large opportunities
	Tapping on the mega-rich - a (international) fund based on businesses and private contributions	
	Newer good-will fund-raising instruments - Sister Parks (North/South or South/South) - Adopt a Park - Round-up - Internet charity shopping - Affinity credit cards - Cell phone based donations	Current importance: low Recent trend: growing Future prospect: good
Markets and businesses		
Innovative/never used ↔ more used/traditional	Tourism - foreign tourists and eco-tourists - tourism and eco-tourism industry catering to foreign visitors	Current importance: high to low depending on location Recent trend: growing Future prospect: fast growing activity but impact on protected (and non) areas may be problematic and distribution of tourism benefits may pose challenges
	Businesses initiative - international businesses good will environmental investments - businesses' codes of conduct and voluntary standards - Private-Public Partnerships - Private-NGOs Partnerships	Current importance: medium Recent trend: growing Future prospect: good
	Green markets - Eco Labelling schemes - Promotion of green consumption and production - International trade in organic, fair-trade, sustainable products - International green investment funds	Current importance: medium Recent trend: growing Future prospect: from slow growth to large opportunities

Source: Gutman and Davidson 2007, modified

As it can be seen from table 2.2 there are many possible mechanisms to finance environmental services. Some of them are still on a theoretical level, others start to be implemented and others are already commonly known and applied. All of them are then characterized by a different level of importance and growth and offer more or less opportunities for the future.

Besides these financial mechanisms, there is also another innovative one that is hardly classifiable as government, voluntary or markets and businesses source, since it could fit in all these groups. This mechanism is commonly known as “Payments for Environmental Services” (PES).

Until now it has been tried to uphold the importance of the voluntary monetary recognition of the value of forest environmental services. As known, the internalization of the ES value is a very complex issue. According to the purpose anticipated in the introduction, this work wants to identify an organizational substratum that would allow the implementation of the ES payment mechanisms to open a way towards a feasible ES commercialization and, thus, internalization. Based on the knowledge of many forest-based enterprises characteristics and on the available literature, “network structures” have been identified as the proper basis for putting into practice this new financial mechanism.

Consequently, this chapter is divided in three parts. In the first one the theory concerning payments for environmental services will be discussed. In the second part attention is focused on network theory in general. Finally, in the last section, the application of network concept to the specific sector of NWFP&S is presented, with the aim of investigating its consistency with PES schemes mechanisms. The fundamental idea introduced here, and deeply investigated in Chapters 3 and 4, is that, at least for some ES, a jointed commercialization with NWFP&S would allow a synergetic effect especially based on complementarity issue.

2.1. Payments for Environmental Services

Definition

Before providing a definition of “Payment for Environmental Services” it is necessary to define what an “environmental service” is. In the literature a generally interchangeable use

of the terms “environmental service”, “ecological service”, and “ecosystem service” is made. Engel *et al.* (2008) reported the definition given by the Millennium Ecosystem Assessment according to which ecosystem services are “the benefits people obtain from ecosystems”. Similar to this one is the definition by Nasi *et al.* (2002) where ecosystem services are the result of the ecosystem functions that benefit human being (e.g. a better clean water, a richer soil, a nicer landscape, etc.). They thus include both products (timber and others) and services in the strict sense.

Based on this, an overall definition of Payments for Environmental Services is: “any kind of market based mechanism for conservation (including e.g. mechanisms such as eco-certification and charging entrance fees for tourists)” (Engel *et al.* 2008).

Wunder (2005) provided a very clear definition of PES organized in five items, according to which “a PES is:

- (a) a *voluntary* transaction where
- (b) a well-defined *environmental service* (or a land use likely to secure that service)
- (c) is being “bought” by a (minimum one) *service buyer*
- (d) from a (minimum one) *service provider*
- (e) if and only if the service provider secures service provision (*conditionality*)”.

This definition exactly mentions all the central aspects and actors involved in PES. A punctual analysis of them is provided in the paragraph titled “PES schemes characteristics” (p. 35).

A PES than is a mechanism aimed at translate a positive externality in a tangible amount of money paid to the providers of that positive externality.

The so-called Coase theorem stipulates that the problem of external effects (i.e. externalities) can, under certain conditions, be overcome through private negotiation between affected parties (Coase 1960, Engel *et al.* 2008). It lays down that there is an automatic tendency to approach the social optimum through bargaining (Turner *et al.* 2004). Some criticisms to that theorem obviously exist. Among them there are: the existence of imperfect competition, the high transaction costs that characterize this bargaining procedure, the difficulties in identifying the parties to the case (Turner *et al.* 2004).

Stated this, PES schemes can be seen as an attempt to accomplish with this theorem overcoming its critic points.

Due to the numerous ES they generate, forest areas are often the heart of PES schemes.

When looking at the literature, it emerges that only a few PES schemes have been put into practice; besides, they have been implemented mainly in developing countries. Two main

reasons can be recognized. First: these countries still have a huge richness of natural and forest areas that are in danger of disappearing together with all the associated ES. Second: PES schemes have been seen often as instruments for poverty alleviation, regional development, improving governance, etc. (Engel *et al.* 2008) and in this sense their original purpose have been forgotten in some way.

This work will concentrate on PES schemes to be developed based on Italian forests¹⁷. Furthermore, PES will be considered in their original conception, i.e. as a way to give a value and open real market opportunities for that ES that can be classified as “impure public goods”. In other words, PES schemes are intended as financial market mechanisms aimed at paying to forest owners and/or managers the ES they provide.

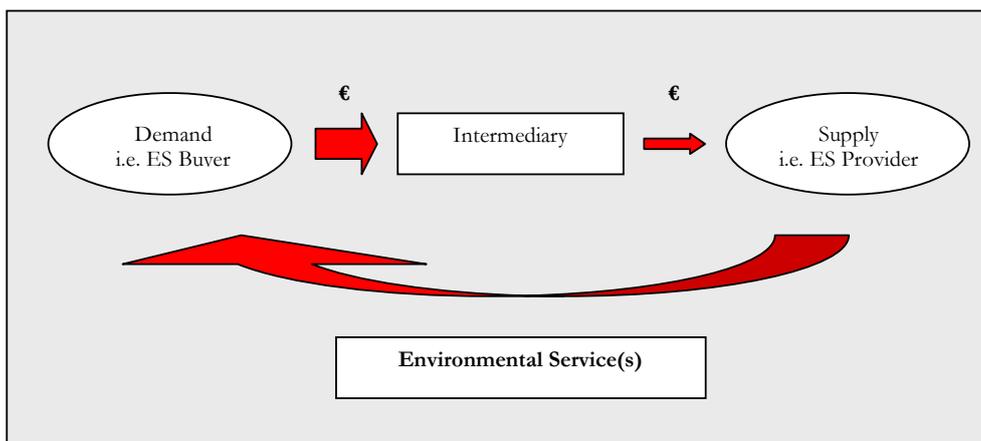
PES schemes can be very different in their characteristics. The identification of these variables is fundamental to try to define the model of PES scheme that could be applied in Italy (and in similar developed countries) with the aim of incorporating in the market also the impure public goods.

General structure of a PES scheme

The very basic and synthetic representation of a PES scheme is that of figure 2.1.1. The key elements are: the demand (i.e. the ES buyer, the subject willing to pay for an ES he enjoys or wants to preserve); the supply (i.e. the ES provider, the subject producing an ES and willing to sell it); the ES (i.e. the “object” of the exchange); an intermediary (a figure often needed to put in contact the buyer and the seller of the ES, i.e. to help organizing and coordinating the reciprocal exchange). As emerges from the figure, the intermediary often absorbs a part (more or less consistent according to specific cases) of the money available for paying the ES.

¹⁷ In this work it is assumed that a general PES scheme structure proposed for an Italian forest will probably suit for many other European forests characterized by similar socio-economical-environmental conditions. So the results of this work are expected to be transferable also to other countries.

Figure 2.1.1. PES scheme basic organization



Source: author's elaboration

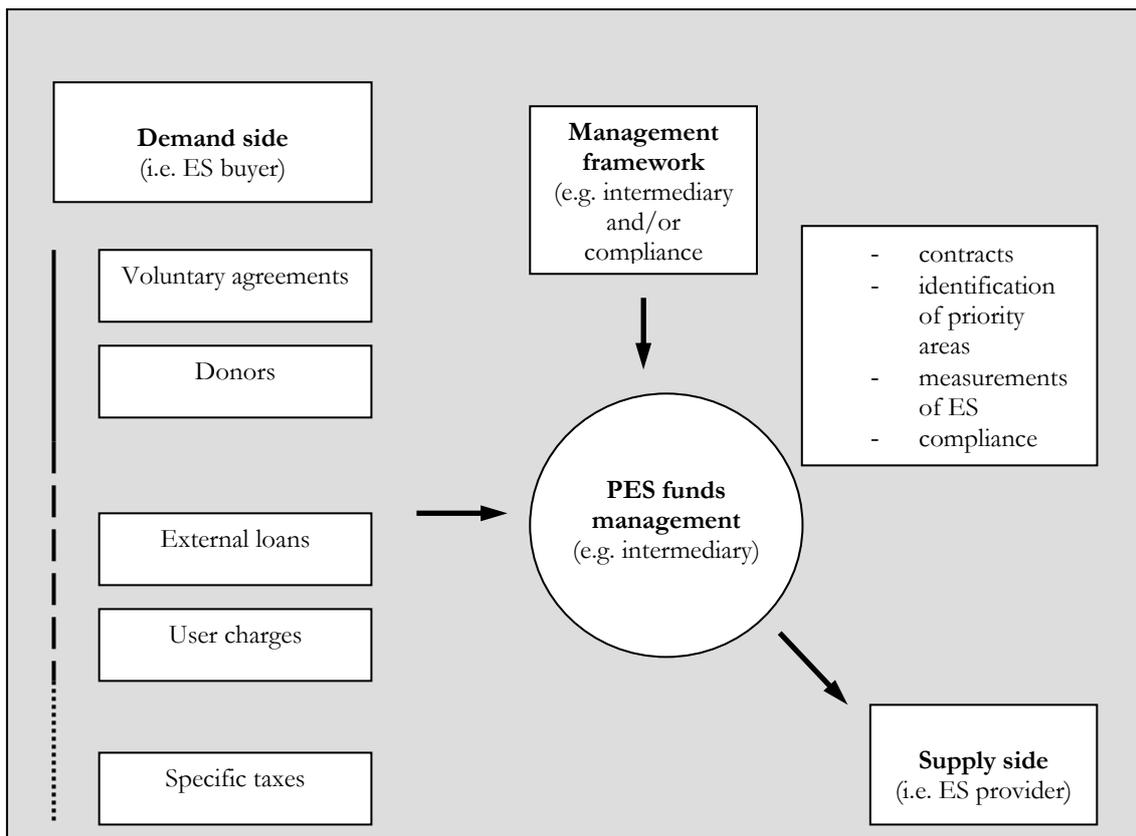
In the reality this organization is usually more complex and another subject used to be included: a “compliance controller”. This subject is usually necessary to assure that the contract among parties is being correctly realized. In other words, the compliance controller checks that the ES provider is really managing his land¹⁸ in the agreed way in order to provide the ES the ES buyer is paying for.

Obviously, it is quite rare that a single ES buyer interacts with a single ES provider. Usually there are various buyers that buy from various suppliers, so a more complex structure is required. On the operational point of view, a further representation of a PES scheme can be that of figure 2.1.2.

¹⁸ Almost always PES schemes are not based on “units of ES provided” but on the hectares of land managed in a well defined way that is thought to originate the ES.

In this work the huge problem of the cause-effect relationship among ES and forests management is not taken into account. It is assumed that when planning a PES scheme, a cause-effect relationship must have already been identified and verified together with the practices that lead to the ES provision.

Figure 2.1.2. PES scheme operational organization



Source: author's elaboration

It can be seen in figure 2.1.2 that PES schemes are based on a collection of funds from all the various ES buyers and that the collected money will be used to pay the ES suppliers. Furthermore, the whole system needs to be organized and the scheme needs to be kept working (i.e. to put demand in contact with supply). All this is carried out by a “management framework” which can also include a figure developing the role of compliance controller that was previously mentioned.

An important aspect that emerges from figure 2.1.2, and that was anticipated in table 2.2, concerns the way of getting money from the ES demand side. The sources listed there are the ones commonly cited in the literature concerning PES. Anyway, if we come back to PES scheme's definition, we should remember the characteristic of voluntariness of payments. The black line on the left of figure 2.1.2 shows the level of voluntariness (higher: unbroken line, lower: dotted line). Since this characteristic is considered to be essential in this work, only two ways of getting money (voluntary agreements and donors) can be accepted. External loans and user charges stay in a middle way and could be considered as voluntary under certain conditions. In that case they could be accepted. Specific taxes are

not intended as acceptable in this work because of their compulsoriness and of the consequent impossibility for payers to choose of not paying for an ES.

PES schemes characteristics

PES schemes can be differentiated according to their main characteristics (Engel *et al.* 2008). In the specific instance, the most significant characteristics are: the type of buyer and that of seller; the performance measure; the mode, amount and time of payment; the compliance assurance (table. 2.1.1).

Table 2.1.1. Classification of PES' main characteristics

1	BUYER	ES User
		Government
	SELLER	Private land owner/manager
		Public land owner/manager
MARKET DIMENSION	Global	
	Local	
2	PERFORMANCE MEASURE	Output-based
		Input-based
3	PAYMENT AMOUNT	Targeted (diversified payment amounts)
		Non-targeted (fixed payment amounts)
	PAYMENT MODE	In cash
		In kind
	PAYMENT TIME	At the beginning
		At the end
	In progress	
4	COMPLIANCE ASSURANCE	Third party certification
		Others e.g. assurance given by the management framework, etc.

Source: author's elaboration

These characteristics can be traced back to four main groups which correspond to the fundamental planning phases that lead to the implementation of a PES scheme.

In *phase 1* the buyers (i.e. the people that perceives the benefit and is willing to pay for it) and the sellers (i.e. the providers) of the environmental service must be identified. Their features are of the utmost importance in the design of the PES scheme, as they condition all the following phases.

In *phase 2* the way of measuring the performance of the environmental service provision is defined. This is an important step because the success of the PES scheme will be calculated on this basis.

In *phase 3* the ways of carrying out the payments related to the service provision are established.

In *phase 4* the strategies for assessing the compliance with the PES scheme are fixed.

These phases are not necessarily to be intended as strictly consecutive in a temporal dimension. Some of them (i.e. phases 2 and 4) could perfectly be carried out simultaneously.

Buyers

The buyers of the ES can be divided into two main typologies. The first one consists of the actual users of the ES, i.e. the people that directly enjoys the service and is interested in maintaining its future provision for its personal use. The second typology gathers the “indirect users” i.e. institutions or other bodies (such as governments, NGO¹⁹, international agencies, etc.) who are buying the ES on behalf of the users of the ES (e.g. citizens, local inhabitants, etc.).

These two different buyers typologies allow a classification in “user-financed” and “government-financed” PES schemes (Engel *et al.* 2008). This distinction does not relies simply on “who pays for buying the service”. As in many cases governments finance PES programs through compulsory fees charged to final service users rather than using money coming from general revenues, the key distinction between user-financed and government-financed programs is rather based on who has the authority to make decisions about the payments for the ES.

Sellers

The sellers of an environmental service can be defined as the actors that are able to assure the provision of that particular service. They can be divided into two main groups, namely:

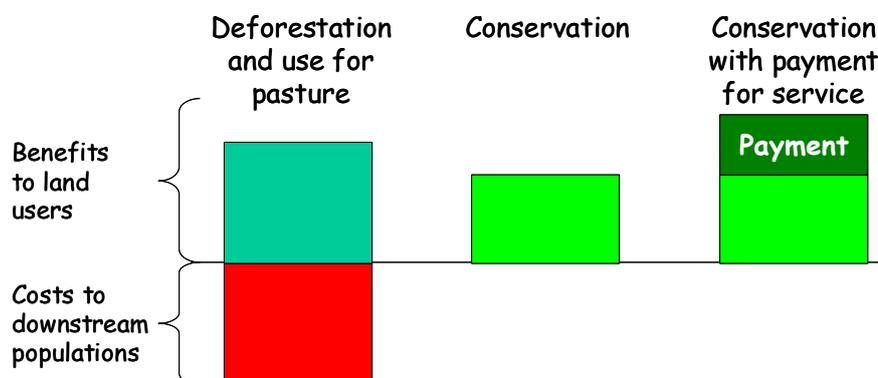
¹⁹ That of NGO (and similar bodies) can be considered as an intermediate case. In fact the organization takes on the role of buyer. As it is a third party that decides how to spend the funds, the program can be considered as “government-financed”, but it can also be considered “user-financed” because the contributions from users are voluntary and they can (at least in principle) refuse futures funding if unsatisfied with the project or the results (and in this sense users are the ones who decide).

private and public land owners/managers. It must be pointed out that the distinction is not merely based on the ownership of the land but rather on the “ownership of the ES”. A very important aspect concerning ES sellers is than that of property rights and of use and management rights on land. With respect to this, a major role is played by governments and consequently there are differences from place to place (e.g. places where the Everyman’s right is in force and places where it is not).

Obviously small or medium private sellers can joint and act together as an unique seller. This opportunity is especially relevant for what concerns the possibility of reducing costs, increasing incomes and increasing the ES production that derives from synergies.

The ES sellers are very important as price-makers for the service provision. In fact, at least when acting in a voluntary PES scheme, they will accept only payments higher than the service provision costs and at least equals to the income they would get from the alternative land uses irrespective of the ES. This concept is very well clarified by figure 2.1.3.

Figure 2.1.3. Values of environmental services



Source: Pagiola and Platais 2005

Market dimension

The market can be local or global (or intermediate), i.e. the customers can live in the same area (or in the neighbourhood) where the ES is produced and perceived, or can live far from there. In the first case, a higher interest in the ES provision can be expected and thus a higher willingness to pay for it. In the second case, the interest can be minor, except for those ES that are not strictly linked to the place of production (such as carbon storage, for

instance). Market dimension then contributes to determine the income opportunities generated from an ES.

It is important to define which is the market dimension because it influences the financial sustainability of the PES scheme (Campos *et al.* 2005).

Performance measure

Performance measure is a main issue for assuring that effectiveness is reached during and at the end of the PES project duration.

Conditionality is critical to the definition of PES schemes, and for payments to be conditional the existence of the ES must be verified and thus a baseline against which measure additional ES units “provided” is needed (Engel *et al.* 2008).

Once defined the tools for measuring the performances (they usually consist of proxies, indicators, measures) they can be used to make payments. Based on this there will be “output-” or “input-based” payments (Engel *et al.* 2008). The first ones are the “ideal” ones, where the payments are made on the basis of the ES provided. Unfortunately these are often impossible due to hard difficulty of measuring the provision of ES at land owner/manager level. The second ones are more applied because of feasibility reasons. To make an example when dealing with an ES such as the reduction of aquifers pollution, it is usually not possible (due to technical inability to get reliable measurements) to directly pay for the reduced amount of pollutants. Consequently, what is paid is a behaviour, a kind of land management, that is thought to lead to a reduction of the pollution.

Payment amount

The basic aspect concerning the amount of the payments for the provision of an ES is related to the eventuality that the planned scheme involves a change of the land use (e.g. reforesting a land). Obviously in this case costs tend to be much higher than when an existing land use is retained (e.g. conserving existing forests).

Besides this, there are two main conditions to be considered with respect to payment amount.

The first condition is that payment amount can not go beyond buyers’ willingness to pay, i.e. the value the environmental service has for them. On the other hand, as already

mentioned when analysing sellers' characteristics, the amount of money they receive for the environmental service they provide must exceed the benefit they would receive from other land uses (i.e. their opportunity cost) and must also cover the costs they bear for providing the service.

The second condition regards "targeting". The total sum available for paying the ES can be divided equally among all the sellers or in varying amounts differentiated according to sellers' characteristics. In other words, payments can be fixed (i.e. a fixed amount per hectare for a given activity) or targeted (i.e. "benefit targeted" or "cost targeted"²⁰) (Engel *et al.* 2008).

The way of subdividing the available fund is often fundamental with respect to the success of the PES scheme. To avoid wasting the limited money at disposal and to reach the most cost-effective payment system, it is important to direct payments to that areas (i.e. land owners/managers) whose characteristics consent the most efficacious ES provision. In many cases, the targeted payment system would be the best one, but its implementation can be more complex. The right equilibrium should be found.

Payment mode

Basically two ways of paying sellers for the environmental service they provide exist. payments can be "in cash" or "in kind". The choice relies on case by case feasibility and appropriateness.

Payment time

The settlement corresponding to the ES provided by sellers can take place in different moments along the projected time of PES scheme. Payments can thus occur: at the beginning, at the end or in the meanwhile. Usually payments are made at the beginning in those PES schemes that require sellers to make some concrete and consistent investments for providing the ES. Payments made at the end, instead, can be used as a way for reaching conditionality. In this case, before been paid for the service provided, sellers will be required to prove the effective provision of the ES.

²⁰ "Benefit targeted" means that payments to sellers are differentiated on the basis of the ES provided. "Cost targeted" means instead that payments are differentiated according to the cost of providing the ES. A mixture of these two targeting types is also possible.

When putting PES schemes into practice, there are at least two important aspects to take into account: some ES (e.g. carbon sequestration) get value only if their provision is kept along time; the provision of some ES is characterized by different growth rates along time. For each of these cases a specific organization of payment time is needed and it should be planned considering all the factors involved (e.g. temporal distribution of ES provision costs, ES providers' requirements, etc.).

Compliance assurance

Finally, an assurance that the PES scheme accomplished with providing the desired environmental service should be provided. Buyers should get a sort of assurance that the sellers supplied the service they paid for. This assurance can be given through a real third party certification, or in other ways (e.g. a specific insurance, the creation of a reserve fund, etc.) agreed among buyers and sellers (and, if that is the case, intermediaries).

On the basis of table 2.1.1 and of the analyzed alternatives, table 2.1.2 tries to give a sort of evaluation of the different options of each characteristic.

Table 2.1.2. Probable advantages of possible alternatives for PES characteristics

		Probable advantages	
1	BUYER	ES User	The involved buyers are the most informed about the ES value. They can observe directly whether it is being delivered. They can re-negotiate or terminate the agreement if needed.
		Government	Because of economies of scale in transaction costs the government-financed PES schemes may be more cost-effective. Often, they may be the only option. If needed, governments can overcome the free-riding problem by charging compulsory user fees.
		Global	Possible higher number of interested customers
	MARKET DIMENSION	Local	High interest among local inhabitants and high willingness to pay
2	PERFORMANCE MEASURE	Output-based	Measures the ES after its provision. The best method, but rarely feasible
		Input-based	The good quality of the results depends on the applied measure system

3	PAYMENT AMOUNT	Targeted (diversified payment amounts)	Usually the most cost-effective. Difficult to put into practice
		Non-targeted (fixed payment amounts)	Easier to implement but often money wasting
	PAYMENT TIME	At the beginning	Useful for financing investments needed
At the end		Allows conditionality, a better control on effective ES provision	
4	COMPLIANCE ASSURANCE	Third party certification	More guaranteed

Source: author's elaboration

Current diffusion of PES schemes and potentiality for their future implementation

In most of cases PES schemes still remain on a theoretical level or are at the very first stages of implementation. Furthermore, a review of the available literature shows that the great majority of the existing examples has been put into practice in developing countries. In fact this innovative financial mechanism has often been used as a tool for poverty alleviation. This implies that most of the existing cases has a major aim which is deeply different from the theoretical one. Consequently also the organization of the scheme and the compliance assurance are developed in order to reach that objective.

Among the limited existing cases concerning developed countries, the majority has been realized in the United States of America and are referred to water quality.

Just few cases have been implemented in Europe and not all of them satisfy Wunder's (2005) definition. An interesting case is that of Vittel water described by Perrot-Maitre (2006). This case perfectly shows the difficulties to be overcome for realizing a PES scheme, the numerous requirements and even the long time period needed for designing and implementing such a program. These aspects probably explain the scarce diffusion of "real" PES schemes until now in Europe. Another reason could be the expectation of inefficiency that characterizes PES schemes. Pagiola (2005) lists the following inefficiencies:

- a) payments can be insufficient to induce the adoption of the socially-desirable land uses and so socially-undesirable land uses can continue;
- b) socially-desirable land uses producing ES can be induced, but the cost of these land uses can be higher than the value of the ES;
- c) the scheme can pay for the adoption of practices that would have been adopted anyway.

In any case, the need for evaluating and giving a monetary recognition to the environmental services is becoming more and more urgent due to current forest ownership's situation.

Pagiola (2005) affirms that “the goal of PES programs is to make privately unprofitable but socially-desirable practices become profitable to individual land users, thus leading them to adopt them”.

PES schemes could be a successful tool in this sense. The issue now is how to translate them into practice in a way efficient and effective both for forest owners and for ES buyers.

2.2. Networks organizations

The enterprises dealing with non-wood forest products and tourism and recreational services (NWFP&S) are typically small or medium sized and usually, with the exception of a few cases, the turnover generated by the harvest, production, transformation and/or commercialization of these products and services is quite limited.

Many reasons can be listed to motivate the current situation: scarcity of raw material (both with respect to quantity and to seasonal availability); difficulties in reaching information on demand, production technologies, etc.; lack of business and marketing skills; small market dimension and high production and transport costs. Another very important reason is that often these enterprises are based on small forest areas, the small ones owned by the entrepreneur and by his partners (if any). This situation is quite typical as a consequence of the property fragmentation documented in Chapter 1.

The commercialization of ES could find a proper place within this small and medium enterprises' (SME) context due to two essential reasons. The first one is that these entrepreneurs, aimed at producing NWFP&S, are managing their forests in ways that are also providing ES. The second reason is that in most of cases these entrepreneurs do not earn enough from the NWFP&S to have that as their unique work activity. This means that often they are part-time forest entrepreneurs and also that the time they can dedicate to forest management is reduced to the strictly necessary. Moreover, these small forest-based economic activities can suddenly incur market problems and shut down because of their financial uncertainty.

It is evident that in such a context additional marketable services (i.e. environmental services) that can flesh out the supply of the SME and consequently increase their financial stability are especially needed.

Besides this further difficulties internal to the enterprises arise. An especially important aspect is the fact that SME usually have limited staff and knowledge resources to cover properly all the business areas needed for sustainable enterprises' activities. As small companies, they do not have possibilities to hire the expert for every business area like manufacturing, marketing, etc. (Matilainen *et al.* 2005). Consequently a need for gaining external information as well as a need to take part to useful strategic networks in order to complete SME' activities and knowledge arise.

In this context it is quite evident that the creation of networks among NWFP&S producers, traders or sellers (i.e., in a broader sense, among nature-based SME) or also among these and other, even larger, enterprises also from other sectors, can be a successful strategic behaviour leading to good economical results.

In general, the smaller the business and the smaller the customer group, the more important become the organisational aspects for production, distribution and also market research and promotion (Pettenella *et al.* 2007). The networking can improve the business activities of NWFP&S enterprises in the production phase, e.g. through forming joint production chains or sub-contracting in order to produce bigger volumes or provide more complete service packages. Moreover the networking with other companies and the co-operation during the product development phase is often extremely important in order to generate the needed information related both to the production as well as to the markets. Additionally co-operation in marketing and supplying the products is often needed in order to achieve the necessary publicity.

The innovative idea proposed in this work is that also marketable ES, organized through a PES scheme, can be added within networks' supply. Networks are seen as appropriate market structures for implementing ES commercialization.

To analyze this suitability that networks might have, it is necessary to investigate the concept and the characteristics of network structures. First of all, a definition of "network" must be provided.

Many different definitions of network can be found in the literature. They are usually quite similar and differences are mainly due to the sector they have been developed for and are applied to (this fact is generally underlined by the adjectives matched with the term "network").

Moreover, it is quite frequent to find that the terms "network" and "alliance" are used as substitute.

In any case, it must be said that no definition was found applied specifically to forest-based SME.

The main definitions of network are listed in Box 2.2.1.

Box 2.2.1. Definitions of “network”

A. Networks in general

Network: a mode of organization that can be used by managers or entrepreneurs to position their firms in a stronger competitive stance (Jarillo 1988).

Jarillo’s definition was used as a basis by Provan and Milward that proposed the following narrower definition:

Network: an intentionally formed group of small- and medium-sized profit-oriented firms in which the firms (1) are geographically proximate, (2) operate within the same industry, potentially sharing inputs and outputs, and (3) undertake direct interactions with each other for specific business outcomes. The interactions may include joint production, new product development, collective marketing and employee training (Provan and Milward 1995).

Network: two or more organizations involved in long term relationships. A network may be viewed as consisting of “nodes” or “positions” (firms, trade associations, other types of organizations, etc.) and links (interaction between the nodes). The *links* constitute a reflection and recognition of interdependence. They are based on relationships over time (Thorelli 1986).

Network: a close yet non-exclusive relationship with other members (Dennis 2000).

Network: an organizational form logically intermediate between the pure market and vertically integrated firm (Nohria and Eccles 1992).

Networks: value-adding partnerships that facilitate the exchange of experience and knowledge between member companies (Johnston and Lawrence 1988).

Social network: a “set of nodes” (persons, organizations, ...) linked by a set of social relationships (friendship, transfer of funds, etc.) (Gulati 1998).

B. More specific networks

Business network: structure of exchange relationships among business actors (firms as well as individuals), structure which emerges, evolves and dissolves over time in a continuous and interactive process (Halinen and Törnroos 1998).

Strategic network: long-term, purposeful arrangement among distinct but related for-profit organizations that allows the firms in it to gain or sustain competitive advantage vis-à-vis their competitors outside the network. Essential to this concept of strategic network is that of “hub firm”: the firm that sets up the network and takes a pro-active attitude in the care of it (Jarillo 1988).

Strategic alliances: the pooling of specific resources and skills by the cooperating organizations in order to achieve common goals, as well as goals specific to the individual partners (Varadarajan and Cunningham 1995).

Robinson and Clark-Hill (1994) provide a broader definition of strategic alliance or strategic business relationship: “a coalition of two or more organizations intended to achieve mutually beneficial goals” (Varadarajan and Cunningham 1995).

The fundamental concepts that should be included in an exhaustive definition of network, according with what emerges from all the definitions reported in Box 2.2.1 and by further lectures, are:

- a structure made of nodes (firms) and links (relationships among firms)
- firms involved can have relationships also with firms outside this structure
- firms can be similar but also complementary
- relationships can be of different types
- relationships can be both vertical and horizontal
- relationships vary during time.

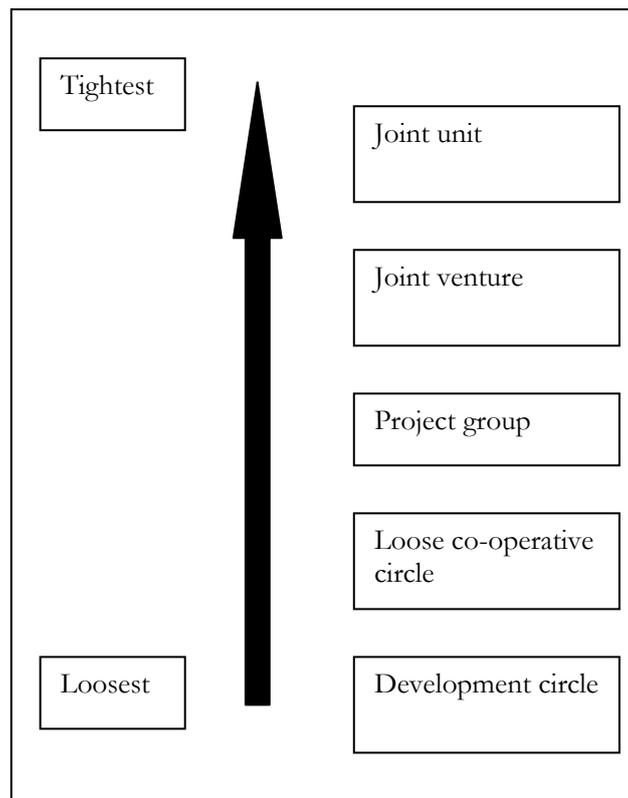
Then, a possible exhaustive definition of network could be: “a structure made of firms of different types and linked (among themselves but also with firms outside this structure) by multiple kinds of relationship. The involved firms are located at different levels, depending on their own characteristics and on the types of relationships they form, and can change their position and relationships during time”.

Main types of networks and their characteristics

Obviously, many different types of network structures exist, and they differentiate each others through a variety of factors (from the types of involved enterprises to the links among them, to the network’s general aim, etc.).

Varamäki and Vesalainen (2003) proposed a list of different types of network differentiated on the basis of the intensity and tightness of the relationships the participating firms form. Figure 2.2.1 summarizes the position of each identified type of network from the loosest to the tightest one. They can be distributed on a continuum according to intensity and tightness of co-operation. The tightness of co-operation uses to be measured by the formality of the established relationship and by the amount of joint investments that the network objectives require.

Figure 2.2.1. Different types of multilateral co-operation between SME



Source: Varamäki and Vesalainen 2003

The Development Circle is in fact a structure of very informal type, based on personal bonds (very frequently friendship between firms' owners) and does not require economic investments by participating firms. On the contrary the Joint Unit requires very high levels of formal agreements and of economic investments: in fact it basically consists in the set up of a new firm in which participating firms must enter leaving their previous autonomous identities.

Tab. 2.2.1 provides a short description and a synthesis of the characteristics of the different types of networks identified by Varamäki and Vesalainen (2003).

Table 2.2.1. Characteristics of the different types of networks identified by Varamäki and Vesalainen (2003)

Cooperative arrangements					
Main characteristics	Development Circle	Loose Cooperative Circle	Project Group	Joint Venture	Joint Unit
Description	A group of entrepreneurs that meet regularly to discuss problems and experiences. The Circle can jointly acquire education, participate seminars, etc.	A group of firms that share some kind of common resource (e.g. transport or production equipment, ...) so that each firm can have that particular resource at its disposal and costs can be shared. Participating firms do not run a joint business.	A group of firms that combine the resource or products of the partner companies into a joint business.	A jointly owned company, set up by participating firms with the central goal to start, develop and run new joint businesses.	Participating firms set up a new firm and enter in it. The original companies remain as legal entities but they function for internal purposes. It is the most formal and tightest type of co-operative management.
Aims	Learning from each other; transferring knowledge	Share resources and so costs	Developing a joint business by combining the complementary resources and skills of partners; new market channels through each participating firm	Start, develop and run new joint business	Set up a new firm in which participants enter
Investments	Not needed	Usually not needed	Variable	Considerable	Considerable
Cost saving	No	Yes	Variable	Variable	Variable
Type of co-operation	Very informal, based on personal bonds	Democratic decision-making; loose contract bonds; oral or written agreements	Consensus-based decision making (more than democratic-); written agreements	Consensus-based decision making; very formal corporate arrangements	Consensus-based decision making (more than democratic-)
Trust	Strong	A certain level, at least regarding quality and reputation of partners	High level	High level	Very high
Commitment	Strong	Strong	Strong	Very important	Very high
Critical factors for success	Entrepreneurs must: actively participate in meetings; discuss openly and on equal terms; take the meetings seriously	Firms must agree on the principles of using and sharing common resources	Careful company selection	Careful partners selection; need for a separate company	Careful company selection
Partner selection	Avoid competitors or potential competitors	Limit the number at the one permitting to get benefits from the common resource	Resources and skills of partners have to be different but complementary; quality, capacity and economy of each partner must be good	Very important, resources and skills have to be different enough but complementary; partners must have enough capital to invest in the development of new businesses	Very important. The same as Joint Venture. Moreover all the partners have to leave individual identities and to merge in a unique body

Source: author's elaboration

The position of a firm in the network is fundamental for what concerns strategic significance (Thorelli 1986).

Network position can be defined as “how individual business actors in the network are related to one another in terms of their function, role and identity in the network structure” (Halinen and Törnroos 1998).

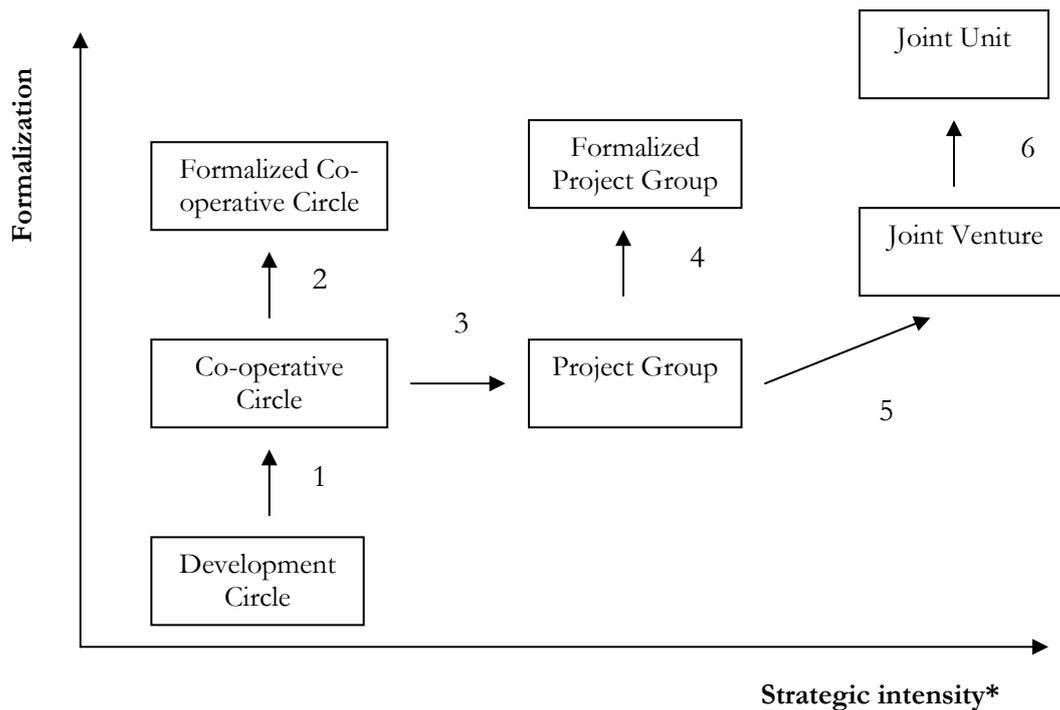
Each actor is engaged in many exchange relationships with other actors. These relationships define the position of the actor in the network (Halinen and Törnroos 1998).

The *position* a company occupies in a network depends on at least three major factors: the domain of the company (i.e. its role in the division of labour); the position of the company in other networks; the power of the company relative to other participants in the focal network (where the power is the ability the company has of influencing decisions and actions of others (Thorelli 1986).

In any case, networks are not fixed structures. Firms can change their position inside the network and also already existing networks can evolve and change their original form by transforming themselves in a tighter (or more rarely in a less tight) structure. As will be discussed in the next paragraph, this aspect may have consequences for what concerns the economical advantages of networks development.

Firms modify their position in a network if something change in their own structure and than in their power over other network members. But their position can also be modified if and when a new member enters the network. In this situation the established members may have to reposition themselves to accommodate a new entrant and their new position will depend from its power. For what concerns networks' evolution, figure 2.2.2 shows some of the possible steps a network can pass through while increasing its degree of formalization, strategic intensity, or both.

Figure 2.2.2. Evolution of co-operative arrangements according to group formalization and strategic intensity



* it corresponds to the level reached by the strategic framework. The strategic framework is determined by the interaction of two variables: the division of work in the net and the type of joint resource allocations.

Source: Varamäki and Vesalainen 2003

Economic advantages associated to network development

To be considered useful and viable structures and to justify their own existence, networks must provide advantages to participating firms.

Usually networks creation implies costs, especially when they are very formal structures and have high levels of strategic intensity (table 2.2.1). With respect to this, we can affirm that networks materialize when expected costs are lower than expected economic and indirect benefits.

According to Jarillo (1988) a network exists only when there is a lowering of transactional costs. But existence is not the only condition a network must satisfy. In fact it has to be efficient too. And a network is efficient if the gains a firm reaches by being part of it are higher (over the long term) to the profit the firm would obtain by going alone (Jarillo 1988). One of the main purposes of network creation or of involvement in an already existing network, is to try to take advantage of lower investment costs and of reduced future capital

expenses (Dennis 2000). Furthermore, other advantages could be the reduction of uncertainty and risks, a lower dependence from public funding, etc.

More in detail, Dennis (2000) lists the following as the main advantages many SME could achieve by network creation or participation:

- they have the opportunity to compete effectively in divergent and often larger markets;
- they can compete on national or international level through the coordination of factors such as research and development, information technology or marketing (without alliances, SME would be confined in their local markets);
- links with companies owning complementary expertise and assets allow members to access resources and skills not owned by the company itself;
- they are encouraged to remain small and to specialize to gain product-specific knowledge; at the same time they remain flexible and adaptable due to very few resources stored internally.

All the probable advantages cited until now lead to some outcome. Outcomes can be of different types, not only limited to the economical aspects. On the contrary, they can be both economic and non economic.

A good outline of the possible outcomes is proposed by Human and Provan (1997). They defined four main general types of outcomes from network creation/organization:

- 1) **inter-organizational exchanges**: direct transactions or exchanges among network firms, such as buying and selling, jointly producing and marketing a product and exchanging friendship and information among each other;
- 2) **organizational credibility**: firms perceive that their external legitimacy can be enhanced through association with the network. For instance, the network administrative organization (eventually a non-profit organization) can establish relationships with local universities, large suppliers and state agencies that smaller, individual firms would not be able to establish if acting alone. Thus, participation can increase the visibility and credibility of member firms;
- 3) **access to resources**: network participation can play an instrumental role in accessing new markets, new product ideas, and other valued resources for their companies;
- 4) **financial performances**: economic benefits could occur within a short time after joining the network, but also in a long-term perspective.

These advantage types have then been divided into two broad categories:

- *Transactional outcomes* = enhanced resource acquisition or gains in performance;

- *Transformational outcomes* = changes in the way the managers of network firms think, act, or both.

The SME acting in the NWFP&S sector are often composed of a very small number of persons, have modest turnovers and act in limited and specific market segments. Because of these reasons, the already mentioned advantages achieved by SME through network creation or participation could be particularly important for the SME dealing with NWFP&S.

However, obviously the most important outcomes a profit-oriented entrepreneur will look for are probably the economical ones. In fact for many SME working with NWFP&S, and then characterized by low income levels, the survival is strictly dependent on good economical results. This is a very complex issue to deal with and, at least until now, no general rules have been defined to try to determine the right outcomes' sharing among the different enterprises participating in the network. It is also necessary to take into account that outcomes can have an asymmetric distribution among firms composing the network: one firm can achieve its objective while another can fail (Gulati 1998).

Another issue to take into account while discussing of the advantages generated by networks is that of time. According to Jarrat (1998), the objectives the firms want to achieve through network participation change while time passes. In any case benefits will have to pass costs, but strategic intents will differ in the three fundamental moments of a firm's life:

1. in the start up phase of the activity of the firm the aim is: "enhancing current business performance". Network participation should help building firm's current capabilities;
2. during the growing and evolution phase of the firm the aim is: "creating new value". Network should contribute to develop future business potential;
3. in the "mature life" phase of the firm the aim is: "defending market position". Network should help the firm in establishing links able to protect past business development against market or environmental forces.

With respect to NWFP&S SME, what follows can be concluded. To exist, networks must give economic advantages to participating firms. However, it is not easy to measure these advantages only in terms of financial outcomes. According with time passing and with the changing position of the enterprise inside the network, the advantages the enterprise will search for are different.

2.3. NWFP&S and networks

The production and commercialization of NWFP&S generally takes place in rural areas. In most of cases these areas are characterized by an extensive production that usually makes them play a marginal role under the economical point of view. Because of this, a policy of diversification and stabilization of earnings is especially important in these contexts. On the other side, in these situations it is sometime possible to rely on an availability of social capital and on property rights structure (e.g. “collective properties”) that favours the development of network structures. There is then a sort of special link that connects NWFP&S and networks or, in other words, that makes networks a very good structure for marketing and commercializing NWFP&S.

Three concepts are especially interesting and important with respect to this. They are that of “territorial marketing”, of “maximization of a single NWFP or service” and of “possible compensations among goods assuring more constant incomes during the year”. Because of their importance and since they will be discussed again in Chapter 4, they deserve a more detailed commentary to be fully understood.

Territorial marketing

“Territorial marketing” is a new branch of marketing concerning cases in which products and services have a specific common territory. According to Pettenella *et al.* (2007) “the territory is the common reference to create a consistent portfolio of products and services, and to bundle marketing efforts for their coordinated promotion, for example through trails, roads, ...”.

In the SWOT analysis of Chapter 4 this concept sometimes is included among strengths and sometimes among opportunities. This differentiation is applied to take into account the possible differences existing in the implementation of this marketing strategy. When territorial marketing strategies are already implemented in a certain area before, or anyway apart from, the establishment of the forest-based enterprise(s), the enterprise can directly participate and capitalize on the advantages. In this situation, territorial marketing strategies should be included among strengths. In fact in this case they will provide an advantage for the promotion and commercialization of a new product or services without requiring a strong effort to the producing enterprise. When there are not pre-established territorial

marketing strategies, they are an important potentiality for the enterprise, but it has to develop them by itself. So they are better included in the category of opportunities.

Maximization of a single NWFP or service

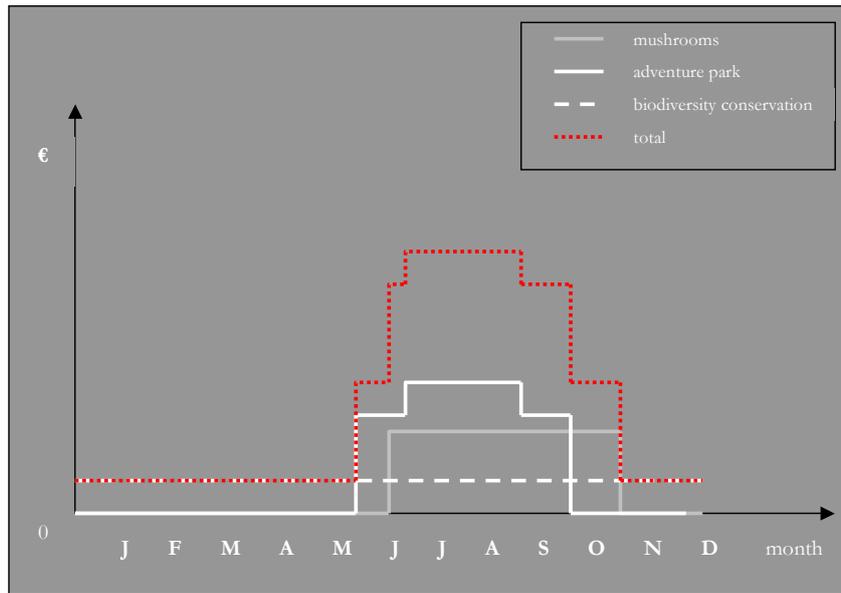
Forests are typically considered to be multifunctional. They can produce a multiplicity of different goods at the same time in the same place. Yet usually the maximization of the production of a certain good can not be attained without sacrificing the production of another good (i.e. maximizing the harvesting of timber implies reducing the carbon sequestration of the forest, maximizing the hunting implies reducing biodiversity conservation, etc.).

A forest-based enterprise using different raw materials from a forest, or included in a network of enterprises that use other raw materials from the same forest should pay a lot of attention on this issue. A wrong, unsustainable, mix of goods is surely an important threat that can affect the enterprise(s) and the network. The more numerous are the forest goods included in the supply, the more cautious should be the maximization of individual productions: threats increase. A special attention in this sense is obviously required when an enterprise wants to commercialize also the environmental services associated to its basic production.

Possible compensations among goods proceeds assuring more constant incomes during the year

Many forest goods are seasonal. This generally implies incomes concentrated in short periods of time during the year. Furthermore, a large part of forest goods is very dependent on meteorological conditions (i.e. sunny/rainy days, temperatures, etc.) that can have a strong impact on goods availability and commercialization. In a normal year, an enterprise based on a single forest good will work only in the period of availability of this good. The same enterprise will have to effort a serious crisis if the availability of the good is reduced e.g. due to adverse meteorological conditions affecting the good's availability. These two concepts are illustrated by figures 2.3.1 and 2.3.2. Of course the purpose of these figures is purely exemplificative both for what concerns the goods included and with respect to their incomes amounts.

Figure 2.3.1. Yearly incomes distribution of some examples of forest goods (normal year)



Source: author's elaboration

Figure 2.3.2. Yearly incomes distribution of some examples of forest goods (bad year)



Source: author's elaboration

From figures 2.3.1 and 2.3.2 also the roles of compensation and of integration and reinforcement of the various goods emerge. Some goods (especially ES) provide a constant (even if maybe non especially significant under a monetary point of view) income all the year long. If the production and commercialization of one of these goods is jointed to that of a seasonal good, the producing enterprise will have at least a minimum income during all the time and in the eventuality of a bad year, this income will assume an especial relevance.

Network structures usually have this “integration”, or “basket”, of different goods as their main characteristic. Anyway, they will gain advantages by this only if they have planned and implemented a proper and efficacious way for subdividing incomes among the various network members.

3. Methodology

The empirical component of this work has been based on case studies analysis. To identify some relevant case study, the first step consisted of a survey of the forest-based SME networks actually existing in Italy. Two case studies were then selected among the collected examples of forest-based SME networks and were subjected to a further more detailed analysis.

Later, a theoretical structure of a SME network-based PES scheme has been defined on the basis of the PES and network theories analyzed in Chapter 2.

Finally, the applicability of the proposed theoretical structure of SME network-based PES scheme has been assessed with respect to the two selected case studies.

In the following paragraphs the four steps will be separately presented and commented one after the other.

Forest-based networks actually existing in Italy

A survey was carried out analysing the existing literature and the information available on the Web to try to identify and list the forest-based networks actually existing in Italy.

Later, on the basis both of author's previous knowledge of existing forest-based SME networks and of further external indications by author's contacts, a Web search was developed to know which are actually the tourist and recreational services provided in Italian forests, and especially to determinate those involved in some kind of network structure.

The results of the survey are shown in table 3.1²¹. The table was prepared in 2006 and the list could be updated especially for what concerns adventure parks (AP). In fact that sector is particularly active and in January 2008 Loreggian (2008) counted 55 adventure parks of which around half of them can be considered as involved in network relationships. An approximate list of these AP is reported in table 3.2.

While analyzing all these examples, it becomes evident that we are facing very different types of network relationships and, moreover, different levels of evolution of network structures.

²¹ The list may not be considered as complete since new tourist and recreational services continuously appear. Furthermore, the basic requirement for being included in the table was that of having a web site.

Some networks (e.g. the Road of Borgotaro mushroom, the Road of Alba's White Truffle of Southern Piedmont, etc.) are complex, involve many different subjects linked by a basic product (restaurants, hotels, farms, etc.), are active all the year long, etc. These can also be considered as placed at a high evolution level because of the long term, well organized and regulated relationships. Other networks (e.g. Herbs and mushrooms festivals, Chestnuts festival, etc.) could be defined as temporary networks. These structures do not work during all the year, on the contrary they are active in the period of the events (and during the preceding organization time). They can still be considered as networks because of the stability among participating subjects (they are more or less the same each year, they make either formal or unwritten agreements, they share responsibilities, etc.) but they are usually placed at a lower evolutionary level because of that temporariness. Finally, others (e.g. Sounds of the Dolomites, the Route "Artenatura", many AP, etc.) are even more primitive. These are networks that in most of cases have been recently formed, or that remained on a very low level of evolution. They usually have not formalized, stable, and long term agreement among participating subjects. Often they are based on verbal agreements that can easily change during time (e.g. they can be confirmed or not), there is not a real share of responsibility, a common organization of activities, etc. Of course, they can evolve into more complex and advanced forms and this is why they are interesting.

Table 3.1. Forest-based networks in Italy

Product/service	Area	Flag product	Connecting idea	Manager/Organizer	Website
Route “Artenatura” (i.e. “nature and art”) Temporary and permanent exposition of works of art mainly made with wood or plants and displaced along a path in the forest	Val di Sella (Trento province)		Exposition of works of art in the forest	Arte Sella, international biennial exhibition of contemporary art	www.artesella.it
Sounds of the Dolomites Festival of music, open-air concerts, in the Dolomite forests or in alpine huts	Trentino Alto Adige region		Open-air concert	Trentino joint-stock company	www.isuonidelledolomiti.it
Road of Borgotaro mushroom <ul style="list-style-type: none"> • “Gastronomic autumn” (special menus in the restaurants) • Mushroom – vintage car trophy • Tourist packets in collaboration whit local SME association 	Borgotaro (Parma)	Cep mushroom	Road	Imbrani Mutual Aid Association	www.stradadelfungo.it
Honey road <ul style="list-style-type: none"> • Explanatory boards about the area and the honey production activity • Sale of typical products • Thematic menus in the restaurants • Festival of honey 	Roeri area , mainly Cuneo, but also Asti province	Honey	Road	AsProMiele (Association of Honey Producers of Piedmont region) Association “Strada del miele del Roero”	www.mieliditalia.it/aspromiele/stradamiele.htm
Road of Alba’s White Truffle of Southern Piedmont Development (tourist, cultural, environmental, eno-gastronomic) of the area	Southern part of Piedmont region	Alba’s White Truffle	Road	Cuneo, Asti and Alessandria province sharing with Piedmont region	www.provincia.cuneo.it/turismo_territorio/tartufo_bianco.jsp
Exhibition-market of white truffle <ul style="list-style-type: none"> • Guided tours in a truffle-ground and search demonstration • Gastronomic stands also with other local products (oil, wine, delicatessen, ...) 	San Miniato hills, Municipality of Volterra, San Miniato and Palaia	White Truffle	Week / Exhibition-market	Association of truffle-sellers of Cecina valley (Pisa province)	www.volterragusto.com/appuntamenti/tartufi.asp
Herbs and mushrooms festivals <ul style="list-style-type: none"> • Guided tours in search of spontaneous herbs through meadows and woods • Slides projection • Street market of handicrafts • Gastronomic stands • Special menus in the restaurants 	Forni di Sopra (Udine)	Spontaneous herbs Mushrooms	Festival / weekend	Tourist Service Union of Forni di Sopra Natural Park of “Dolomiti Friulane”	www.fornidisopra.org/index.php?p=1002
“Erbe in fiore” (i.e. “Blossoming herbs”) <ul style="list-style-type: none"> • Lectures • Tasting • Guided tours to collect spontaneous and officinal herbs (herbs garden of Casola Valsenio) Exhibition-market of truffle Special menus in the restaurants and gastronomic stands Chestnut festival Tourist packets including tours through some villages and the Garden of herbs, menus herbs- and typical products-based, etc.	Emilia Romagna, Province of Ravenna	Spontaneous herbs Truffles Chestnuts	Festival / Exhibition-market / holiday	“Terre di Faenza”: area’s society of Brisighella, Casola Valsenio and Riolo Terme Municipalities (Consortium Limited Company)	www.pubblica.it/terredifaenza/index.asp
“Brise” (i.e. <i>Boletus edulis</i>) festival Holiday (week or weekend) in occasion of the festival, includes: excursions, mushroom searching with expert mycologists, lunches and dinners mushroom and local products-based	Valle del Vanoi, Caorua, Canal San Bovo (Trento)	Cep mushroom (“brise”)	Festival / holiday	Tourist Union of Valle del Vanoi	www.vanoi.it/it/promo.html

Product/service	Area	Flag product	Connecting idea	Manager/Organizer	Website
Herbs and bath holiday packets “Baths in the greenery”: excursions, hydrotherapy and herb bathes	Trento Province	Spontaneous herbs	Holiday	various Tourism Companies of Trentino Region	www.trentino.to/home/index.html?lang=it
Tourist packets involving the “<i>mugolio</i>” (aromatic oil from <i>Pinus mugo</i>) <ul style="list-style-type: none"> Baths with <i>P.mugo</i> oil Compress with <i>P.mugo</i> oil 	Val Sarentino (Bolzano)	<i>Pinus mugo</i> oil (PEFC certified)	Holiday	Eschgfeller family	http://www.eschgfeller.com
Chestnuts festival <ul style="list-style-type: none"> Cultural events (lectures, movies, photos exhibitions, etc.) Gastronomic festival with typical products chestnut-based but also: hazelnuts-based, forest fruits-based, ceps-based, etc. 	Parma Apennines, Municipality of Bore	Chestnut	Festival / weekend	Municipality of Bore	www.comune.bore.pr.it
Exhibition-market of truffle and underwood products “Polenta” and underwood fruits festival National fair of white valuable truffle Exhibition-market of mushroom Chestnuts festival Market-festival of chestnuts	Marche region (Pesaro and Urbino province)	Truffle Underwood fruits Mushrooms Chestnuts	Exhibition-market / festival	Province of Pesaro and Urbino, Local Tourism Association	www.turismo.pesarourbino.it
Chestnuts festival In association with the “weekends in Montefeltro”, integrated weekends in occasion of: mushroom festival, honey festival, chestnuts festival and truffle festival	Central Apennines	Chestnuts Mushrooms Truffle	Festivals / weekends of holiday	“Appennino” partnership project of territorial marketing, promoted by 13 Mountain Communities of Toscana, Emilia Romagna, Marche and Umbria regions	www.appennino.info
Suspended routes among trees <ul style="list-style-type: none"> Various routes, differentiated according to the age of participants Businessmen stages/courses Organization of school trips (with tours at the botanic route, etc.) 	Sella Nevea (Friuli Venezia Giulia)		Adventure route	“Parco Avventura” Sella Nevea	www.sellaneveaparco.it
Adventure Park Suspended pathways between trees	Villeneuve (Val d’Aosta)		Adventure route	Rafting Aventure (associated with the French organisation Amazone Adventure)	www.raftingaventure.com/wwwparcoavventuracom/it/index.it.html
Adventure Park <ul style="list-style-type: none"> Suspended pathways between trees Stage for businesses Hotel accommodation 	San Zeno di Montagna, Garda Lake		Adventure route	Park Jungle Adventure, with the sponsorship of the hotel-owners of San Zeno di Montagna	www.jungleadventure.it

Source: Maso *et al.* 2006, modified

Table 3.2. Adventure parks involved in some network structure

	Adventure Park's Name	Place	Province	Region	Manager/Organizer	Website
1	Adrenalincenter	Cortina d'Ampezzo	BL	Veneto	Adrenalin Center	www.adrenalincenter.it
2	Park Jungle Adventure	S. Zeno di montagna	VR	Veneto	Jungleadventure srl	www.jungleadventure.it
3	Agilityforest	Asiago	VI	Veneto	Agility forest	www.agilityforest.it
4	Agilityforest	S.Martino di Castrozza	TN	Trentino	Agility forest	www.agilityforest.it
5	Aeropark	Ziano di Fiemme	TN	Trentino	Val di Fiemme Alpine Guides	http://www.guidelpinevaldifiemme.it/estate/Arcopark_Parco_Aventura_Ziano_di_Fiemme.htm
6	Flying park	Malè, Val di sole	TN	Trentino	Flyingpark	www.flyingpark.it
7	Jungleraider park	Civenna	CO	Piedmont	Jungleraider	www.jungleraiderpark.com
8	Frabolandia	Frabosa Sottana	CN	Piedmont	Kamaleon group	www.frabolandia.it
9	PA "Grotte del Caudano"	Grotte del Caudano - Frabosa Sottana	CN	Piedmont	Municipality - group "grotte del Caudano"	www.grottecaudano.altervista.org
10	Lago maggiore adventure park	Baveno	VB	Piedmont	Sport&fun srl (Milan's enterprise)	www.lagomaggioreadventurepark.com
11	P.A.Veglio	Veglio	BI	Piedmont	Exploring group srl	www.veglio.parcoavventura.it
12	P.A. Onore	Onore	BG	Lombardy	Municipality	www.onore.parcoavventura.it
13	Green in the Sky	Pila	AO	Valle d'Aosta	Pila S.p.A.	http://www.pila.it/standard.asp?l=i&cid=166&s=c
14	P.A.Villeneuve	Chavonne - Villeneuve	AO	Valle d'Aosta	Rafting aventure	www.raftingadventure.com
15	P.A. Cervino	Valtournenche	AO	Valle d'Aosta	MB aventure	www.cerviniamt.it/percorso_avventura
16	P.A. Sella Nevea	Chiusaforte	UD	Friuli VG	not available	www.sellaneveaparco.it
17	P.A.Val di Vara	Tavarone di Maissana (Sestri Levante)	SV	Liguria	Holiday farmhouse "Giandriale"	www.parcoavventura.giandriale.it
18	Triton's park	Monghidoro	BO	Emilia-Romagna	Social cooperative "La Carovana"	www.comune.monghidoro.bo.it
19	P.A. Cerwood	Cervarezza terme	RE	Emilia-Romagna	"Cerwood"	www.cerwood.it
20	Parco delle 100 Avventure	Pratospilla	PR	Emilia-Romagna	Naturmedia srl	www.100avventure.com
21	Indianapark Terme della Fratta	Fratta Terme	FC	Emilia-Romagna	Sport association IndianaPark	www.fratta.indianapark.it
22	Parco outdoor "dei Cimini"	Bagnaia	VT	Tuscany	Holiday farmhouse Parco dei Cimini	www.parcodeicimini.it
23	P.A. Fosdinovo	Fosdinovo	MC	Tuscany	not available	www.parcoavventurafosdinovo.com
24	Quercus park	Ripatransone	AP	Marche	Cooperative "il picchio verde"	www.ceafontenova.it
25	Skypark	Perticara di Novafeltria	PU	Marche	Skypark srl	www.skypark.it
26	Sibilliniadventure park	Serravalle di Norcia	PG	Umbria	Sibilliniadventure	www.sibilliniadventure.it
27	P.A. Nahar	Arrone (Valnerina)	TR	Umbria	Collina Fiocchi (az.agr. Fiocchi Edoardo)	www.lacollinafiocchi.it
28	Fagus park	Fontenova (Leonessa)	RI	Lazio	Cooperative "il picchio verde"	www.ceafontenova.it
29	IndianaPark Majella	Guardiagrele	CH	Abruzzo	Sport association IndianaPark	www.majella.indianapark.it
30	IndianaPark	Barano d'Ischia	NA	Campania	Sport association IndianaPark	www.ischia.indianapark.it
31	IndianaPark Castellana Grotte	Castellana Grotte	BA	Puglia	Sport association IndianaPark	www.castellana.indianapark.it

Source: Loreggian (2008), modified

As it can be seen, none of the networks listed in tables 3.1 and 3.2 deals with the commercialization of environmental services. They involve NWFP, tourist and recreational services or both, but no ES. Anyway, all of them are based on forest areas intended as the place of growing for NWFP or as the place for the development of the tourist and recreational activities. This means that they are all dependent on the correct preservation of forest environment and related issues. Obviously, a proper management of forest resources generates and/or preserves also some environmental services.

The important hypothesis that this work tries to demonstrate is exactly that NWFP&S marketing can have positive effects (e.g. making easier the commercialization of ES) on the associated ES through their inclusion in network structures. All this will be discussed in detail in the followings.

According to the purposes of this work, attention has been focused on the examples most promising in terms of network evolution towards the inclusion of the commercialization of environmental services, too.

Selected case studies

Among the examples of tables 3.1 and 3.2, two case studies have been selected for a further and detailed analysis. These cases had to represent the broadest theoretical overview, so they satisfy the following characteristics. The first one concerns a tourist and recreational service and is located at an elementary level of network evolution. The second case concerns both a tourist and recreational service and a NWFP; moreover, it represents an example of complex network, located at a higher level²² of the evolutionary path.

The analysis is organized as follows. First, each case will be briefly described. Successively its main characteristics will be collected in a standard table in order to allow an easy comparison among the two examples. Further development of these two case studies under the hypothesis of the insertion of PES schemes will be investigated in Chapter 4.

²² According to the classification by Varamäki and Vesalainen (2003).

Case study 1: “Agility Forest Adventure Park”²³

The first case study concerns a network still in the very early stage of its establishment. It involves a quite new kind of tourist and recreational service: an adventure park. This NWFS is actually very successful in Italy and for this reason it can be an interesting example to be analyzed.

Adventure parks are a NWFS consisting basically in paths made of ropes and platforms suspended among trees in the forest. Courses of different difficulty are available and participants walk along them using compulsory safety measures and under the supervision of an instructor.

AP born in the United Kingdom as military training. Successively they evolved as a recreational activity and become popular especially in France. In Italy they are experiencing a great success since the first one opened in 2001. From the year 2004 this kind of activity is registering a big expansion and in 2008 more or less 60 adventure parks can be counted in Italy.

In most of cases, AP are built in high forests and use the suitable trees (i.e. the ones providing the basic requirements of dimensions and stability) as supports for the hanging paths and platforms.

Because of their originality AP became a very attractive recreational service offered in forests. Moreover, they are also becoming a leading service stimulating the increase of the supply of other complementary services. The example described here fits perfectly in this situation. It concerns the Agility Forest Adventure Park located in the Asiago Plateau, in the Veneto region of Italy.

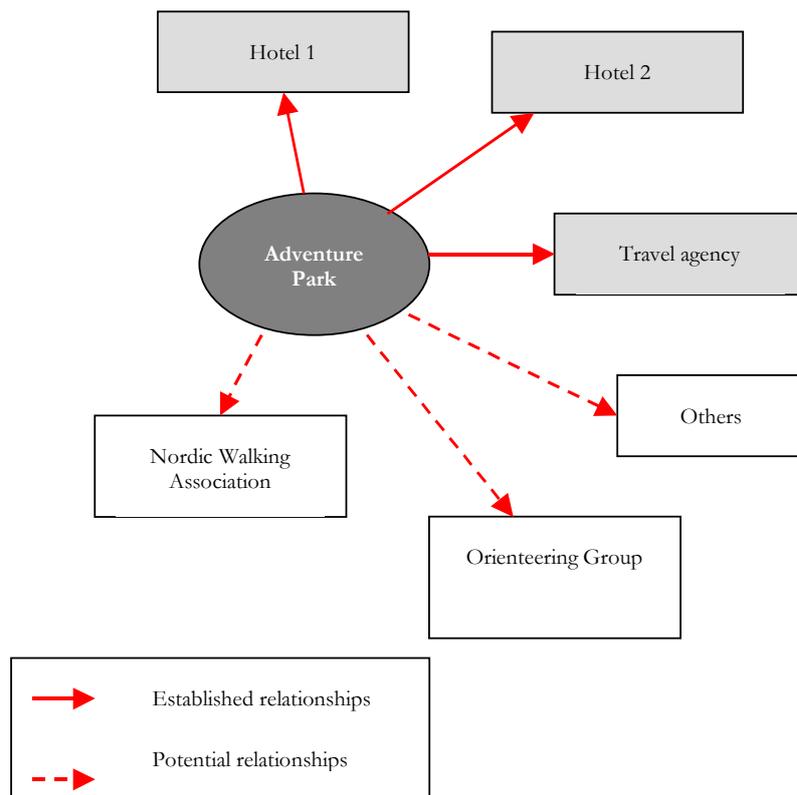
It must be reasserted that it is not the unique example, on the contrary it is representative of many others for which the same analysis and the same conclusions could be made.

The Agility Forest AP could be defined as a sort of “work in progress” network. It is a network of very recent formation, thus it is located at an initial stage of the evolutionary path of a network structure. Actually, as it can be seen in figure 3.1, it involves an Adventure Park, two hotels and a travel agency and is on the way of adding also an Orienteering school, a Nordic walking association, a company offering “river sports” to general public and a didactical farm.

²³ Information and data concerning this example come mainly from the Bachelor thesis by Francesco Loreggian (Loreggian 2008) and from authors’ researches (data refer to the beginning of year 2008).

A sort of “twin AP”, the Agility Forest Park of S. Martino di Castrozza (in Trentino region), is owned by the same group. This other AP is not properly another member of the network. The main relationships between these two AP consist in that they have the same owners (which facilitated the construction of the second AP thanks to the knowledge already acquired during the first park building) and in that they are included in the same website, thus advertising each other. This situation is quite common among AP since many AP owners have more than one park. Moreover, even when the owner they only have one AP, it was often built by subjects that already built their own AP somewhere else and it is probable that they are willing to carry out a mutual advertising through their websites. At the moment, for the Agility Forest in Asiago, the links among the various subjects occur basically among the Adventure Park and the other partners and they consist in the fact that the two hotels and the travel agency offer to their customers a free entrance ticket for the Adventure Park.

Figure 3.1. Agility Forest Adventure Park network: a schematic representation



Source: author’s elaboration

The entrepreneurial input that is leading to network formation can be defined as endogenous since it comes from the Adventure Park (i.e. from a network participant).

Anyway, it emerges that at the moment a broader general structure of links involving all the partners among themselves is still missing, since only the AP is creating links with the other subjects.

A further potentially relevant aspect is that an intervention of the local public administration starts to materialize in the figure of the local tourism office aiming at promoting the establishment of cooperation among the tourism related enterprises of the Asiago plateau.

All the main information concerning this network are provided in table 3.3. As it can be seen, they consist of: the network type (defined on the basis of the classification by Varamäki and Vesalainen 2003); where does the entrepreneurial input come from; how is the network structured; which NWFP and/or NWFS are involved; in which year the network was established; which is the number and type of participating subjects; who is the subject coordinating the network; which is the aim of the network, which are the relationships with the public administration; the economical aspects of the network (funding, incomes share, etc.); which is the role of the territory; and, finally, some considerations about the future of the network.

As previously anticipated, the same kind of table, containing the same information, will be provided also for the second case study.

Table 3.3. The Agility Forest Adventure Park network

	Agility Forest Adventure Park
Network type	Development Circle/Loose Cooperative Circle
Entrepreneurial input	Endogenous
Network structure	Personal agreements among the Agility Forest Adventure Park and the other involved structures
NWF Products and/or Services involved	NWFS: the adventure park (rope paths hanging among forest trees)
Beginning year	The Adventure Park opened in 2007, after that it started establishing relationships
Actual number of participating enterprises	4 (in 2008): 1 Adventure park 2 Hotels 1 Travel agency
Coordination	Adventure Park
Role of the network	Economic development of the member enterprises; reciprocal advertising for the member enterprises
Fundamental links	The location of all activities in the Asiago plateau
Public Administration role	Not in the establishment of the project. Mainly promotional through the tourism consortium (but additive to the promotion realized by the members itself through their websites, etc.)
Funding	Agreements among enterprises
Importance of the public funding on the development of the network	None importance

Network's incomes	Actually no quantification is available in terms of number of visitors
Sharing of network's incomes (if any)	The financial results coming from the links among enterprises are not well definable and quantifiable yet so no sharing rule or procedure has been defined until now.
Importance of territory	Very high: the Asiago plateau is a naturally and geographically well defined area. It is also a mountainous rural area traditionally based on timber and cheese production and actually searching for new ideas for an economical development based on nature tourism The territory is currently used as an attraction element
Others	The society owner of the park owns also another adventure park in Trentino region. This could be interesting in some moment
Future network development	The involvement of 4 new partners (1 Orienteering school; 1 Nordic walking association; 1 Society organizing "River sports"; 1 Didactical farm) The establishment of jointed weekend or week organized activities The establishment of links among all the involved partners, and not only between the Adventure park and the others. More in detail, the Orienteering school seems to be very interested in developing packages of activities with all the various partners The Municipality would like the park to offer also joint packages together with the ice-stadium Commercialization of environmental services: <ul style="list-style-type: none"> - carbon sequestration - landscape

Source: author's elaboration

On the basis of the Varamäki and Vesalainen's classification (2003) this network could probably be set between the Development Circle and the Loose Cooperative Circle. In fact some characteristics typical of the Development Circle can be recognised, such as: the absence of concrete investments, the very informal type of cooperation (mainly based on personal bonds deriving from acquaintance or friendship relationships among partners), etc. But also some trait of the Loose Cooperative Circle appears, and especially the presence of a strategic aim (the reciprocal advertising finalized to an enlargement of the market share of the various partners).

The Agility Forest Adventure Park was built and is working with private funds from the owners and it is financing itself through the entrance tickets. The only "contribution" that can be ascribed to Public Administration (and precisely to the Municipality) is that of letting to the Adventure Park's owners (and managers) the forest it is built in.

At the moment, it is not really defined which is the way of sharing incomes among involved subjects. The aim of the network is basically that of increasing the number of customers of all the involved enterprises, but no figures are actually available concerning the results of the network. So, for the moment, the main "income" is the reciprocal advertising among the network's members.

As anticipated, this network is still very young and its future evolutionary path is not yet defined. In this sense the crucial aspect is probably that of network coordination. This role

is actually carried out somehow by the Adventure Park but it is possible that other partners (even new ones) will take it. A subject willing to organize in a more coordinated way (and involving various partners at the same time) the tourist proposals of the Asiago plateau area (e.g. through the definition of pre-determined packages of sports activities, accommodation, etc. for weekends and holiday's weeks) will probably success. In the future it will be shown if this coordination role will be carried out by the Adventure Park or if this enterprise offering that innovative NWFS will perform only the role of "attraction factor" for customers, i.e. a role of "imago service" as already happens for various NWFP and also for other adventure parks.

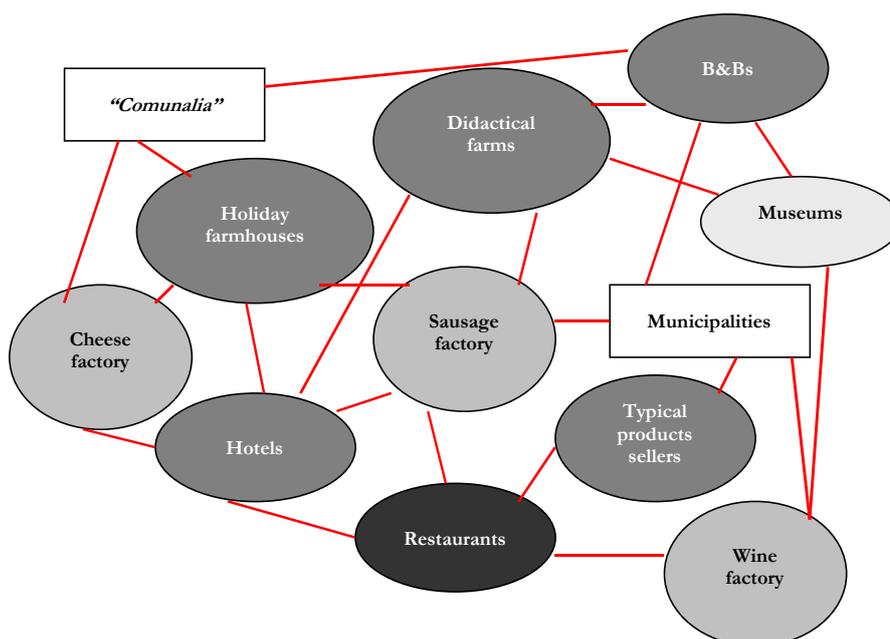
Case study 2: the "Road of Borgotaro mushroom"²⁴

The second case study that has been selected is that of the "Road of Borgotaro mushroom". This is a network developed among the enterprises of Borgotaro area, which is located between Parma and Massa Carrara provinces (on the border between Emilia Romagna and Tuscany regions), dealing with the *Boletus* mushrooms. Since the local enterprises were the main promoters, this network can be considered as endogenous for what concerns its origin. Anyway, it is not limited only to those enterprises working on *Boletus* transformation and commercialization. On the contrary it includes also other ones that provide services recognized as complementary for the customers the mushroom attracts in that place. Also, some municipalities and local organizations called "*Comunalidà*"²⁵ are involved. Figure 3.2 shows a very schematic representation of the network. It emerges as, differently from case study 1, all the subject involved in this network are connected between themselves. Those connections (which are indicatively represented by the red line in figure 3.2) are concretely represented by the "road" concept. The road (both theoretical and physical) connects all the subjects involved in the network, linking customers from one to another.

²⁴ Information and data concerning this example come mainly from the MSC thesis by Matteo Sommacampagna (2007) and from the website www.stradadelfungo.it.

²⁵ The "*Comunalidà*" are fractional collective properties whose origin is dated back to the Ligurian populations that lived in the Taro and Ceno Valleys and that commonly used the land being semi-nomadic populations. In the recent past their role has been that of sustaining and integrating local economy both assuring to residents the rights of estovers and grazing and realizing works useful for the community. Actually they develop various activities such as: institutional activities (such as the realization of the forest management plans, etc.), they promote NWFP, they carry out research activities, etc. (Sommacampagna 2007).

Figure 3.2. The Road of Borgotaro mushroom network: a schematic representation



Source: author's elaboration

This network is based both on a NWFP (i.e. the Borgotaro *Boletus*) and on a NWFS (i.e. the activity of mushrooms picking).

Of course, because of this double supply and because of the numerous subjects involved, this is an example of complex network.

As it has already been done for case study 1, table 3.4 provides the main information concerning this network.

Table 3.4. The “Road of Borgotaro mushroom” network

	Road of Borgotaro Mushroom
Network type	Project Group
Entrepreneurial input	Endogenous
Network structure	Members organized in: Charter Members, Ordinary Members and Dues-paying Members or Honorary Members Organization: Assembly, President, Vice-president, Managing Board, Board's Secretary and College of the Auditors of Accounts. These administrative-political roles are held by the owners of the enterprises participating in the “Road” project and do not receive any payment for their work
NWF Products and/or Services involved	<i>Boletus</i> mushroom and mushrooms picking
Beginning year	2005
Actual number of participating enterprises	Enterprises: 62 (in 2008) 15 Holiday farmhouses/ Farm businesses 12 Hotels/Guest quarters 8 Bed & Breakfasts/Inns/Hostels

	9 Cheese, sausage and wine growing and producing factories 2 Didactical farms 3 Museums/Private collections 30 Restaurants/Porterhouses 26 Typical products sellers
Coordination	Non-profit association hosted in the offices of the <i>Comunità Montana</i> ²⁶ of Taro's and Ceno's Valleys
Role of the network	Promotion of the member enterprises Organization of the festival of Borgotaro <i>Boletus</i> , etc.
Fundamental links	The "road"
Public Administration role	Some Municipalities are members of the Association Very important for the PGI certification of Borgotaro <i>Boletus</i> , the basis of the economic importance of the mushroom and of the area
Funding	(year 2007) 250 €/enterprise during the 1 st year; 103 €/enterprise during the following years 0.52 €/inhabitants from the member Municipalities 2 000 € from the <i>Comunità Montana</i> Other funding from Leader +
Importance of the public funding on the development of the network	n.a.
Network's incomes	Actually no quantification is available in terms of number of visitors brought by one member to the others
Sharing of network's incomes (if any)	The financial results coming from the links among enterprises seems not well definable and quantifiable yet, thus there is not an established sharing procedure.
Importance of territory	Very high: the Borgotaro area is the basis of <i>Boletus</i> production, transformation and commercialization The "road" develops inside this specific territory
Others	Many events centred on mushrooms are organized in the area. The most important ones are the "Festival of Borgotaro mushroom" and the "National fair of Albareto mushroom". All these attract potential customers in the area and contribute to stimulate local SMEs' economies
Future network development	Commercialization of environmental services: <ul style="list-style-type: none"> - carbon sequestration - landscape - biodiversity conservation

n.a. not available data

Source: author's elaboration

On the basis of the classification proposed by Varamäki and Vesalainen (2003), it seems correct to classify this network as a Project Group. In fact the involved subjects show to respect the basic characteristics of this network type: resources and products of the partners (or at least a part) are combined into a joint business; there are written agreements among the partners (they are members of the Association, than they signed its articles of partnership and its regulation); partners are deeply involved with each other especially because of the need of maintaining a common image; resources and skills of partners are

²⁶ "*Comunità Montana*": territorial government body subject to the regional planning. It acts in order to safeguard the hydrogeological, forest and environmental order of the territory for pursuing an harmonious development of the various economical activities present in it.

different but still sensibly complementary (sellers of mushrooms delicatessens, restaurants offering *Boletus*-based menus, hotels providing rooms for mushrooms pickers or for people going through the Road of mushrooms, etc.); there is a common aim that is to get new market channels through each participating subject.

The network certainly contributes to the development of the SME partners. In fact it is surely a source of impulses toward enterprises' continuous improvement for staying at partners' level. Moreover the whole network is probably constantly searching ways for innovating and expanding itself so to attract more and more customers and this surely reflects also on individual partners.

For what concerns the role of Public Administration, table 3.4 shows that some Municipalities are members of the Association and that they pay for their membership, and in this way they contribute economically to the network. Another very important aspect regarding the role of the Public Administration in this network is that concerning the Protected Geographical Indication (PGI) certification²⁷. The economic importance of Borgotaro *Boletus* relies on the fact on being PGI certified and the Public Administration has been the main actor for the achievement of this PGI certification. This recognition allows Borgotaro *Boletus* to distinguish itself from other *Boletus* mushrooms and to reach higher market recognition, being more attractive and, finally, being a valuable non wood forest product to be commercialized and around which develop a network of local SME.

The "Road of Borgotaro mushroom" received also some EU funding from Leader Project. Actually, however, it is working autonomously, financing itself with the memberships fees. Another important aspect to be underlined is that this networks also establishes links with external activities and events such as the "Festival of Borgotaro mushroom" and the "National fair of Albareto mushroom" and this should lead to an additional reciprocal development impulse.

SME network-based PES scheme

The starting point of this research work was the concept that PES schemes make possible the internalization of part of the TEV of forests. With respect to this, as was anticipated in the introduction, the main issue is how to translate into practice PES schemes as a real and

²⁷ PGI - Protected Geographical Indication certification (EC Reg. 2081/92): it concerns the name of a region, of a determined place or, in exceptional cases, of a country, that is used for identifying an agricultural product or a food that is produced in that region, place or country; has a particular quality or reputation and whose production and/or transformation and/or processing take place in that specific area.

effective market mechanism. Evidences prove that starting a PES scheme responding to its original definition is very difficult. Consequently, and according to what was reported in paragraph 2.1, most of the PES schemes actually going on have been planned as poverty alleviation measures. Moreover, they are based on strong governments' interventions in the management and get relevant funding from taxes, donations from NGO and other institutions, etc. Because of this, they can not always be considered to be sustainable financial mechanisms and schemes, self-sufficient and destined for during in time after funding is finished.

According to the objective of this work that were presented in the introduction, the purpose of this paragraph is to see how PES schemes can be realized as durable income sources for forest owners in developed countries such as Italy.

The analysis of the situation of Italian forest ownership and forest enterprises organization together with the research on PES characteristics, led to the idea that network structures developed among forest SME are the proper structures where a PES market mechanism based on voluntary transactions can be inserted and successfully implemented.

A confirmation of this idea emerges by the comparison of the basic characteristics of general network structures and PES schemes provided in table 3.5. It must be underlined that the structures are considered in their absolute general concept, i.e. the mentioned characteristics concerns each possible evolutionary level of the structures, from the simplest to the most complex one.

Table 3.5. Characteristics of network structures and PES schemes compared

Network structures	PES schemes
A. Aims:	
To make NWFP&S commercialization competitive	<i>Aim:</i> to commercialize ES
To enlarge the market share of the single NWFP&S	<i>Aim:</i> to create or to enlarge the market share of the ES
B. Organizational aspects:	
Exist among enterprises (in the forest sector usually SME) that voluntarily decide to work together	Involve at least two distinct subjects: a voluntary ES buyer and a voluntary ES provider
Contracts (written or not) among SME	Contracts need to be signed among ES sellers and ES buyers. Basic requirement: property rights definition. The seller must own* the service (i.e. the land assumed to provide the service)
Long-term relationships among SME	Constant and continuous payments (i.e. long-term relationships between buyer and seller)

Reciprocal control among member enterprises	Monitoring system
	Conditionality
Transaction costs must be lower than the advantages	Transaction costs must be low, they cannot erode all the money arriving to forest managers

* Ownership is not the unique condition: the seller may also have the right to use (e.g. being the holder of a lease) the land

Source: author's elaboration

Table 3.5 can be read in two ways. Vertically, i.e. per columns, the main characteristics of the two structures under examination are listed. Horizontally, the comparison is provided. For what concerns the organizational aspects, the first characteristic is quite obvious. To create a network at least two subjects must participate. The same is needed also for a PES scheme since it implies an exchange and than at least two exchanging (money, ES) subjects are needed.

Contracts must be signed, both in the case of network and in the case of PES schemes. In the case of a network, also oral contracts can be used, especially at very early stages of networking.

In order that cooperating enterprises can be considered a network, they must develop long-term co-operations and not only "project limited co-operations". Also PES schemes need long-term agreement to be able to implement the system and to get results from the established land uses and management practices.

Control is a key issue. To assure reciprocal trust and consequently network existence, network members need to be in control of the conduct of the other members. Also in PES schemes control is needed. Here it is necessary both a monitoring of the provision of the ES itself and a control of the correspondence between the amounts paid and the ES provided, i.e. conditionality must be assured (even by a third part if needed).

Another important point is that of transaction costs. In both the considered structures, these costs must be as moderate as possible. In the first case, if they are too high, the creation of a network structure is not convenient and thus it will not be realized. In the second case, they could erode an excessive part of the available funding and than make the whole PES scheme useless.

Coming to the characteristic aims of the two analysed structures, a correspondence is evident. The first aim is goods commercialization. In networks this consist mainly in an improvement of already existent marketing tools for goods commercialization. Anyway, also the commercialization of new goods can be stimulated by the system. With respect to

PES schemes the aim is the commercialization of ES, i.e. something never commercialized before, that can be made possible through the proper development of the scheme.

The other aim is the creation and the enlargement of the goods' market segment. Also this one is an aim both structures tend to. In fact, it is the basic aim for any market establishment.

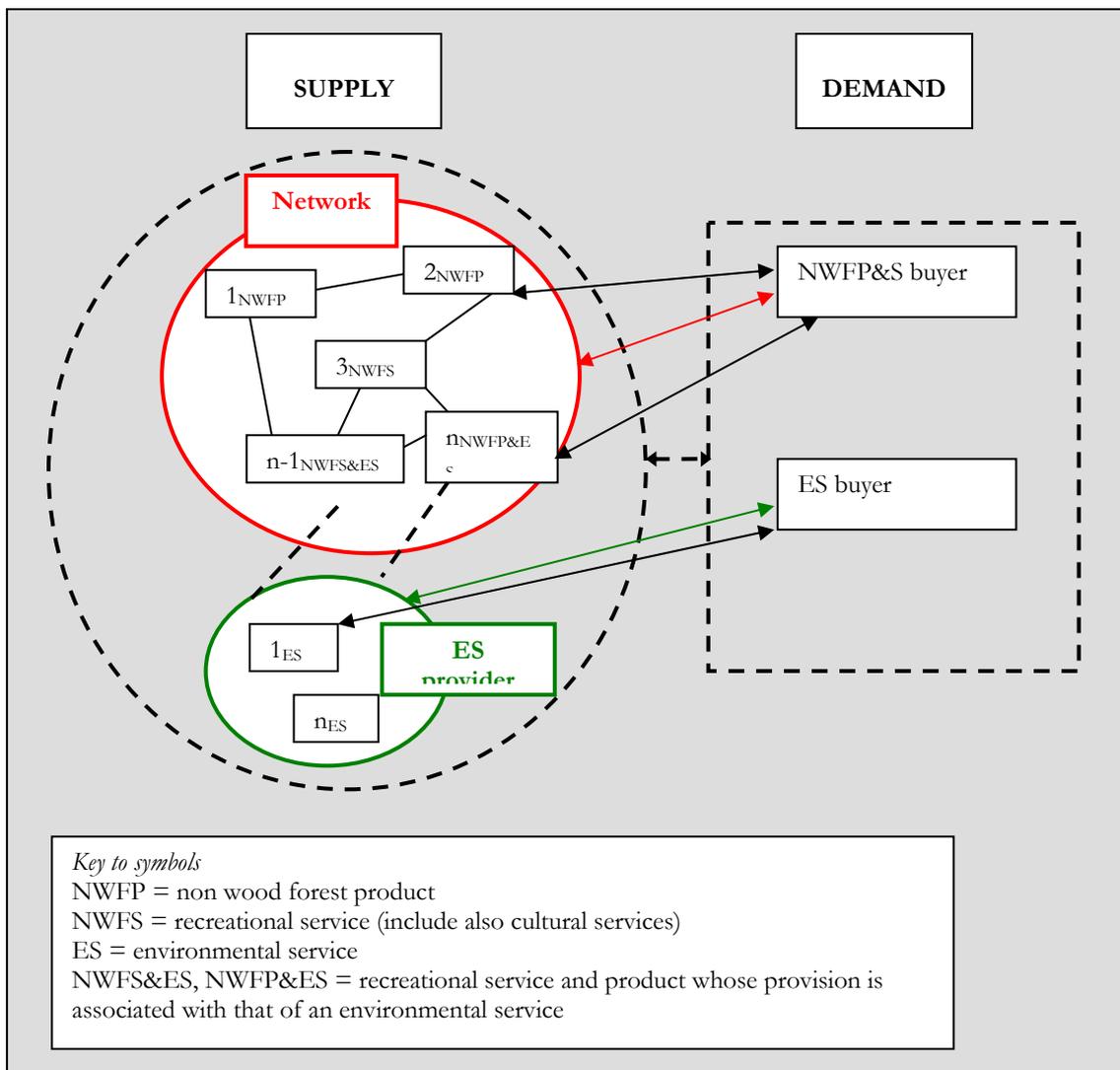
Finally, on the basis of all these considerations, a significant parallelism among the substantial characteristics of the two structures emerges. On this basis, a proposal for the integration of PES schemes into network structures made of forest-based SME is put forward. In the followings this hypothesis of integration will than be presented and discussed firstly on a theoretical level and successively in a tentative application to the two case studies previously described.

The SME network-based PES scheme proposed here has the aim of including marketable ES among the supply of a network of forest-based SME. Figure 3.3 tries to clarify this idea. First of all, the essential pre-requisite of this system is the location in the market, i.e. a market based on demand and supply, depending on customers and enterprises (products and services providers) and based on voluntary monetary transaction from one subject to the other.

There are three basic concepts included in this conceptual structure, as it can be seen from figure 3.3.

The first one is the network organization of the SME. According to what was anticipated in Chapter 2, small and medium forest-based enterprises producing NWFP and tourist and recreational services often reach stability and improve their economical results through the creation of network structures. These structures allow two possible effects with respect to customers. On one side, they help each enterprise in reaching its own target market segment of customers (the black arrows connecting single product or services with NWFP&S buyers). On the other side, especially through joint marketing strategies and most of all through territorial marketing strategies, the networks allow an enlargement of the single enterprise's segment of customers. In fact, in many cases customers of a SME member of the network become customers also of another member enterprise that can in such a way enlarge its segment of market (the red arrow connecting the SME network with NWFP&S buyers).

Figure 3.3. Basic representation of a SME network-based PES scheme



Source: author's elaboration

The second concept is the market-based PES scheme. Under specific conditions, some ES can be sold as they were private goods. Consequently payment schemes can be organized based on customers' demand and willingness to realize a real monetary transaction for buying an ES. An ES buyer can buy a single ES (the black arrow connecting the ES with the ES buyer) or a group of ES (the green arrow connecting the ES with the ES buyer).

The third concept is something innovative: forest-based SME can sell some of the ES they eventually already produce. In fact many SME, and especially those offering forest-based tourist and recreational services, while producing the NWFP&S they commercialize, are producing also ES (e.g. an enterprise offering bird-watching excursions in its forest is at the

same time providing a biodiversity conservation service). When this is possible²⁸ a broader network (represented by the broken lines and arrow) is than created. Furthermore, also simply forest owners (whose forest produces ES) can be involved in network structures together with SME.

The implications on the consumer side can be two. The first one is that SME already have a substratum of customers (already buyers of NWFP and/or of tourist and recreational services) that are probably willing to buy also environmental services, and so they do not need to strive too much to get customers for the ES. The second implication is that new potential customers are addressed and, due to the current highly increase of people's interest on environment and on forests, also people unconnected with buying of NWFP&S will be easily involved. In this case there will be an enlargement of market segment that will involve totally new customers. Moreover, thanks to the synergies originated by the network, it is possible that these new ES buyers will then become also NWFP&S buyers.

In this way another part of forests TEV could be included in the monetary exchanges. Of course the effects on the SME and on the forest-based economy of rural areas will be an increase of incomes, higher availability of capital to be invested in the area, a renewed interest in forest management and in forest-based enterprises.

²⁸ It must not be forgotten that not necessarily the sale of a NWFS allows that of an ES (e.g. trekking may not be compatible with soil erosion prevention). Sometimes they may be exclusive, above all when the maximization of one of them is searched.

4. Discussion

To try to get some evidence of the results of the application of a such SME network-based PES scheme the following procedure has been applied. The SWOT analysis (Box 4.1) of the general possible four theoretical cases (i.e. enterprise offering only a NWFP, enterprise offering only a tourist and recreational service based on forest, enterprise offering only an ES, network of enterprises offering NWFP&S and ES) have been developed. For each of the SWOT analysis, the A'WOT analysis (Box 4.2) has been carried out. The results have than been compared and discussed.

Successively, the same procedure based on SWOT and A'WOT analysis has been applied also to the two case studies.

Box 4.1. SWOT analysis

Sources: Analoui and Karami 2003; Stapleton and Thomas 1998

SWOT analysis offers a useful framework to achieve the interpretation of a company's current marketing situation.

SWOT is an acronym for the Strengths and Weaknesses of a firm and the Opportunities and Threats posed to the firm by the external environment.

SWOT is an analytical tool which can be used for both large and small organizations. It is a technique that shows what the firm can do very well and what it cannot do. It consists in determining the firm's strengths and weaknesses as well as opportunities and threats.

The first two criteria, strengths and weaknesses, are calculated from analysis of the internal environment of the firm while the last two, opportunities and threats, come from analysis of the external environment of the firm.

Strengths. A strength for a SME is a key success factor. Strengths could include the skills and abilities of the firm such as skilled and committed human resources, effective distribution channels, financial stability and technology know-how. Also patents, rights and reputation are considered as strengths of a small business. In the case of small businesses the distinctive competencies are usually considered as strengths. These competencies are the abilities which the firm possesses and its access to them. Evidently firms, especially SME, should explore and identify their strengths, exploit them fully and adapt to the environment. As a rule, SWOT analysis reveals whether or not a firm possesses any distinctive competencies (strengths) or not. Accordingly, if the firm learns that it has strengths, these can be further developed. The business strategies are then based on the identified strengths. In contrast, where there is a lack of strengths related to the industry, the firm must either build up competences and develop its existing strengths or move to another industry.

Weaknesses. Strategic analysis of the firm may well lead to finding its weaknesses. A weakness is something that a firm lacks or is not as good at as its competitors. In identifying the weaknesses, the next step would be both recovering from those weaknesses quickly and strengthening the strategic weaknesses of the firm. Some examples of the typical weaknesses in small businesses are: lack of financial resources; entrepreneur's lack of managerial experience; entrepreneur's lack of technical skills; high labour costs; inefficient organisational structure; low production and service quality. As discussed, the firm's weaknesses are identified by comparing the firm with its rivals. In other words, any weakness of the firm may be considered as a strength by competitors.

By identifying the strengths of the business we will be able to formulate effective strategies based on the firm's strengths. Consequently, if we can recognise the strategic weaknesses of the firm, the next step will be adopting a course of action(s) to recover from and to strengthen the identified weaknesses.

Opportunities. Opportunities are the situations in which the firm can improve its strategic position. For example, an increased market share for the firm in the international market or the firm's access to low price energy can both be considered as opportunities. The first step in the planning process is to be aware of opportunities. For small businesses, environmental scanning through which the firm can effectively determine its core competencies and opportunities acts as a major factor in the realisation of strategic management for the firm. If a firm is involved in either long or medium run planning, they have to have a clear vision of the future and the potential opportunities available. It is difficult to prepare an effective business plan without considering the opportunities. Therefore, small businesses usually succeed or fail based on how accurately they can identify the opportunities and benefit from these advantages. Since in the competitive environment the needs of the customers are changing, the firm needs to analyse the environment as often as possible.

Threats. Threats are the main obstacles and issues in the external environment of the organisation. Any changes in the external environment of the SME that have the potential to disrupt the firm's well-being could be considered as threats. Some of the threats that SME typically experience are: unexpected entry of a large and more powerful competitor into the local arena; technological innovation makes obsolete the way firms produce their products, making investments in equipment valueless; union labour demands wages substantially higher than those paid by competitors in non-union part of the country; increasing cost of being in the business because of government environmental rules and regulations; customer demand shifts away from the firm's products or services. It is important to know that each firm will have its specific opportunities and threats profile. In other words, an opportunity for one firm could be a threat for another within the same industry.

Box 4.2. A'WOT analysis

Source: Weiss *et al.* 2007

Introduction

The term A'WOT stays for “Analytical Hierarchy Process in SWOT analysis”.

As a methodological framework, A'WOT analysis is used to analyse enterprise's innovation capabilities. It is a sort of integration of the SWOT analysis since it means analysing Strengths, Weaknesses, Opportunities and Threats (SWOT) concerning both internal and external environments in order to attain a systematic approach and to analytically determine priorities for the factors included in SWOT.

Methodology

In the method called A'WOT, SWOT analysis is made more analytical by giving numerical rates for the SWOT factors as well as for the four SWOT groups.

This method proceeds through the following four consecutive steps:

- (i) the SWOT analysis is carried out, i.e. the relevant factors of the external and internal environment are identified and included in the SWOT analysis. This means selecting the most important Strengths, Weaknesses, Opportunities and Threats (about five to seven factors in each);
- (ii) the mutual importance of the SWOT factors is determined separately within each SWOT group. The importance of the SWOT factors is defined as follows: first the most important factor inside the group is selected and one hundred points are given for that factor. The importance of the other factors are compared to the first one and weighted points are given according the comparison. For example, if the factor is considered to be half as important that the first one, then 50 points is allocated to that. This weighting procedure is carried out separately for each of the four SWOT groups;
- (iii) the mutual importance of the SWOT groups is determined so that the most important strength, weakness, opportunity and threat are compared with each other. One hundred points are given to the considered most important SWOT group, and decreasing points are given to the remaining three groups according to their relative importance;
- (iv) the individual SWOT factors within each SWOT group are scaled relatively to these priority values.

Result

The individual SWOT factors values resulting from the scaling procedure are summed within each group. Four total values are than obtained, one per each of the four SWOT groups. These values are used to realize graphs allowing comments and comparisons.

The whole A'WOT procedure can be easily developed using a calculation spreadsheet such as

SWOT analysis of the general possible theoretical cases

In the followings four SWOT analysis are presented for what concerns the production and commercialization of, respectively: NWFP(s) only; tourist and recreational service(s) only; environmental service(s) only; NWFP(s) together with tourist and recreational service(s) and with environmental service(s). They are based on hypothetical theoretical cases. They have been compiled trying to take into account the most relevant characteristics per each

case and then per each of the groups of Strengths, Weaknesses, Opportunities and Threats. In reference to NWFP&S marketing in social contexts where, like in Italy, SME are predominant, and due to their generality, these four SWOT can also be intended as a sort of checklists that small and medium entrepreneurs can use to evaluate the situation of their enterprise.

Case a) production/commercialization of NWFP(s) only

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • a small forest area can be sufficient for the production • link with the local area, with the territory • low investment costs (depending on the NWFP) • protection of the product with trade marks and/or patents • product certification • easy way of establishing prices and organizing payments • the forest owner can also be the entrepreneur 	<ul style="list-style-type: none"> • usually small amounts of product (no scale economies) • marketing communication and entrepreneurial skills are required
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • synergies with other products or services of the same territory (“territorial marketing”) • positive impact on the area (if incomes remain in the area, and/or are re-invested in the activity) 	<ul style="list-style-type: none"> • highly dependent on meteorology and climate • amount and quality of production vary year by year • maximization of a single NWFP can imply damages and mismanagements to the forest area (excessive pressure and/or specialization impeding the multifunctional use of the resources)

Case b) production/commercialization of tourist and recreational service(s) only

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • a small forest area can be sufficient for the provision of the service • link with the local area, with the territory • low investment costs (depending on the service offered) • the forest owner can also be the entrepreneur 	<ul style="list-style-type: none"> • marketing and entrepreneurial skills are required • ideas are often copied, it is difficult to protect them with patents, etc. • sometimes it is difficult to establish prices and to organize the payments
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • synergies with other products or services of the same territory (“territorial marketing”) • positive impact on the area (if incomes remain in the area, and/or are re-invested in the activity) 	<ul style="list-style-type: none"> • highly dependent on meteorology and climate • maximization of a single service can imply damages and mismanagements to the forest area (excessive pressure and/or specialization impeding the multifunctional use of the resources)

Case c) production/commercialization of environmental service(s) only

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • a small forest area can be sufficient for the provision of the service • the environmental service can be provided also by a forest area used for other main purposes (production/provision of NWFP and tourist and recreational services) 	<ul style="list-style-type: none"> • always very difficult to establish prices and to organize the payments • difficulties in organizing the selling-buying system • ways to assure environmental service provision are needed • difficulties in establishing the exact causal relationship among a land use and an environmental service • need for intermediaries (increases transaction costs)
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Increase of environmental concern/attention by the public • willingness to pay, both of enterprises and private single citizens • synergies with other products or services of the same territory (“territorial marketing”) • the forest owner can also be the entrepreneur 	<ul style="list-style-type: none"> • maximization of a single environmental service can imply damages and mismanagements to the forest area • problems related to the risk/menace of privatization of services typically considered public • difficulties to achieve the right demand segment

Case d) production/commercialization of NWFP(s) together with tourist and recreational service(s) and with environmental service(s)

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • a small forest area can be sufficient for the production both of product(s) and services • low investment costs at least for the product and the tourist/recreational service (depending on the NWFP and service) • synergies with other products or services of the same territory (“territorial marketing”) 	<ul style="list-style-type: none"> • ways to assure the environmental service provision are needed • co-operation and coordination among different entrepreneurs are required
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • link with the local area, with the territory • environmental service sale can be structured on the same basis of the other product(s) and service(s) that are commercialized • demand enlargement: customers of the NWFP can become also customers of the services (tourist/recreational and environmental), and vice versa • different entrepreneurs producing NWFP and service can associate in network structures • if the same entrepreneur produces both NWFP(s) and the tourist/recreational and environmental services, compensations are possible in the case of a negative year for the product or the services 	<ul style="list-style-type: none"> • how to organize relationships among different entrepreneurs • some support from governments and/or local public institutions can be needed • problems related to the risk/menace of privatization of services typically considered public • difficulties in establishing the optimum mix of production/provision for the product and services commercialized

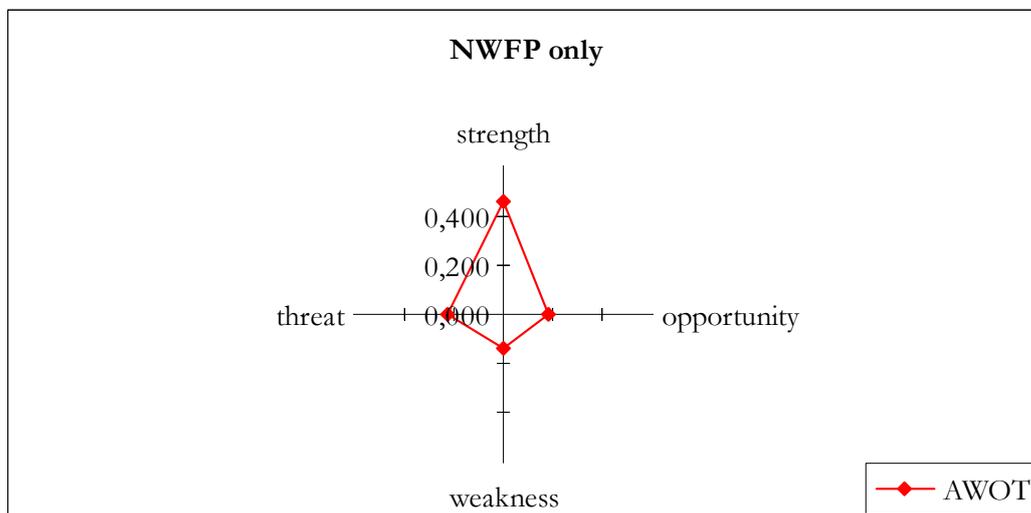
A'WOT analysis of the general possible theoretical cases

The procedure of the A'WOT analysis implies a high degree of subjectivity. Weights must be assigned to each voice of the SWOT analysis and successively to each of the four groups (strengths, weaknesses, opportunities and threats). The choice of these weights always relies on the author of the analysis. Different authors can use different weights and consequently results can vary. On the other side, the high flexibility allowed by this weighting system makes it especially suitable for being applied in participatory processes of decision making. It can then be used in negotiation processes where the important outcome is not the result of the A'WOT analysis itself, but the procedure for finding a commonly accepted agreed solution with the active involvement of the stakeholders (and this is a very important step for what concerns the possible development path of networking).

The weights used in this work derives from the opinions and convictions the author gained while carrying out this research work. The weights have been defined independently one from the other for each point of the four SWOT analysis. Differently, the same weights have been used for scaling the four categories, i.e.: 90 for *Strengths*, 80 for *Weaknesses*, 100 for *Opportunities* and 90 for *Threats*. Opportunities have been considered to be the most important aspect, anyway the values assigned to each of the four categories have been kept around a same level in order to avoid consistent alterations on the contributions of the single voices included in the analysis. The results of the elaborations carried out on these basis are presented in the followings.

Case a) production/commercialization of NWFP(s) only

Figure 4.1. A'WOT analysis concerning the production/commercialization of NWFP(s) only



The final values deriving from the A'WOT analysis are reported in table 4.1.

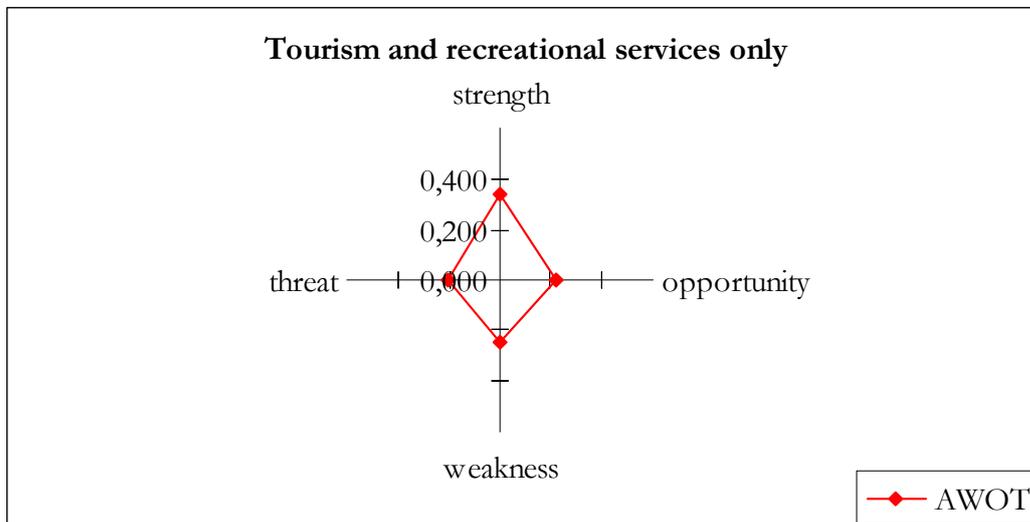
Table 4.1. Values of the A'WOT analysis for NWFP(s) only

Category	Value
S	0,458
W	0,141
O	0,176
T	0,225

In figure 4.1 Strengths clearly emerge as the stronger category, with a value quite far from the others. This is indicative of consolidated goods, well established and set in the market. The other values are levelled around a similar value with Threats as second importance value. Some menaces from external world are than relevant, but it seems that they are not going to affect excessively the commercialization of NWFP.

Case b) production/commercialization of tourist and recreational service(s) only

Figure 4.2. A'WOT analysis concerning the production/commercialization of tourist and recreational service(s) only



The final values deriving from the analysis are reported in table 4.2.

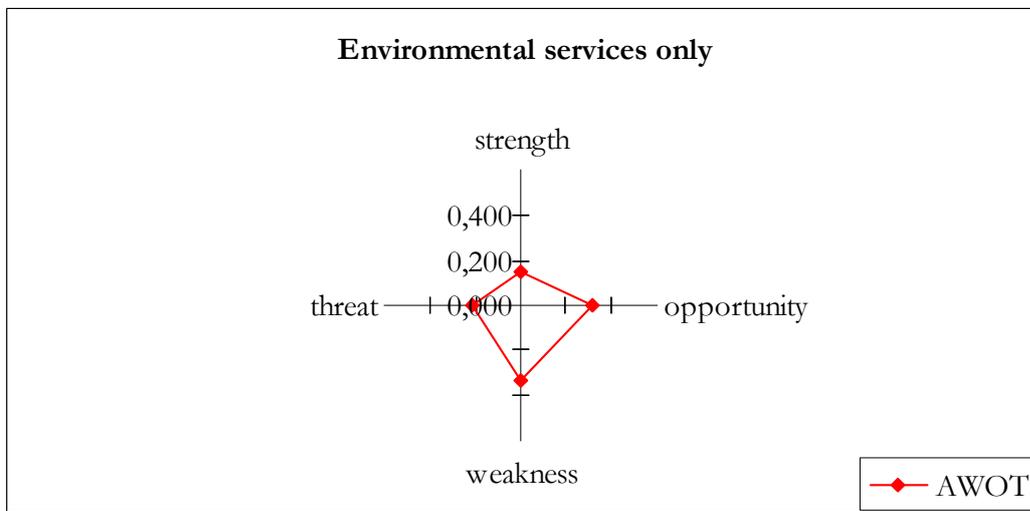
Table 4.2. Values of the A'WOT analysis for tourist and recreational service(s) only

Category	Value
S	0,336
W	0,243
O	0,222
T	0,200

In figure 4.2 Strengths still emerge as the stronger category, but the distance from the others is reduced. The good can still be considered to be quite consolidated, well established and set in the market. But the importance of the other factors is higher, and Weaknesses need to be taken into account since their value pass the others. Opportunities remain relevant.

Case c) production/commercialization of environmental service(s) only

Figure 4.3. A'WOT analysis concerning the production/commercialization of environmental service(s) only



The final values deriving from the analysis are reported in table 4.3.

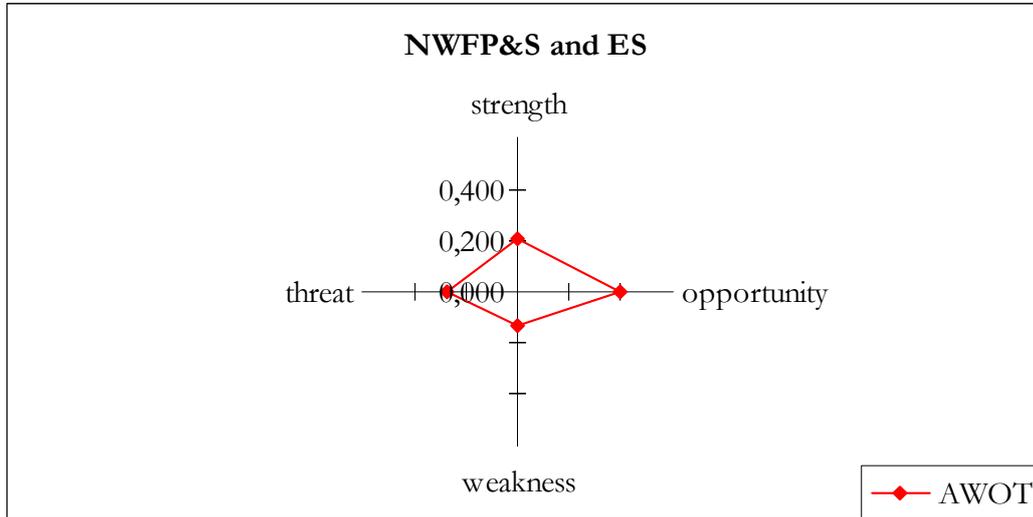
Table 4.3. Values of the A'WOT analysis for environmental service(s) only

Category	Value
S	0,152
W	0,328
O	0,312
T	0,208

In figure 4.3 Weaknesses appear to be the stronger category, but the distance from the Opportunities is reduced. Strengths reach the lower value. The good can be considered to be strongly affected both by internal and by external constraints. Anyway the high value of Opportunities indicates a promising evolution once the right strategy and organization of production and commercialization are reached. A consistent work for improving Strengths is required.

Case d) production/commercialization of NWFP(s) together with tourist and recreational service(s) and with environmental service(s)

Figure 4.4. A'WOT analysis concerning the production/commercialization of NWFP(s) together with tourist and recreational service(s) and with environmental service(s)



The final values deriving from the analysis are reported in table 4.4.

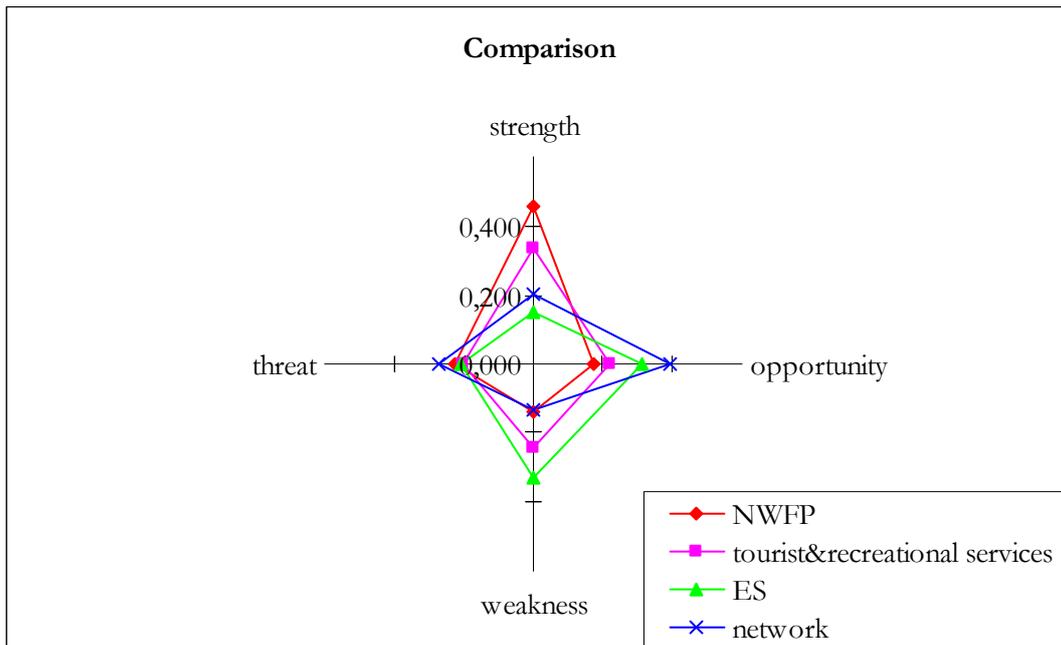
Table 4.4. Values of the A'WOT analysis per each category

Category	Value
S	0,203
W	0,132
O	0,391
T	0,274

In figure 4.4 Opportunities appear to be the stronger category, with a value quite far from the others. This is indicative of the good potentialities that the “joint management” or, in other words, a network including both NWFP and tourist and recreational services and also environmental services can have. Threats reach an high value too, but the same do strengths. So at the end this theoretical network seems to be enough equilibrate with a good chance for further improvement and development.

It is surely interesting to compare the results of this A'WOT analysis with those of the previous ones. A graphic comparison is proposed in figure 4.5.

Figure 4.5. Comparison of the A'WOT analysis concerning the theoretical cases



The case of the commercialization of ES alone is evidently the worse one. In fact it is characterized by the higher weaknesses and also by the lower value of strength. For what concerns threats, all the analysed theoretical cases lay more or less on the same level. The NWFP case shows the higher strengths, nearly followed by the case of tourist and recreational services. Both these cases also show the higher strengths. On the contrary, the ES case shows an higher opportunity value then NWFP and tourist and recreational services. These characteristics probably derive from the fact that NWFP and tourist and recreational services are easily managed and commercialized, while ES are difficult goods to be managed autonomously. The hypothetical network unifying these three goods seems to have interesting and promising characteristics according to the A'WOT analysis. In fact opportunities have the higher value. Threats, as already said, have a value similar to those of the isolated goods and weaknesses reach one of the lower values. Strengths are probably affected by the weak points of ES, so show a value higher than ES one but lower both of tourist and recreational services and of NWFP.

In conclusion, the network case shows a lower strength value, but also weaknesses have a lower one and opportunities have the higher one. Because of this it can be considered as the case having the better characteristics compared to the other three.

SWOT analysis of the case studies

A quick SWOT analysis²⁹ has been realized for the two considered network case studies. The SWOT analysis were prepared including the eventuality that some environmental service is added to the goods already produced and commercialized by each of the two networks. The aim of this is to see if a positive effect of this insertion of ES can be inferred. The environmental services to be included in the two networks were chosen according to the other goods already produced by the networks. The criteria adopted for the choice were those of: consistency with the other goods, judiciousness, and moderation in the number of ES. As a result, one ES has been included in the case of the “adventure park network” and two in that of the “Borgotaro mushroom network”.

In the “adventure park network” the included ES is carbon sequestration (CS). The presence of standing trees is strictly associated to the existence of an adventure park. In fact mature trees are needed to provide the proper scenery, and less mature trees (i.e. trees young enough to satisfy both dimensional and stability requirements) are needed for supporting the rope paths, the platforms, etc. At the same time these trees act for carbon sequestration and this ES could be measured and marketed without impeding the recreational service but providing an additional income.

In the “Borgotaro mushroom network” the included ES are carbon sequestration and biodiversity conservation (BC). For its own existence and functionality, this network is based on a carefully managed forest. This implies the presence of trees suitable of providing the CS service. Thus, the commercialization of this environmental service could be realized. At the same time, the well managed forest provides and guarantees an habitat for various animal and plant species. It is than offering a BC service that could be marketed and commercialized together with the other goods of the network.

Other ES typically associated to forests could be inserted in these networks (e.g. landscape, etc.) but, according to the principle of moderation, they have been left outside to avoid distorting the results with improbable and unrealistic elements.

The SWOT analysis of these two case studies have been prepared. Particularly, two SWOT analysis are proposed for each case study. The first one considers the eventuality in which the commercialization of an ES is inserted in the network. The second one consider instead the insertion of a whole PES scheme. The difference is subtle. In the first case the ES

²⁹ The two SWOT analysis have been realized by the author on the basis of the information available concerning the two case studies. Due to expediency and time reasons, they were not checked with the members and/or coordinators of the networks.

commercialization is planned but not yet implemented, thus uncertainty and difficulties prevail: it can be noted in the SWOT a consistent presence of elements such as “difficulties in defining in the SWOT”, “difficulties in defining ES price”, etc. The second case represent the further evolution, the time in which there is a well affirmed and working PES scheme and than elements such as “income increase” are present in the SWOT in place of the uncertain and negative ones.

The choice of proposing also the SWOT concerning the ES introduction has been made with the aim of highlighting the importance of the implementation of PES schemes. ES can not be considered as any other product or service, their commercialization is much more complex and PES schemes are fundamental tools for succeeding in it.

The Adventure Park network + ES (ES = carbon sequestration)*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • a small forest area is sufficient for the production of the NWFS • relatively low investment costs for NWFS • successful NWFS • synergies with other products or services of the same territory • <i>the ES is produced and sold by the same entrepreneur</i> • <i>the ES is less dependent by meteorology and climate (its income is more constant along the year)</i> • <i>no additional work is necessary for providing the new ES</i> 	<ul style="list-style-type: none"> • marketing and entrepreneurial skills are required • co-operation and coordination with the other network participants are required • <i>difficulties in defining the ES measurement system</i> • <i>difficulties in defining ES price</i> • <i>difficulties in organizing the ES payment system</i>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • “territorial marketing” • network enlargement • support by local public institutions • <i>enlargement of market share: new customers</i> • <i>new marketing opportunities</i> 	<ul style="list-style-type: none"> • competition for the same NWFS • NWFS highly dependent on meteorology and climate • <i>combining in the right measure NWFS and ES provision (establishing the optimum mix)</i> • <i>novelty of carbon market</i> • <i>carbon related policies (national and international)</i>

* the aspects concerning the eventual environmental services are *in italics*

The Adventure Park network + ES + PES (ES = carbon sequestration)

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • a small forest area is sufficient for the production of the NWFS • relatively low investment costs for NWFS • successful NWFS • synergies with other products or services of the same territory • the ES is produced and sold by the same entrepreneur • the ES is less dependent by meteorology and climate (its income is more constant along the year) • no additional work is necessary for providing the new ES • income increase 	<ul style="list-style-type: none"> • marketing and entrepreneurial skills are required • co-operation and coordination with the other network participants are required • difficulties in defining the ES measurement system
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • “territorial marketing” • network enlargement • support by local public institutions • enlargement of market share: new customers • new marketing opportunities • people interest 	<ul style="list-style-type: none"> • competition for the same NWFS • NWFS highly dependent on meteorology and climate • combining in the right measure NWFS and ES provision (establishing the optimum mix) • carbon related policies (national and international)

The “Borgotaro mushroom” network + ES (ES = carbon sequestration and biodiversity conservation)*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • consolidated and well known structure • strong link with the territory • PGI certification • network structure • support by local public institutions • “territorial marketing” • <i>two ES produced and sold by the same network members</i> • <i>the ES are less dependent by meteorology and climate (its incomes are more constant along the year and also in bad years for mushrooms)</i> • <i>no additional work is necessary for providing the new ES</i> • <i>practice in managing a certification scheme helps for the management of ES provision</i> 	<ul style="list-style-type: none"> • hasty tourists • risk of excessive pressure on forests • <i>difficulties in defining the ES measurement system</i> • <i>difficulties in defining ES price</i> • <i>difficulties in organizing the ES payment system</i>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • network enlargement • <i>enlargement of market share: two different potential kinds of customers</i> • <i>new marketing opportunities</i> 	<ul style="list-style-type: none"> • dependent on meteorology and climate (both NWFS and NWFP) • <i>combining in the right measure NWFS and ES provision (establishing the optimum mix)</i> • <i>novelty of carbon and BC markets</i> • <i>carbon related policies (national and international)</i>

* the aspects concerning the eventual environmental services are *in italics*

The “Borgotaro mushroom” network + ES + PES (ES = carbon sequestration and biodiversity conservation)

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • consolidated and well known structure • strong link with the territory • PGI certification • network structure • support by local public institutions • “territorial marketing” • two ES produced and sold by the same network members • the ES are less dependent by meteorology and climate (its incomes are more constant along the year and also in bad years for mushrooms) • no additional work is necessary for providing the new ES • practice in managing a certification scheme helps for the management of ES provision • income increase 	<ul style="list-style-type: none"> • hasty tourists • risk of excessive pressure on forests • difficulties in defining the ES measurement system
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • network enlargement • enlargement of market share: two different potential kinds of customers • new marketing opportunities • people interest 	<ul style="list-style-type: none"> • dependent on meteorology and climate (both NWFS and NWFP) • combining in the right measure NWFS and ES provision (establishing the optimum mix) • novelty of carbon and BC markets • carbon related policies (national and international)

These SWOT analysis rely on the specific characteristic of the concrete cases they concerns. Anyway they can be easily adapted to similar situations and thus they can be used as checklists like it was said for the theoretical cases. Furthermore, they can even be used as comparison tool for networks placed at a different (and especially a lower) level of evolution.

A’WOT analysis of the case studies

Like in the previous SWOT analysis, also in these two cases weights have been assigned by the author and have been defined independently one from the other for each point of the two SWOT analysis. Again, the same weights have been used for scaling the four categories, moreover, the same weights used for the other four A’WOT analysis have been adopted here: 90 for *Strengths*, 80 for *Weaknesses*, 100 for *Opportunities* and 90 for *Threats*. Opportunities have still been considered to be the most important aspect, while the values assigned to each of the four categories have been kept around a same level.

In order to allow a broader comparison and commentary on these two cases, A'WOT analysis were carried out considering both the SWOT of the network without ES and the SWOT of the network including the related ES.

The Adventure Park network + ES + PES (ES = carbon sequestration)

Figure 4.6. A'WOT analysis concerning the Adventure Park network + ES + PES

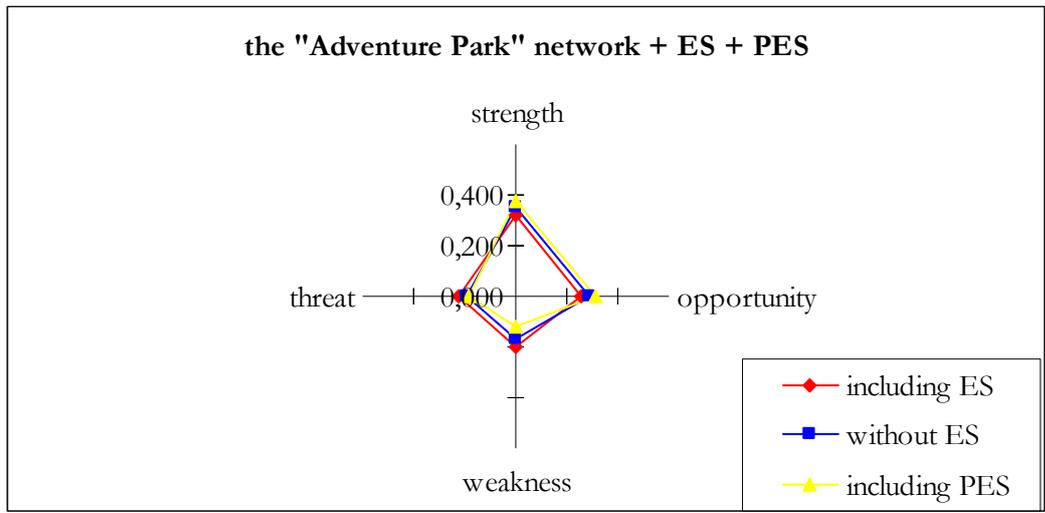


Table 4.5. Values of the A'WOT analysis for the case study both without and including ES

	Without ES	Including ES	Including PES
S	0,351	0,321	0,379
W	0,169	0,198	0,119
O	0,290	0,253	0,315
T	0,190	0,228	0,187

On the basis of the results of the analysis reported in figure 4.6 and in table 4.5 the following considerations can be made. The inclusion of a PES scheme shows an improvement of the situation through the increase of the values of Strengths and Opportunities and the decrease of those of Threats and Weaknesses. The mere insertion of an ES, on the contrary, seems to lead to a worsening of the situation, due to all that uncertainty factor present in the SWOT. All the three A'WOT of figure 4.6 are characterized by a distribution slightly tending to Strengths and Opportunities. This tendency is particularly noticeable in the case of the PES scheme and can indicate a successful development path the Adventure Park network should follow in order to develop itself.

The “Borgotaro mushroom” network + ES + PES (ES = carbon sequestration and biodiversity conservation)

Figure 4.7. A’WOT analysis concerning the Road of Borgotaro network + ES + PES

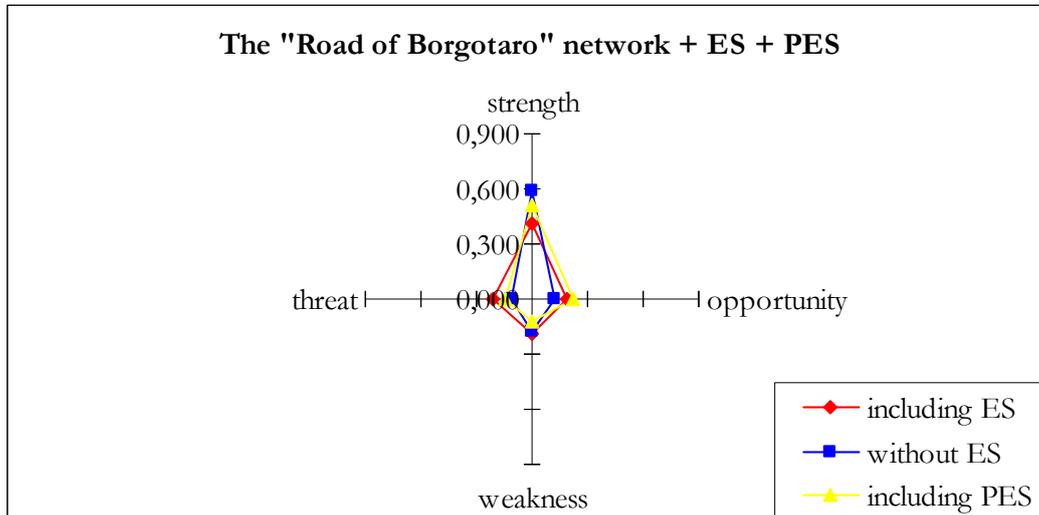


Table 4.6. Values of the A’WOT analysis for the case study both without and including PES

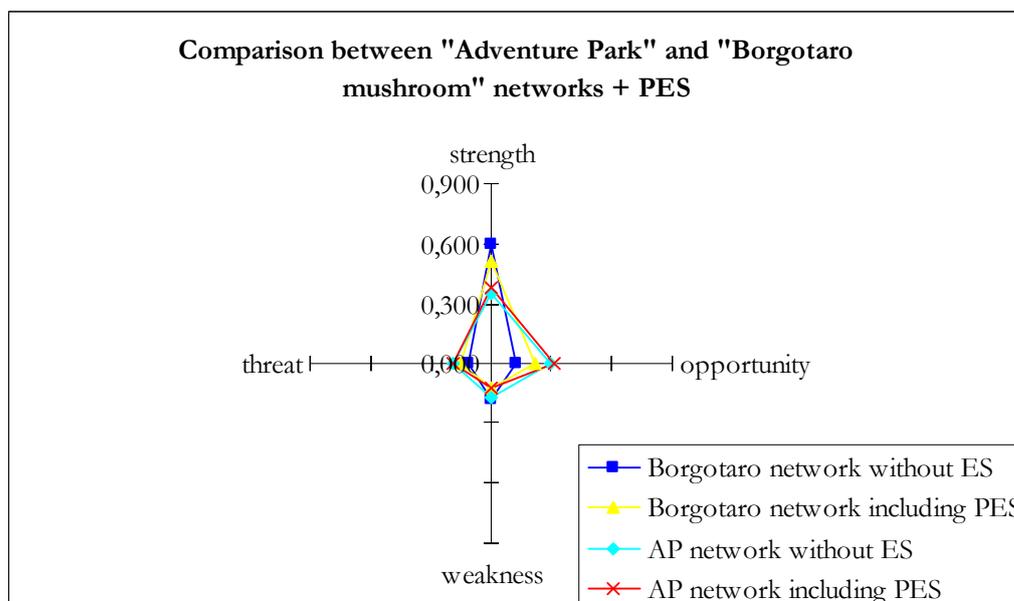
	Without ES	Including ES	Including PES
S	0,593	0,412	0,513
W	0,176	0,185	0,121
O	0,122	0,194	0,218
T	0,110	0,209	0,147

On the basis of the results of the analysis reported in figure 4.7 and in table 4.6 some considerations can be made with respect to the second case study. But before this it is necessary to make an important specification. In the SWOT analysis, and consequently also in the A’WOT analysis, of the “Borgotaro mushroom” network the two ES are included together in the same sentences. The A’WOT outputs would have been different if they were separated in two, since that would mean doubling all the related points. This decision has been motivated by the assumption that the analysis is eminently qualitative for what concerns the introduction of PES schemes. Furthermore, due to the mainly theoretical development of PES schemes, the actual knowledge of the probable differences in implementation for distinct ES is insufficient. Because of this the general result of the analysis should be confirmed in its tendency, and the difference should be concentrated only in the numerical outputs resulting from the A’WOT.

In general, the inclusion of a PES scheme shows a general improvement of the situation through the increase of the value of Opportunities and the decrease of those of Threats and Weaknesses. Only the value of Strengths decreases passing from the present network situation to the future one including PES schemes. This is probably due to the fact that actually the “Borgotaro mushroom network” is very well working and based on successful products and services, and than very strong. The modification into a different structure dealing with more uncertain ES will probably affect in some way the situation. Again, also in this case, the mere insertion of an ES seems to lead to a worsening of the situation, due to all that uncertainty factor present in the SWOT. All the three A’WOT of figure 4.7 are characterized by a distribution slightly tending to Strengths. This prove the solidity and the good organization of the network, that at the point that the inclusion of PES scheme will probably lead to only marginal improvements. Anyway, the increasing value of Opportunities can encourage to act in this sense.

Finally, an interesting comparison can be made among and the results of the A’WOT analysis of the two case studies. Figure 4.8 shows the graph concerning the case without ES and that including a PES scheme for both the considered networks.

Figure 4.8. Comparison of the A’WOT analysis of “Adventure Park” and “Borgotaro mushroom” networks



In both cases the eventuality of the introduction of PES scheme(s) in the networks shows a common tendency toward a general decrease of the Threats and Weaknesses value. The eventual increase in Strengths probably depends on the previous consistency of the other

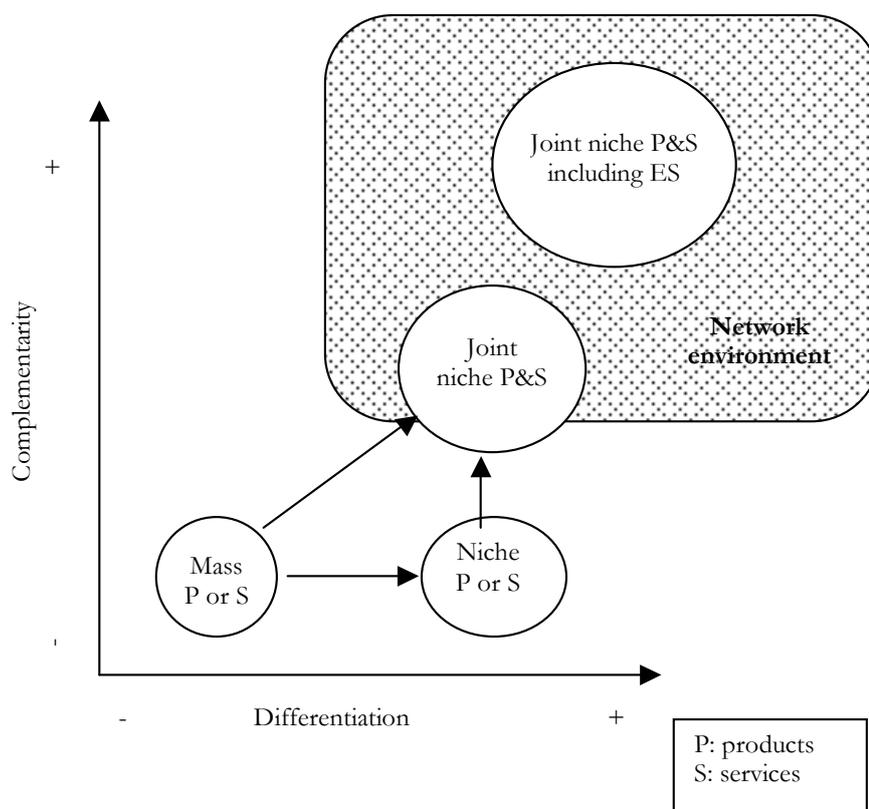
goods managed in the networks, where they are stronger a minor space for strength increase is available. Opportunities are anyway increasing also in already affirmed networks. It is interesting to note how younger network (such as “AP network”) are by far more unbalanced towards Opportunities, thanks to the larger space they still provide for growth and innovation.

As a conclusion, according to the results of the analysis, a positive result emerges from the integration of PES schemes in network structures of forest-based SME.

Conclusions

Given the characteristics of Italian forest resources and those of forest property and forest entrepreneurship, the inclusion of Environmental Services among the goods commercialized by forest owners and/or managers should be considered as a way for improving forest economy. As figure 1 shows, the achievement of this new step in the development path would consist of a further shifting towards an higher level of differentiation and of complementarity among forest goods. This process will open important opportunities for the rural development of forest areas. This potentiality is represented in figure 1 by the dimension of the circles. With the exclusion of mass goods, the circle dimension is also representative of an enlargement of the market size, i.e. of the number of customers.

Figure 1. Evolution of forest goods markets



Source: author's elaboration

In Italy, like in the other European and developed countries in general, the value of the Environmental Services is well recognized by now. Despite this, few results have been achieved until now for what concerns its internalization and the sound proposed solution (i.e. the PES schemes) still remain on a theoretical level. This work wanted to see how PES schemes can be put into practice thus becoming a durable, additional, income source for forest owners and/or managers acting in the context provided by developed countries.

The solution proposed for enabling this concrete realization of PES schemes is that of including them in network structures. In fact these organizations are already proving to be respondent to forest SME existence and development requirements and consequently an enlargement of them appears to be feasible and desirable. Actually forest-based SME networks are the organizations that allow the commercialization of complementary forest goods. At the moment, only NWFP&S are included in the basket of complementary goods that are commercialized so this work aimed at demonstrating that the introduction of ES can be expected to be worthwhile and successful.

Figure 1 shows that the increase of the market size (i.e. the final objective) can be especially significant for the last group of goods (i.e. the complementary goods including also environmental services), since it includes also customers external to the productive area but interested in buying the environmental services generated there. It is also evident that the last two groups of goods are included in a “network environment” (i.e. are based on network organizations) that allows them to work and succeed.

Consequently, an increase of income for forest owners and/or managers is expected passing from mass goods, to niche goods, to joint goods and finally, as a last step, to joint goods including also environmental services.

The A’WOT analysis carried out for the two case studies seem to confirm this hypothesis since both indicate an increase in *Opportunities* level when passing from the network without ES to that including them. At the same time, also a more or less important reduction of *Threats* and *Weaknesses* levels appears, thus reinforcing the previous indications. Interesting is the case of *Strengths* levels where the two case studies show different results. In the case of the Adventure Park network, a network classified as “Development Circle/Loose Cooperative Circle” (i.e. at first step of networks’ evolutionary path), the introduction of ES increases *Strengths*. On the contrary, in the case of the Road of Borgotaro mushroom network, a network classified as “Project Group” (i.e. near to the top of networks’ evolutionary path), the introduction of ES decreases *Strengths*.

This could depend from the fact that various networks, characterized by different levels of evolution and of activity on the market, have reached different levels of stability and

economical success. Consequently, the younger ones that are already searching for stability may obtain a higher improvement by the inclusion of ES among commercialized goods. On the contrary, the positive effect of ES introduction in well established and implemented network can be less relevant, furthermore they and can be more difficult to introduce.

Anyway, the results obtained by these analysis can only be considered as indicative. Only carrying out the analysis with much more detailed data for each case studies (especially data concerning the ES) more reliable and significant results will be available. To do this, it will be necessary to wait for more precise information concerning the rules of the various ES markets to be established.

In any case, it can be concluded that the development of a SME network-based PES scheme seems to be a proper tool to facilitate the commercialization of environmental services originating from Italian forests thus giving a new impulse to forest economy.

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