Developing the edible wild mushroom sector in Tunisia

The Micosylva project

by Donia ABDELWAHED

Non-Wood Forest Products offer an important potential for rural development contributing to diversification of rural economic activity and boosting household incomes while protecting and increasing the value of natural resources. Among these products, Tunisia has edible wild mushrooms of commercial value. These mushrooms have attracted the interest of European markets but also, to a lesser extent, those at the national and local level. The aim of this paper is to provide insight into the added value chain of edible wild mushrooms in Tunisia.

Introduction

Even though the rural communities living in Tunisia's forested and woodland areas are surrounded by the forests' diverse wealth of resources and services, 45% of this forest-based population lives below the poverty line compared to 15.5% nation-wide (National Forestry Service - DGF, 2012). Also, this population had an unemployment level of 30% in 2012 compared to the national level of 19% (National Statistics Institute, 2012). However, these statistics from the NSI reveal that a very big part of this population is employed in agriculture, forests and fishing[1] and 38% of its income stems from the forestry sector.

Depending on the season, these self-employed inhabitants gather, transform and sell certain NWFP (non-wood forest products), i.e. cork, medicinal and aromatic plants, Aleppo pine seeds and stone pine kernels, saw wood, etc. The edible wild mushroom sector, like others, is nevertheless often faced with assorted constraints of an institutional, regulatory or organisational nature, as well as collecting methods that are sometimes unsuitable and destructive.

1 - http://www.ins.nat.tn/fr/rgph2.6ens.php? Code_indicateur=0306013

Picture 1:
A mushroom picker's harvest.
© Donia Abdelwahed.

Hence the imperative need to define a strategy for the establishment and promotion of a chain of added value for edible wild mushroom activities. Cooperation between the different key players in this sector — research bodies, the Forestry Service, local communities and the private sector — will enhance knowledge and understanding to result in better management of natural resources and in a better return for local skills and knowhow.

Table 1:
Description of the main species of edible wild mushroom sold in Tunisia.

English name	Latin name	Habitat	Season	Edibility
Chanterelle	*Cantharellus cibarius*	Grouped or single, under conifer or broadleaf	Autumn	Excellent Edible
Horn of plenty	*Craterellus cornucopioides*	Under broadleaf	Autumn	Excellent Edible
Royal agaric	*Amanita caesarea*	Under oaks	Early autumn	Excellent Edible
Boletus	*Boletus edulis*	Under conifer or broadleaf	Early autumn	Excellent Edible
Yellow foot	*Cantharellus lutescens*	Grouped under pines	From late autumn until winter	Good Edible
Saffron milk cap	*Lactarius deliciosus*	Mainly under piness	During autumn and winter	Good Edible
Sweet tooth/ hedgehog	*Hydnum repandum*	Mainly under conifers	Autumn	Good Edible

Chain of added value for the edible wild mushroom sector: what's what

Misunderstood potential…

Almost nothing exists by way of documentation and studies on the diversity of wild mushrooms growing in Tunisian forest and woodlands, on their localisation and their abundance. This is because drawing up a mycological inventory and carrying out a study of species distribution in relation to ecological and biological conditions is not only a long-term project but requires multidisciplinary competence for the observation and analysis of the dynamics and evolution of distribution areas (GUINBERTEAU and COURTECUISSE, 1997). Furthermore, special attention needs to be paid to the socio-economic implications of collecting and selling mushrooms and to the possibilities for optimizing their use so as to limit excessive exploitation by users and preserve natural resources.

The exact number of edible wild mushroom species has not yet been listed. The best known are those of interest to the export market: saffron milk cap, royal agaric, horn of plenty, boletus, chanterelle, sweet tooth/hedgehog (see Table 1).

The weakest link…

Various stakeholders are involved in the chain of added value centred on Tunisia's edible wild mushrooms. Since the 2011 Revolution, several small companies and retail dealers have tried to break into the export market but have inevitably been faced with competition from the big players in exports.

The pickers (men and women living in and near the forests and woodlands) travel on foot over distances between 5 and 15 kms from their homes. The harvest is limited to the varieties known to be edible and ordered by the clientele. The share of income derived from mushrooms is difficult to quantify. Commercial picking by users is forbidden by article 39 of Forestry Code[2]. Despite the fact that mushroom picking represents an economic activity that has burgeoned in recent years, it remains an undercover practice so

the locals have to sell to the first buyer who comes at take-it-or-leave-it rates.

The variation in prices along the various parts of the added value chain, as shown in Table 2, reflects the forest-based population's lack of knowledge about the commercial value of wild mushrooms and highlights the absence of market transparency and stability. In addition, competition between the regions, the irregular availability of the product, inadequate knowledge about storage and packaging conditions and methods of conservation reinforce the hit-and-miss, unstructured nature of mushroom picking and, above all, lead to massive pressure on the forest ecosystem.

Mushrooms	Picker price DT/kg	Middleman price DT/kg	Exporter price DT/kg
Chanterelle	9	11	27.5
Horn of plenty	3	6	7
Yellow foot	2.5	5.75	7
Boletus	4.25	5.5	15
Royal agaric	2.5	3.5	7.5
Sweet tooth/Hedgehog	2.5	4.5	7
Saffron milk cap	2.5	4.5	7

Source: data obtained from individuals in the field.
1 Tunisian dinar (DT) equals 0.48 Euro
1 dollar equals 1.94 Tunisian dinars (DT)

Table 2:
Review of wild mushroom sale prices by species and by different sellers in the sector.

Regulations that favour the few

From 1992 to 2010, allocation of forested plots for mushroom picking took place annually and only by private agreement (see Table 3). From 2010 onwards, plots to be used for picking have been allocated by calls for tender, or by private contract in some cases, as prescribed by article 18 of the Forestry Code [3]. As a consequence, the number of export companies dealing in edible wild mushrooms has multiplied and competition for obtaining gathering rights and getting supplies from local pickers is fiercer. This has confused the resident forest population which is now at a lost to know how to profit from the changed situation. Moreover, to obtain rights for exploitation entails taking part in the adjudication procedure or in private negotiations and the local population frequently lacks the means to take on the big companies. Thus, undercover gathering continues as a way of ensuring at least a minimum income.

There is also a fluctuation in the areas of land devoted to mushrooming. This is due above all to inadequate understanding of the mycological potential of the forest and woodland zones (inventory, annual yield, distribution…) and of sustainable and rational management of the plots involved. In adjudication contracts, the guideline specifications actually make the dealers responsible for checking the accessibility of the plots, their condition, productivity and the diversity of their mushroom species with commercial potential!

Table 3:
Evolution in the areas devoted to edible mushroom picking and their value.

Year	Areas available (ha)	Areas rented out (ha)	Value (DT)
1992	72 649	61 787	17 744
1993	77 529	1816	480
1994	58 478	500	260
1995	37 701	800	940
1996	42 174	5500	11 000
1997	38 592	0	0
1998	180 126	91 303	41 950
1999	180 126	180 126	60 100
2000 - 2003	180 128	180 128	200 000
2004	180 128	180 128	15 600
2005	180 128	180 128	28 800
2006	180 128	180 128	28 800
2007 - 2008	163 000	163 000	32 000
2009 - 2010	163 000	163 000	16 000
2011	172 126	122 255	72 600
2012	172 126	144 126	61 000

Source: Ministry of Agriculture
1 dollar equals 1.94 Tunisian dinars (DT)

2 - Article 39 of the Forestry Code, for example:
"*Such customary uses will continue to be allowed to the benefit of the general public as long as the woods are not caused to suffer nor such uses become commercial or industrial in character: they include gathering mushrooms, moss, wild flowers, capers, blueberries, etc., unless the Minister in charge of forests decides otherwise.*"

3 - Article18 of the Forestry Code 2010
"*The sale of any product, whatever its nature, coming from state forests can only be done by public adjudication with minimum prior notice of fifteen days published in the press (…) However, in the event of emergency or for reasons duly justified or when sale by public adjudication is impossible, sale by private agreement can take place. The conditions for such private agreements and the minimum threshold levels of authority of those authorised to proceed with such sales are fixed by government order as proposed by the Minister in charge of agriculture.*"

Promotion and protection: two sides of the same coin

The development of NWFP, and particularly mushrooms, is inherently linked to their conservation. A better understanding of forest resources is a priority for any sustainable management and development strategy.

It is recognized that funguses and mushrooms play a fundamental role in the protection, ongoing survival and diversity of forest ecosystems. Hence, the notion of "mycosilviculture" is justified; it has been tried out and studied in numerous countries. Its basic principle is to take into account in forestry management the ecology of mushrooms and their production. Mycosilviculture also aims to improve the financial return from silvicultural methods (which generally entail high costs) by enhancing the production and diversity of edible wild mushrooms which frequently have a greater economic value than wood. It is thus possible to manage both resources at one and the same time.

Picture 2:
Juan Martinez de Aragon from the CTFC (Forest Sciences Center of Catalonia) on his visit to Tunisia.
© *David Solano.*

Micosylva – a model worth following…

The Micosylva project is an inter-regional European project based on the concept of "*the sustainable, multifunctional management of forests and woodlands which integrates and makes profitable use of the ecological, social and economic features of edible forest mushrooms* [4]". This project has generated Micosylva+ which disseminates the new knowledge and knowhow related to the management, development and socio-economic enhancement of forested areas.

The approach combines three disciplines: forestry science and technology (centred on the way trees and stands function), mycology (focused on mushrooms and how they function) and pedology (focusing more on the physical and chemical features of soils than on the biological). This approach provides a better basis for an overall view of the situation prevailing in an area under forest. Then, on the basis of such previously-established diagnosis, a management and improvement plan is drawn up and tried out in the field. Thus, the methods employed can be adjusted and adapted in the light of the evolution both of the forested area and of the specific objectives.

This project has also involved bodies working on development so that enhanced advantage has accrued to the local and regional communities through greater awareness, public education and ecological tourism.

Mycologists from the Forest Sciences Center of Catalonia (CTFC), a partner in the Micosylva project, visited the sites in Tunisia for the purpose of assessing the mycological potential of the resource as well as the methods of management and exploitation. These experts confirmed the positive mycological potential, given the favourable conditions for production obtaining in the forested areas of North-West Tunisia. With the work carried out in Catalonia by the CTFC as a reference, the consultants considered that it was most relevant for Tunisia to draw up an inventory of mushrooms and then monitor them over the long term in order to:

– provide management, producers and consumers with decision-making tools grounded as much as possible on the realities of potential production;

4 - http://formagri-65-vic.fr/MICOSYLVA/

– understand the impact of forestry management and development on the mycological resource;

– develop the socio-economic advantages of the sector while at the same time encouraging the participation of the user population and the general public in measures for the preservation of forest and woodland heritage.

Conclusion

To make the most out of this resource, it will obviously be necessary to raise awareness of its potential. But there is even greater need to better understand this potential and its limits. Given the increasing demand by export markets for "more and better", it will absolutely essential to adapt the regulatory framework taking into account the upstream element of the added-value chain: the forest inhabitants who are the source of supply of the products. The development and organization of harvesting activity and the various stages of storing, packaging and stocking should create job opportunities directly at the local level. In this context, the profitable use and sustainable management of edible wild mushrooms necessarily implies the transfer of knowledge, further education and professional training and technology transfer.

D.A.

Pictures 3 & 4:
Saffron milk cap, *Lactarius deliciosus* (top)
and Sweet tooth/hedgehog, *Hydnum repandum* (below).
© *D.A.*

References

CTFC, 2013, Rapport de mission dans le cadre du projet TCP/TUN/3304, Appui à la promotion des micro-entreprises forestières basées sur les PFNL pour améliorer le niveau de vie des populations forestières et une gestion durable des ressources forestières tunisiennes : Filière champignons sauvages comestibles, pp. 22.

Direction générale des forêts, 2012, La population forestière en Tunisie : un référentiel économique et social national, pp. 34.

D. Abdelwahed, 2013, Rapport de stage : Appui à la promotion des micro-entreprises forestières basées sur les PFNL pour améliorer le niveau de vie des populations forestières et une gestion durable des ressources forestières tunisiennes : Filière champignons sauvages comestibles, Projet TCP/TUN/3304, pp26.

J. Guinberteau, R. Courtecuisse, 1997, Diversité des champignons (surtout mycorhiziens) dans les écosystèmes forestiers actuels, *Revue forestière française,* 49:25-39.

J. Rondet, N. Seegers, L. Rigou, G. Arlandes et F. Martinez-Peña, la micosylviculture : méthodes de diagnostic et de gestion, Micosylva+, Editor: Chambre d'agriculture de la Dordogne, Union Grand Sud des Communes forestières, Fundación CESEFOR, Centre Tecnològic Forestal de Catalunya (CTFC), ZASNET, pp 51.

INS, 2012, Enquête nationale sur la population et l'emploi 2012, pp 223.

Donia ABDELWAHED
abdelwahed.donia@gmail.com

Summary

Non Timber Forest Products (NTFPs) in Tunisia offer an important potential for rural development contributing to diversification of rural economic activities and to increase households incomes while protecting and increasing the value of natural resources.
All matter-experts would agree that these products complement the household's agricultural production, providing food, products for medicinal use, fodder and food supplements for livestock, etc. Among these products, the edible wild mushrooms of commercial value. These mushrooms attracted the interest of European markets and, to a lesser extent, at national and local level. With the lack of knowledge and expertise on the ecological and socio-economic value of edible mushrooms, this product is undervalued and not economically developed.
The objective of this paper is to provide insights on the value chain of wild edible mushrooms in Tunisia. The study also presents the example of Micosylva project as a pilot experience in the Euro-Mediterranean region and which may be replicated in Tunisia to improve knowledge bases on wild edible fungi and the development of its value chain.

Résumé

La valorisation des produits forestiers non ligneux (PFNL) représente en Tunisie un potentiel pour le développement rural, susceptible de diversifier les activités, d'améliorer les revenus de la population forestière ainsi que la protection et la promotion des ressources naturelles.
Il est connu que ces produits complètent la production agricole des ménages en leur apportant des compléments d'alimentation, des produits à usage médicinal, du fourrage, de la paille, etc. Parmi ces produits, on trouve les champignons sauvages comestibles à potentiel commercial. Cette filière suscite l'intérêt du marché européen, mais dans une moindre mesure à l'échelle nationale et locale. Face au manque de connaissances sur sa spécificité, son intérêt et sa valeur commerciale, cette ressource reste très peu valorisée et marginalisée en Tunisie.
L'objectif de cet article est de présenter un aperçu sur la chaîne de valeur des champignons sauvages comestibles en Tunisie. L'étude présente également l'exemple du projet Micosylva comme une expérience pilote menée dans la région euro-méditerranéenne et qui devrait être répliqué en Tunisie pour améliorer les connaissances de bases sur les champignons sauvages comestibles et le développement de leur chaîne de valeur.

Resumen

Los Productos Forestales No Madereros (PFNM) en Túnez ofrecen un potencial para el desarrollo rural, contribuyendo a diversificar las actividades económicas rurales y a incrementar los ingresos de la población forestal a la vez que se protegen y promocionan los recursos naturales.
Es bien sabido que estos productos complementan la producción agrícola de los hogares, proporcionando alimento, productos de uso medicinal, forraje, paja, etc. Entre estos productos, las setas silvestres comestibles de valor comercial. Este sector suscita el interés del mercado europeo y, en menor medida, a nivel nacional y local. Dada la falta de conocimiento y experiencia sobre el valor socio-económico de las setas comestibles, este producto permanece infravalorado y no desarrollado económicamente en Túnez.
El objetivo de este artículo es el de proporcionar una visión general sobre la cadena de valor de las setas silvestres comestibles en Túnez. El estudio también presenta el ejemplo del proyecto Micosylva como una experiencia piloto en la región euro-mediterránea y que podría reproducirse en Túnez para mejorar las bases de conocimiento sobre los hongos silvestres comestibles y el desarrollo de su cadena de valor.