Income generation from wild mushrooms in marginal rural areas

Mattia Cai, Davide Pettenella*, Enrico Vidale

Università di Padova, Dipartimento Territorio e Sistemi Agro-Forestali, Viale dell'Università 16, 35020 Legnaro (PD), Italy

ABSTRACT

Harvesting wild edible fungi for recreation, home consumption or to supply small local markets has traditionally been a popular activity in rural Finland. Yet some species, such as ceps (Boletus edulis) and pine boletes (Boletus pinophilus), which are well appreciated in Southern Europe, were not exploited commercially. In the past decade, international trade in previously unused mushroom resources has increasingly provided rural communities with additional earning opportunities. In this article we document the emergence in Eastern Finland of a wild edible fungi industry, describe its value chain, and assess its significance as a source of income for disadvantaged rural dwellers. The data for the analysis were collected through interviews with the management of Finland's largest wild mushroom business, and an extensive survey of the pickers who supply the company.

1. Introduction

Over the past two decades, interest in commercial harvesting of wild edible fungi (WEF) has increased considerably in many regions (Monserud et al., 2003; Merlo and Croitoru, 2005; Pettenella and Kloehn, 2007). In most cases, this happened as expanding markets for specialty products, decreasing wood prices and restrictions on logging made the economics of wild mushrooms more attractive (Alexander et al., 2002; Palahi et al., 2009). In some forests the market value of wild mushrooms may well be as high as that of timber (Pettenella and Secco, 2006). Indeed, several countries have attempted to promote the emergence of a WEF industry as a means of providing incentives for forest conservation and improving the earning opportunities of people living in marginal rural areas (Härkönen, 1998; Ortega-Martínez and Martínez-Peña, 2008; Kilchling et al., 2009).

Despite the growing interest in picking wild mushrooms in developed countries, in most cases the social, economic and environmental implications are largely unknown because of a substantial lack of data. Statistical information on volumes collected and values is patchy and often unreliable (Vantomme, 2003; Boa, 2004) and there are only a few published accounts of how the WEF industry operates. The region where commercial picking of wild mushrooms has probably been most thoroughly described is the Pacific North-Western United States (e.g. Schlosser and Blatner, 1995; Pilz and Molina, 2002). In Europe, few studies of commercial wild mushroom gathering could be located: Dyke and Newton (1999) surveyed pickers, buyers and landowners to assess the sustainability of the WEF industry in Scotland; in Northern Spain, De Román and Boa (2006) analyzed the extent to which a small rural community has been affected by the gathering and marketing of Lactarius deliciosus.

In this article we document the emergence of commercial wild mushroom harvesting in Eastern Finland, describe the industry's value chain and assess its contribution to rural development in an area where the population is slightly more than half a million, sparse and dwindling, and the rate of unemployment has historically been high compared to its national counterpart. In 2009, indeed, the unemployment rate in Eastern Finland, which until recently was designated as a less developed region under the European Union's regional policy, exceeded 11%, second only to that of Lapland, the northernmost part of the country (Statistics Finland, 2010).

In addition, a combination of external shocks (e.g. the Russian adoption of a wood export tariff in 2008) and long-term downsizing trends in the wood and paper sector have resulted in significant job losses in forestry and related industries, which traditionally represented a key component of the regional economy.

Our analysis devotes particular attention to the harvesters who gather the WEF from the forest, as they represent the vast majority of those involved in the industry. Even in developed countries, very little is usually known about the socio-economic characteristics of the pickers, their practices, and returns from the activity. With the aim of identifying how many and what types of people engage in commercial gathering of WEF, quantifying the time devoted to the activity and the amounts collected, and assessing the economic significance of this source of income, we ran an extensive survey of Eastern Finland's pickers. Our analysis has been facilitated by the presence in the area of Finland's largest WEF company, Dalla Valle OY.

Forest managers and researchers in several countries have reported that pickers are unwilling to share information about their activities because of a combination of jealously guarding good sites, awareness that they access the resource without a required

* Corresponding author. Tel.: +39 049 8272741; fax: +39 049 8272772.
E-mail addresses: mattia.cai@unipd.it (M. Cai), davide.pettenella@unipd.it (D. Pettenella), enrico.vidale@unipd.it (E. Vidale).

1389-9341/– see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.forpol.2010.10.001
authorization, and worries about possible changes in WEF regulations. In the specific case of Finland, friendly legislation leaves pickers with few reasons to be suspicious of inquiry. Under the so-called every-man’s right, anyone is entitled to collect wild foods from a forest, irrespective of land ownership. Also, any revenues from the sale of their harvest are exempted from income tax.

Indeed, Finland’s pickers of wild edibles have been the subject of a handfull of studies. Once necessary for subsistence, collecting wild foods from the forests now largely represents a form of recreation. While its popularity is sometimes described as declining, the activity is still very common: more than one Finn in two appears to participate foods from the forests now largely represents a form of recreation. A study collected than WEF (Saastamoinen and Lohiniva, 1989; Saastamoinen et al., 2000; Kangas and Markkanen, 2001; Pouta et al., 2006). A study specifically on the collection of WEF was carried out by Sievänen et al. (2004) using data from a large survey of outdoor activities conducted in the late 1990s. They observed that as many as 73% of Finnish adults possess the necessary skills to pick WEF (e.g. distinguishing edible from poisonous mushrooms, wandering in a forest without getting lost, a basic understanding of the forest ecosystem). While picking abilities are widespread, actual involvement and target species vary widely across locations, with Eastern Finland being the region with the largest share of WEF pickers (50% of the population). Picking effort is also found to respond to the abundance of the crop. Being closely linked to the weather, the availability of WEF can vary dramatically from one year to another. When the crop is poor, both the rate of participation and the number of harvesting trips to the forest appear to decrease substantially. Unfortunately, the study by Sievänen et al. (2004), consistently with its focus on recreation, produced little evidence on the commercial aspects of WEF collection. No information is available about the quantities picked, the share that is collected for sale as opposed to home consumption, and the earnings of the pickers.

The remainder of this article is organized as follows: Section 1 gives a brief description of the survey and outlines the methodological aspects of the subsequent analysis; Section 2 documents the emergence of a local WEF business; Section 3 presents the results and the discussion of our survey; Section 4 concludes.

2. Materials and methods

The operations and socio-economic impacts of Eastern Finland’s WEF industry are described using information from two main sources: interviews with the management board of Dalla Valle OY, a WEF business with large operations in the area, and a survey of the pickers who supply the company. The wholesaler that places most of Dalla Valle OY’s fresh ceps on the Italian market was also interviewed. Due to the tight schedules of company staff during the WEF high season, the interviews took place over a relatively long period of time stretching from late 2007 to late 2008. Whenever possible the answers were validated against official forestry statistics (METLA, 2008).

The survey of the pickers was conducted in August and September 2008, throughout the mushroom gathering season. At selected Dalla Valle OY purchase points located throughout North Karelia, in Eastern Finland, pickers who approached the company to sell their harvest were administered a questionnaire which asked for information about their mushroom gathering activities, socio-economic characteristics, and concerns pertaining to the picking of wild mushrooms.

Of the 1652 questionnaires handed out, about 5% were returned, but only 750 had complete answers to all the questions of interest, which amounts to a 45% response rate. In fact, the only problem with the great majority of the incomplete questionnaires is that they lack answers to the questions about collected quantities (i.e. about revenues). However, no evidence was found of selection bias, and it can be safely assumed that answers are missing at random.

Using cluster analysis, pickers were divided into internally homogeneous groups on the basis of measures of their picking effort (amount collected and picking days per season, percentage sold, and length of a typical gathering trip). At a preliminary stage, hierarchical clustering algorithms were used to identify the appropriate number of groups. Subsequently, the sample was partitioned using the k-means algorithm with Euclidean dissimilarities. Variables were rescaled to be in the [0,1] interval. Differences among groups are described by means of linear discriminant analysis.

The probability that a picker belongs to a given group was then modelled as a function of socio-economic characteristics (age, sex, education and occupational status) using logistic regression. We also present the results of separate ordinary least-square regressions of time spent on mushroom gathering trips and total commercial harvest on socio-economic characteristics. The statistical analysis was carried out in Stata (2007).

3. The development of a local WEF industry Dalla Valle

Over the years, Finland’s governments have tried to promote the use of wild mushrooms through a variety of rural policy measures. Early attempts to encourage collection for food after World War II were not very effective (Härkönen, 1998). In the 1970s, efforts intensified to develop the commercial uses of wild mushrooms and other non-timber forest products. Several local and national projects were established to train mushroom advisers. Revenues from collecting wild edibles were exempted from income tax, and tax relief was introduced for companies purchasing wild mushrooms or berries (Saastamoinen, 1999). A statute on WEF was passed and a list of commercial species published.

For a short period in the mid-1990s, direct subsidies were implemented to encourage mushroom and berry businesses to expand their operations. A trader would receive 3 Finnish Marks (about .50 Euro) for every kilogram of mushrooms bought from the pickers. It was at about this time that two wholesalers and a berry entrepreneur teamed up to found Dalla Valle OY.

Until mushroom export companies began to appear in the early 1980s, very few businesses were active in mushroom collection in Eastern Finland and focused only on marketing a few locally well-known species (Lactarius trivialis, Lactarius rufus, Cantharellus cibarius and Russula spp.) in the urban areas of the country. Some species that command fairly high prices on foreign markets, such as ceps (Boletus edulis), received little interest.

Since the 1997 season, Dalla Valle OY has purchased wild mushrooms — mainly but not exclusively ceps — from pickers, and marketed most of its output in Southern Europe. Because ceps were not popular among North Karelia’s pickers, the company had to devote substantial effort to training. Leaflets were distributed to explain why, when and how to collect boletes. Communication with potential pickers is also crucial in order to secure a stable supply of mushrooms. Ensuring that enough mushrooms are available for sale is one of the most critical issues in the WEF industry. To this end, Dalla Valle OY advertises massively in the local and national press, and dispatches information to pickers through its newsletter. In the summer of 2008, Dalla Valle OY’s website had about 14,000 registered users who regularly received mushroom news on their cellphones. At the peak of the 2003 season the number of pickers supplying the company was reportedly between 15,000 and 20,000.

In each major town, the company operates permanent ‘collection points’ where pickers can sell their harvest throughout the season. In addition, daily trucks (‘lines’) drive to more remote areas that are deemed strategically important. Depending on the local crop and the conditions that prevail on the international market, picker-level prices range from 3 to 10 Euro/kg for high-grade ceps, and from 1 to
3 Euro/kg for medium-grade. Low-grade ceps are purchased for less than 1 Euro/kg. Chanterelles (C. cibarius) and black trumpets (Craterellus cornucopioides) are bought for 4 to 7 Euro/kg.

At day’s end, the whole harvest is delivered to the central processing facility in Sotkuma, from where it can take three different routes. Ceps may be sold either fresh or frozen, depending on quality and market demand, and shipped to Italy or, more rarely, to other Southern European countries. Mushrooms other than ceps, which account for only a minor share of Dalla Valle OY’s revenues, are sold locally to food processors or as fresh products at municipal markets.

Fresh boletes are sorted, cleaned, packed in suitable boxes and shipped either on the same day they were collected, or within the next 24 h if the amount fails to reach a certain threshold size. Because of the difficulties in supplying a multitude of buyers with modest quantities of a highly perishable product, the company relies on a wholesaler to place its fresh ceps on the Italian market. Typically, wholesalers buy fresh high-grade ceps at prices between 9.50 and 12 Euro/kg. Rarely does the price of medium- and low-grade mushroom rooms exceed 3–5 Euro/kg.

While many mushroom wholesalers operate in Italy, only a few of them trade in fresh products. As a result of high handling costs and wholesaler market power, retailers pay prices in the range 16–24 Euro/kg for fresh high-grade ceps. Consumer prices vary between 18 and 40 Euro/kg.

Production exceeding demand for the fresh product and lower-grade mushrooms that are not suitable for sale as fresh are frozen. Far less perishable, the frozen product is marketed, at least partially, without intermediation by a wholesaler. Dalla Valle OY directly supplies many small and medium Italian firms at prices of about 12 Euro/kg plus shipping costs (20–40 Euro/kg) for high-grade ceps and 5 Euro/kg for medium-grade.

In 2007, Dalla Valle OY accounted for about 45% of the total volume of WEF collected in Finland (90% of ceps). Inevitably, its revenues are closely linked to local availability of WEF. A poor crop affects output not only because there are fewer mushrooms to be picked, but also because fewer pickers collect them. Sale prices, on the other hand, are relatively unresponsive. As a result, the company’s turnover can change by one order of magnitude from one year to another. Over the past few years, Dalla Valle OY’s total revenues ranged between 444,000 Euro in 2007 and 5.5 million Euro in 2003.

Following a boom harvest in 2003 (1100 tons), the company received enthusiastic coverage from the local media and official praise from the government for generating considerable economic opportunities for disadvantaged rural dwellers (Minister of Foreign Affairs of Finland, 2007). Regional forest planning documents cited Dalla Valle OY as a model that should be replicated with other natural areas of Finland, 2007 (Statistics Finland, 2008a). Based at summer cottage .056 n.a.

### 4. Results and discussion on the socio-economic characteristics of the pickers

Because the availability of WEF is intrinsically variable, a survey of the pickers may produce rates of participation and estimates of quantities collected that are remarkably different depending on whether the research hits a favourable or an unfavourable year. In this respect, the 2008 season was average and, to some extent, can be taken as representative of a typical year. Table 1 presents summary statistics for key socio-economic characteristics and measures of mushroom picking activity.

Enumerating all the pickers who supplied Dalla Valle OY was not possible because of time and budget constraints. Yet, company records, survey results and anecdotal evidence combine to suggest a total number of between 2500 and 3000.

Levels of activity can differ markedly from one picker to another. On average, over the course of the season, a picker spent about 90.76 h (s.d. 105.00) collecting mushrooms in the forest and sold 113.91 kg (s.d. 181.42) to Dalla Valle OY. At 2008 prices, this implies revenues of around 420.32 Euro. Mean harvest is 1.69 kg/h (s.d. 1.51), which would earn a picker about 6.22 Euro/h, little more than half the wage rate for a regular forestry worker (10.51–12.84 Euro/h) (METLA, 2008).

While the data from our survey are not amenable to a detailed analysis of the determinants of participation in commercial picking, hints may come from comparing the socio-economic composition of our sample with that of the general population of Eastern Finland. Dalla Valle OY’s pool of pickers appears to differ from the general population in several ways. Consistently with the findings of other studies on participation in wild food collection, people who are comparatively older, less-educated and retired are over-represented in the sample. However, even though those with low opportunity cost of time appear more likely to engage in commercial picking, there is no evidence of the unemployed becoming heavily involved in the activity.

Clustering algorithms were used to identify groups that are homogeneous with regard to their mushroom gathering activities (i.e. with respect to the variables in Table 1, part A). From a preliminary hierarchical analysis with Ward’s linkage, Euclidean dissimilarity and variables rescaled to be in the [0,1] interval, three emerged as the appropriate number of groups. This result proved fairly robust to the choice of other data transformations and clustering methods. The k-means algorithm was then used to form three partitions of the sample. Table 2 reports cluster sizes and center

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster centers.</td>
</tr>
</tbody>
</table>

| Group of pickers | n | Harvest (kg) | Days picked | Duration (h) | % sold |
| --- |
| Professional | 164 | 389.58 | 45.21 | 5.52 | 88.29 |
| Ordinary | 403 | 82.66 | 19.50 | 2.85 | 84.45 |
| Recreational | 183 | 47.30 | 16.93 | 2.65 | 30.51 |
| N | 750 | Calinski-Harabasz pseudo-F | 427.3 |

Please cite this article as: Cai, M., et al., Income generation from wild mushrooms in marginal rural areas, Forest Policy and Economics (2010), doi:10.1016/j.forpol.2010.10.001
points. A different choice of starting point or limiting the analysis to a subsample has little influence on these results.

Linear discriminant analysis was performed to describe the relative importance of the four variables in separating the three groups. In the first function, which accounts for about 74% of discriminating power, the largest standardized coefficient (in absolute value) is the one on percentage of harvest sold. Duration of a typical picking trip has the second-largest absolute value coefficient in the first function and the largest in the second function. All variables, being closely linked to one another, have similar correlations with both the first and the second discriminant functions.

In broad terms, what seems to differentiate pickers into different groups is their degree of professionalism. About one in four pickers appear to be gathering mushrooms mostly for recreational purposes. While relatively frequent, their trips into the forest to gather mushrooms tend to be short. They harvest relatively modest quantities and sell only a fraction to Dalla Valle OY. While sizable, this group only accounts for 3.5% of the company's purchases of mushrooms. For convenience, we label these people "recreational pickers".

At the other end of the spectrum there appear to be "professional pickers" for whom mushroom collection represents the main occupation, at least at the peak of the season. Despite representing slightly more than one picker in five, this group supplies almost two-thirds of all the mushrooms the company buys. On average, a commercial picker earns about 1224 Euro over the course of the season.

About half of all pickers ("ordinary pickers") fall somewhere between those two groups. Compared to commercial pickers, their mushroom gathering trips to the forest are both fewer and shorter, yet their harvest is almost entirely sold for cash and represents about 33% of Dalla Valle OY's purchases. Overall, earning extra income appears to be their main motivation for picking mushrooms. For people in this group, mean seasonal revenues from mushrooms amount to about 257 Euro.

Using a multinomial logit specification, we modelled the probability of a picker belonging to a given group as a function of socio-economic characteristics (i.e. the variables in Table 1 part B). The base category is ordinary picker. The estimated parameters are reported in Table 3.

Because the magnitudes of logit coefficients can be difficult to interpret, average partial effects were computed by averaging the predicted individual partial effects across the sample (Wooldridge, 2006) and are displayed for selected variables in Table 4.

The chances that a person engages in mushroom picking for leisure rather than for income increase with the level of education. Having a higher education increases the probability of being a recreational picker by .109. The probability of being in the recreational group is about 30 higher for those people who pick mushrooms while taking time off at their summer cottage. Male pickers are significantly less likely than female to be in a group with lower mushroom gathering activity. Those aged below 26 are more likely to be in the intermediate group by about .15. Yet, there is no other evidence that the intensity of a picker's effort is related to his or her age or retirement status. Also, the coefficient on unemployed is only significant at the 10% level in the equation for commercial versus ordinary.

Regressing the natural logarithm of total time spent collecting mushrooms and the log of total kilograms sold on the socio-demographic characteristics produces qualitatively similar results. The estimates are reported in Table 5. While a lot of the variability in picking effort appears to relate to factors other than the socio-demographics, some patterns are clear. Higher levels of education are associated with low mushroom gathering effort; compared to a picker with basic education, a highly-educated one seems to devote 29% less time to mushroom gathering and harvest 36% fewer kilograms for sale. Being based at a summer cottage is associated with 58% less time to mushroom gathering and harvest 36% fewer kilograms for sale. A different choice of starting point or limiting the analysis to a subsample has little influence on these results.

Linear discriminant analysis was performed to describe the relative importance of the four variables in separating the three groups. In the first function, which accounts for about 74% of discriminating power, the largest standardized coefficient (in absolute value) is the one on percentage of harvest sold. Duration of a typical picking trip has the second-largest absolute value coefficient in the first function and the largest in the second function. All variables, being closely linked to one another, have similar correlations with both the first and the second discriminant functions.

In broad terms, what seems to differentiate pickers into different groups is their degree of professionalism. About one in four pickers appear to be gathering mushrooms mostly for recreational purposes. While relatively frequent, their trips into the forest to gather mushrooms tend to be short. They harvest relatively modest quantities and sell only a fraction to Dalla Valle OY. While sizable, this group only accounts for 3.5% of the company's purchases of mushrooms. For convenience, we label these people "recreational pickers".

At the other end of the spectrum there appear to be "professional pickers" for whom mushroom collection represents the main occupation, at least at the peak of the season. Despite representing slightly more than one picker in five, this group supplies almost two-thirds of all the mushrooms the company buys. On average, a commercial picker earns about 1224 Euro over the course of the season.

About half of all pickers ("ordinary pickers") fall somewhere between those two groups. Compared to commercial pickers, their mushroom gathering trips to the forest are both fewer and shorter, yet their harvest is almost entirely sold for cash and represents about 33% of Dalla Valle OY's purchases. Overall, earning extra income appears to be their main motivation for picking mushrooms. For people in this group, mean seasonal revenues from mushrooms amount to about 257 Euro.

Using a multinomial logit specification, we modelled the probability of a picker belonging to a given group as a function of socio-economic characteristics (i.e. the variables in Table 1 part B). The base category is ordinary picker. The estimated parameters are reported in Table 3.

Because the magnitudes of logit coefficients can be difficult to interpret, average partial effects were computed by averaging the predicted individual partial effects across the sample (Wooldridge, 2006) and are displayed for selected variables in Table 4.

The chances that a person engages in mushroom picking for leisure rather than for income increase with the level of education. Having a higher education increases the probability of being a recreational picker by .109. The probability of being in the recreational group is about 30 higher for those people who pick mushrooms while taking time off at their summer cottage. Male pickers are significantly less likely than female to be in a group with lower mushroom gathering activity. Those aged below 26 are more likely to be in the intermediate group by about .15. Yet, there is no other evidence that the intensity of a picker's effort is related to his or her age or retirement status. Also, the coefficient on unemployed is only significant at the 10% level in the equation for commercial versus ordinary.

Regressing the natural logarithm of total time spent collecting mushrooms and the log of total kilograms sold on the socio-demographic characteristics produces qualitatively similar results. The estimates are reported in Table 5. While a lot of the variability in picking effort appears to relate to factors other than the socio-demographics, some patterns are clear. Higher levels of education are associated with low mushroom gathering effort; compared to a picker with basic education, a highly-educated one seems to devote 29% less time to mushroom gathering and harvest 36% fewer kilograms for sale. Being based at a summer cottage is associated with 58% less time to mushroom gathering and harvest 36% fewer kilograms for sale. A different choice of starting point or limiting the analysis to a subsample has little influence on these results.

### Table 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Professional picker</th>
<th>Recreational picker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>.378*</td>
<td>−.538***</td>
</tr>
<tr>
<td>Retired</td>
<td>.370</td>
<td>.320</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.541*</td>
<td>−.010</td>
</tr>
<tr>
<td>Secondary education</td>
<td>−.284</td>
<td>.178</td>
</tr>
<tr>
<td>High education</td>
<td>.073</td>
<td>.604**</td>
</tr>
<tr>
<td>Age ≤ 26</td>
<td>−.430</td>
<td>−.899**</td>
</tr>
<tr>
<td>Age 27–35</td>
<td>−.796</td>
<td>−.693</td>
</tr>
<tr>
<td>Age 43–55</td>
<td>.522</td>
<td>.049</td>
</tr>
<tr>
<td>Age 56–65</td>
<td>.326</td>
<td>−.278</td>
</tr>
<tr>
<td>Age &gt; 65</td>
<td>.236</td>
<td>.021</td>
</tr>
<tr>
<td>Based at summer cottage</td>
<td>−.880</td>
<td>1.221***</td>
</tr>
<tr>
<td>Constant</td>
<td>−1.404***</td>
<td>−.736*</td>
</tr>
<tr>
<td>N</td>
<td>750</td>
<td>−717.470</td>
</tr>
</tbody>
</table>

*: 10% significant; **: 5% significant; ***: 1% significant. Standard errors in brackets; ordinary picker is the base outcome.

spent picking and 66% smaller commercial harvest. Males spend more time picking in the forest and sell much larger quantities of mushrooms than females. Age turns out to be be not significant, with the exception of the dummy for being 26 or younger, which appears to reduce time and amounts collected by 28% and 42% respectively. There is little evidence of retired or unemployed people putting more effort than others into mushroom gathering.

### Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Professional</th>
<th>Ordinary</th>
<th>Recreational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>.087</td>
<td>.026</td>
<td>−.113</td>
</tr>
<tr>
<td>Retired</td>
<td>.045</td>
<td>−.082</td>
<td>.037</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.098</td>
<td>−.067</td>
<td>−.031</td>
</tr>
<tr>
<td>Secondary education</td>
<td>−.054</td>
<td>.010</td>
<td>.044</td>
</tr>
<tr>
<td>High education</td>
<td>−.021</td>
<td>−.088</td>
<td>.009</td>
</tr>
<tr>
<td>Age ≤ 26</td>
<td>−.035</td>
<td>.151</td>
<td>−.116</td>
</tr>
<tr>
<td>Based at summer cottage</td>
<td>−.157</td>
<td>−.146</td>
<td>.303</td>
</tr>
</tbody>
</table>

### 5. Final remarks

In recent decades, non-timber forest products have been the object of considerable public interest as a potential source of revenues for the forest sector that are complementary or alternative to timber. While enthusiastic assumptions have sometimes overplayed the potential role of non-timber forest products for rural development (Sheil and Wunder, 2002), success stories do exist. In this article, we have described how a small but economically viable WEF industry emerged and operates in a marginal area of Finland.

Our account revolved around Dalla Valle OY, a company that purchases wild ceps from pickers in North Karelia, where virtually no demand exists for this type of mushroom, and exports its output, either fresh or frozen, to the markets of Southern Europe like Italy, Spain and France, where this product commands quite high prices. Our survey produced evidence that, for a fairly sizable group of people, the presence of this business generates the possibility to earn significant additional income.
In a typical year, between 2500 and 3000 pickers supply the company over the course of the season, which lasts for most of August and September. However, because mushroom crops are both highly variable and very difficult to predict, the number of people who take part in harvesting in North Karelia may vary widely from one year to another. As a share of the region’s total population, the number of pickers may vary from less than 1% in a bad year to about 8% in an exceptionally good one (e.g., 2003), and is the same order of magnitude as the number of forestry workers (METLA, 2008).

Although about 25% of all pickers, especially those based at a summer cottage, gather only trivial amounts and appear to have mostly recreational motives, more than one in five harvest WEF almost as a full-time occupation during the season, devoting on average 5.5 h per day to the activity over 45 days. In the 2008 season, such professional pickers earned on average 1224 Euro, which exceeds 5% of the average net annual household income in Finland (EUROSTAT, 2009a).

As expected, rates of participation and picking effort tend to be higher among people with lower education, that is, among those with presumably fewer earning opportunities. There is only weak evidence, however, that particularly vulnerable groups, such as the retired or unemployed, are turning to intensive mushroom harvesting as a source of income.

It is worth mentioning that professional pickers display a general preference for spruce forests, where the availability of fruiting bodies during the sprouting season is typically higher. Pine forests, on the other hand, are more popular destinations for recreation.

The ecological impact of collection activities on Eastern Finland’s WEF resources appears very limited. Nevertheless, pickers often remark about the scarcity of boletes in the forest. Most likely, what causes this perception is, rather than actual ecological degradation, the fact that most pickers tend to concentrate in areas that are close to urban centres and easily accessible through the road system.

A recurring question in the literature on the commercialization of NTFPs is what determines success. While it is hard to generalize from a single example, it is clear that the everyman’s rights and the widespread custom of collecting mushrooms and berries made Finland a very favourable environment to begin with. Most likely, the short-lived government subsidies of the mid-1990s and the exemption of mushroom revenues from taxation played a significant role in kicking off the industry. However, even though any policy change making mushroom harvesting less economically attractive (e.g., permit fees or income tax) would presumably put off a substantial portion of the pickers and reduce Dalla Valle OY’s output, a crucial aspect for the establishment of a successful value chain was in this case represented by entrepreneurship. As te Velde et al. (2006) have argued, NTFP entrepreneurs fulfil the function of creating the links with attractive and often distant markets where the products of local rural communities can be placed. The role of entrepreneurs will also be critical in any attempts to replicate the North Karelian WEF business model in broadly similar contexts (e.g., in Eastern Europe), as doing so will require devising effective logistic solutions and a fair system of payments to the mushroom collectors. According to anecdotal reports, indeed, firms that have tried to operate similar models in Poland and Romania have often received little interest from local communities, in most cases because their grading and payment systems were not attractive or transparent enough.

Data about the working of the WEF industry are scarce and it is sometimes claimed that the major barrier to entry in this market is lack of information (Sievänen et al., 2004). Uncertainty about potential output, costs, revenues, and marketing channels may be holding back the development of a WEF business in locations where it could be economically viable. Without trying to abstract too general lessons from the case examined here, this study has contributed new data on some of these issues. From an applicative perspective, identifying types of pickers can be useful for the purpose of designing more effective procurement marketing strategies. In the WEF business, where ensuring a stable supply of the key input is often a major problem, aiming one’s promotional efforts at those pickers who are more likely to become productively involved can be crucial.

Acknowledgements

The study was made possible through the assistance of Dalla Valle OY, which gave the authors access to company data and cooperated to run the survey of North Karelia’s mushroom pickers. The authors would also like to thank dr. Jukka Matero and dr. Blas Mola for support in the early stages of the survey.

References


Table 5

<table>
<thead>
<tr>
<th>Ordinary least-square analysis of picking effort.</th>
<th>Log time spent picking</th>
<th>Log kilograms sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>.297*** (1)</td>
<td>.642*** (1)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.211 (1)</td>
<td>.331 (1)</td>
</tr>
<tr>
<td>Retired</td>
<td>.218* (1)</td>
<td>.265 (1)</td>
</tr>
<tr>
<td>Secondary education</td>
<td>−.300*** (1)</td>
<td>−.257* (1)</td>
</tr>
<tr>
<td>High education</td>
<td>−.342*** (1)</td>
<td>−.443** (1)</td>
</tr>
<tr>
<td>Age ≤ 26</td>
<td>−.324* (1)</td>
<td>−.551* (1)</td>
</tr>
<tr>
<td>Based at summer cottage</td>
<td>−.876*** (1)</td>
<td>−1.094*** (1)</td>
</tr>
<tr>
<td>N</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>R²</td>
<td>.107</td>
<td>.085</td>
</tr>
</tbody>
</table>

*: 10% significant; **: 5% significant; ***: 1% significant.

Standard errors in brackets. Constant and age dummies included but not displayed.


