1. Introduction

The Italian forestry sector represents a controversial reality in the national rural context. While the forest area covers almost one third of the national surface, the sector has a marginal economic role in the country. But, as stated in the EU Forestry Strategy and in Agenda 2000, forests can play an important role in maintaining a good social structure and improving the economic development of rural areas. The increase in the share of European financial budget dedicated to forestry measures in the Rural Development Plans gives evidence to this multifunctional role. As a consequence, in the last years there has been a growing interest in monitoring and evaluating the socio-economic effects of forestry measure, and consequently the demand for economic data on forestry sector has increased. In particular, the accounting results at farm level can be considered as a proxy of socio-economic indicators. INEA, responsible for the Italian Farm Accountancy Data Network (FADN) for agriculture, carried out the FADN survey at regional level using a software named GAIA, which structure follows the double entry bookkeeping scheme and includes the international accounting principles. In this work the results of a first application of the FADN accounting scheme to evaluate the profitability of a forest enterprise located in Veneto Region will be presented. Two different accounting schemes will be described: the traditional and the “forestry” one that computes also unrealized costs and revenues, generally not taken into account in the traditional schemes. The paper deals also about the main concerns of the forestry accounting.

Key words: forestry accounting; balance sheet; costs; IAS.
Parole chiave: contabilità forestale; bilancio; costi; IAS.

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the competitiveness of the agricultural and forestry sector, to improve the quality of life in rural areas and the diversification of the activities in the rural economy. Moreover the Leader program provides for different measures concerning the forest sector. As a consequence, the share of the European financial budget addressed to forestry measures raised from 9.7% in the period 2000-2006 to 12-14% in the present implementation period (2007-2013).

As for other RD measures, there is a growing interest in monitoring the results and in evaluating the socio-economical effects of the actions (in particular the impacts on efficiency and competitiveness). Following the European common framework for monitoring and evaluation defined for rural development policies, the accounting results at farm level can be considered as a proxy of socio-economic indicators. For instance: an impact indicator to evaluate the economic growth of forestry sector is the Net Added Value, which computation implies the availability of monetary and economical data about forestry enterprises.

Differently from agricultural sector, in Italy there is not a systematic investigation on costs and revenues of forest enterprises at a national level. This lack has different consequences: fragmentary knowledge about costs, revenues and income situation of forestry farms; difficulties in the implementation of some policies; scarce quality of economic evaluation results. To fill this gap, the National Institute of Agricultural Economics (INEA), already responsible of the Italian Farm Accountancy Data Network (FADN) is trying to extend the FADN accounting scheme also to forest owners and logging enterprises with the aim to have a balance sheet, an income statement and a set of indicators comparable among farms and useful to make specific analysis, in particular the impact evaluation of rural development measures. The assessment of the profitability of forestry is essential also for securing the sustainable management of private forests. The national FADN survey is carried out using a software named GAIA, which structure follows the double-entry bookkeeping scheme and includes some general and international principles, including those of the International Accounting Standard (IAS) 41 Agriculture. Different studies have analysed the potential impact of IAS 41 on the European FADN system (ARGILE and SLOF, 2001).

The project started as pilot project in Veneto Region, following the indications and the guidelines assessed in MOSEFA (Monitoring the Socio-Economics Situation on European Farm Forestry), a FAIR action launched in 1997, in which INEA was one of the partners. The paper is divided into three sections. The first one is a short resume of the literature about forestry accounting in Europe and the efforts towards the harmonization of the existing schemes. The second section describes the Balance Sheet scheme of a public forest enterprise of Trichiana Municipality (Veneto Region). The accounting scheme has been defined taking into account the main concerns of forestry area. Finally, some conclusions and remarks in the last section.

2. A LITERATURE REVIEW ABOUT FORESTRY ACCOUNTING

The forest accounting has been the main topic of different European economical analysis, in particular after the second middle of the last century. The collection of the most important contributes has been realized by the work group of Managerial Economics of IUFRO, the International Union of Forest Research Organisations (JÖBSTL and HÖGG, 1998; JÖBSTL, 2005). Another important work is a handbook (OPENSHAW, 1980) which contains the description of different accounting methodologies used to compute costs and revenues of forestry plantations and explains some capital evaluation criteria to determine the best rotation period.

In different European States, forestry sector is one of the most important component of the national accounts. As a consequence they have developed accounting systems to improve the efficiency of the forestry production but also to have useful tools to control and
manage all the forestry resources, including the non marketable ones. During the time, the traditional accounting schemes based on the financial costs and revenues flow is changed, including social and environmental aspects (for instance: social audit, social balance sheet, eco-audit, environmental impact analysis, etc.). This complexity, together with the need to include the recent development of the accounting principles (presented inside different thematic conferences in IUFRO), have determined an evident separation between the research and the practical application. It seems not easy to translate in practical tools the theoretical basis of the accounting schemes.

There are different crucial aspects typical of the forestry accounting. The main problem is the difficulty to identify every year all the periodical changes of forestry assets (growth, fells, damages from fires, etc.) with the consequence that, in many cases, the results are not completed and misleading (Jöbstl., 2005). Particular attention is paid to the treatment of the growing stock and the growing stock changes.

Another important problem is the harmonization of the different accounting systems due to culture and historical development, politics, legal system, economy, socio-economic context. With regard to the specific case of forestry accounting, the disparities in accounting could be linked to more variables: ownership structure, size of forestry enterprises, forestry tradition, laws, general accounting, links between forestry and wood industry. This makes very difficult to compare the profitability among forest enterprises, to report their economic situation and to promote the use of accounting tools. Moreover, not all information are available: a report of UNECE/FAO reports that for 45 countries in Europe only general data on forest area, standing volume, annual removals are available for all countries. Other data (socio-economic data, number and size of forest enterprise, etc.) are not available and so it is not possible to make comparisons.

An effort in this direction goes back to the 50s when, at a national level, a minimum of standardization was provided for the accounts plan and cost centre frameworks (Jöbstl and Hogg, 1998; Hogg and Jöbstl., 2008). After that, the harmonization process was transferred onto an European level: during the 60s, an important report about cost and revenue of forestry in seven European countries was drafted (Stridsberg and Algvere, 1967). In this process, the working group Forest Accountancy of the Section Forest Economy of IUFRO has played an important role, standardising the terminology, the concept of forestry charts of accounts and performance accounting. To understand the situation, in the middle of 90s IUFRO made a comparison among six countries (Austria, Finland, France, Germany, Great Britain and Switzerland) for which sufficient data on structure and socio-economic aspects were available. This analysis focused on the different type and size of forest enterprises (public and private), the different forestry laws and accounting schemes, the different taxation levels of the growing stock. This last aspect seems to be very important in the selection of an accounting scheme: where the taxation is applied to the annual increase, the accounting scheme is very complicated. In some cases the social and environmental evaluation have been included in the selected scheme. In 1995, during the IUFRO World Congress in Tampere, a discussion forum in the field of forestry accounting was established and, as a consequence, a new research group (Managerial, social and environmental accounting) was installed in IUFRO. During the 90s two important works have been published. The first by EFI (Hyttinen et al., 1997) consists in a comparison of the profitability among the private forestry firms of five European member states (Austria, Finland, Germany, Great Britain, Switzerland) with a focus about the selection of statistical data. The second one has been the publication of INRA (Institut National de la Recherche Agronomique) that has collected all the contribution coming from the International Symposium of ENGREF (Ecole National du Génie Rural des Eaux et des Forêts) held in Nancy in 1997. The Symposium was focused
on the use of the accounting scheme for the sustainable management of forestry farms. One interesting research line concerns the methods for integrating the non-market outputs of forest enterprises in the traditional accounting schemes of public and private forestry farms, following a stepwise approach (Merlo and Jöbstl, 1996).

All these experiences were the basis of the development of the following transnational accounting network among more countries (Denmark, Holland and Norway beside the six countries analyzed by IUFRO): thanks to the exchange of experiences it has been possible to monitor costs and revenues of forestry sector and to improve accounting framework analyzing the reaction of every country to the accounting problems. A technical contribution to this network comes from the FADN (Farm Accountancy Data Network) and from other specific research projects. One of them is MOSEFA (Monitoring the Socio-Economic Situation of European Farm Forestry), an European Concerted Action (FAIR) realized in 2001, coordinated by EFI. The main results of MOSEFA was a handbook of guidelines useful to establish an European network for the forestry accounting (Sekot and Niskanen, 2001). The work was very complex, involving 20 Research institutes coming from 17 European countries. During the project, the different accounting methodologies have been compared, not only in forestry sector but also in agro-forestry enterprises. Notwithstanding the higher presence of northern European countries, the comparison has highlighted the need to take into account also the mixed systems that are more spread in the southern Europe. With this respect, one of the final hypothesis was the extension of the FADN also to forestry sector. FADN is a very structural body of data collection rules that permit to produce aggregate reports similar to a balance sheet and an income statement (Marongiu et al., 2008).

In the last decade, a further step towards the international harmonization of accounting schemes comes from the release of the International Accounting Standard (IAS) 41 Agriculture by the International Accounting Standard Board (IASB). IAS 41 has been criticized for being too academic and for introducing inappropriate measurement methods for biological assets. Different studies have considered the potential impacts of IAS 41 in agricultural entities operating in European countries (Elad 2004; Argilés and Slof 2001). Some specific papers have analyzed recently also the impact on forestry enterprises, especially in Australia which AASB 1037 Self Generating and Regenerating Assets is similar to IAS 41 (Herbohn and Herbohn, 1999; Herbohn and Herbohn, 2006; Herbohn et al., 1998; Dowling and Godfrey, 2001).

3. THE METHODOLOGY AND THE CASE STUDY

3.1. The consideration of forestry assets in different accounting schemes

Comparing with agricultural sector and differently from other European countries (especially the northern ones), accounting schemes and procedures for forest management have been scarcely developed in Italy. As a consequence, there are not specific and standardized accounting rules followed to evaluate forestry assets and related costs and revenues.

The application of the traditional accounting framework is not easy because of different reasons. First of all because the estimated value of the biological and annual growth of standing timber in terms of volume, quality and assortment mix is influenced by the market prices, fluctuating over the time. Prices and other external factors can influence also the decrease of the value. Second: the long forestry rotation of forests implies a long period between incurring costs and generating revenues at the time of harvest. Moreover, beside the traditional function of forest enterprises (timber production), today forests play a multiple role considering their social and environmental aspects. In case of multiple objectives (timber production, welfare, recreation, protection, etc.), the problem is also to allocate the overheads and common costs among the different cost centres.
The traditional accounting scheme of double-entry bookkeeping system does not take into account the influence of the current cutting in the future harvesting possibilities or the future increments. Value changes associated with growth and market conditions are recognised when they are occur (at the time of harvest). Only realized revenues coming from the harvested trees are considered. Unrealized revenues of uncut trees (standing timber) are not accounted. This is a crucial problem because who invests in forestry activities rather than cuttings usually has a loss, even if the market value of forest has increased as a consequence of the activities. In rural and marginal areas the increase of forest value is important to justify the rural development measures for forestry sector. Disregard the growing stock and its changes during the time makes the double-entry bookkeeping system an insufficient and misleading method in case of forestry accounting. However, it seems to be the best accounting method, very standardized, flexible, comparable during the time. Moreover there are some advantages coming from the application of standard accounting software packages in connection with standard double-entry bookkeeping. With respect to this, the availability of a new software for agriculture (GAIA), used to collect data for national FADN has been useful to make some consideration about the application of traditional accounting scheme for forestry enterprise. GAIA has been developed following the theoretical approach of double-entry bookkeeping system in compliance with the national accounting rules and the IAS 41 Agriculture, applied also in the evaluation of forestry assets (Penttinen and Rantala, 2008). GAIA combined technical information with accounting information and this is very useful when balance sheet and financial ratios have to be determined (Bodini and Marongiu, 2009). For some forestry costs and revenues (direct and traceable costs, subsidies, etc.) the computation is not difficult, being equal to the agricultural accounting scheme. For other items, the structure needs to be adapted. For instance: the software does not have a mechanism to take into account the annual growth of wood volume generated by the biological transformation or the value change due to the stumpage value variations during the years. So, one problem in the implementation of GAIA for forestry accounting is related to the adaptation of the annual accounting scheme of agriculture to the multi-years scheme of forest production. The scheme of GAIA has been applied to define the Balance Sheet and the Profit and Loss of a public forest enterprise located in Trichiana, a Municipality of Veneto Region, in the northern part of Italy.

3.2. The case study

The case study is located in Trichiana, a Municipality in Belluno province, in the northern part of Italy (Figure 1), in Veneto region. Trichiana forested area is about 300 hectares (beech and coniferous trees), managed with high forest and coppice systems and situated in mountain. The average growing stock in volume is about 100-300 m³ per hectare and the logging area in 2009 has been 3.2 hectares.

The forest is managed according to a Management Plan (2008-2018) and the accounting information have been collected using a questionnaire and interviewing a forest guard of Trichiana. All the useful documents have been analyzed in order to have a clear picture of the situation of forest and management during the time and, in particular, in 2009 and 2010.

Only costs and revenues coming from the timber production are take into account, regardless the costs and revenues coming from other non marketable goods and services. In this case the net profit of forest enterprises derives mainly from the sales of wood coming from final cutting and/or thinning during the accounting period.

3.3. The results

The Balance Sheet of the public forest of Trichiana has been compiled considering the general principles of double entry bookkeeping but also the specific needs of
the forest accounting and of the international accounting rules stated for biological assets. In Table 1 the Profit and Loss scheme is presented.

Usually, the forestry owners realize revenues through the timber sales but they could have also unrealized revenues coming from the growth of standing forest, from investments, changes in quality or in the price of timber (different stumpage price values over the time). Usually, all these changes are not taken into account as a business transaction and do not leave any trace in the accounting system. The inclusion of the unrealized gains or losses in the income statement is one of the most important recommendation coming from the accounting principles.

In the scheme, the item “Saled timber” accounts for the realized revenues coming from the sale of wood and evaluated considering the market price of the different assortments as applied in the market. The “Other forest products” includes the mushroom picking permits while in “Services” are computed different costs paid to consumption, materials and general expenses. The depreciation of fixed assets has been computed following the straight-line depreciation scheme and using the depreciation ratios used in GAIA for similar assets.

The account “Growing stock” refers to the unrealized revenues due to the growth of forests and evaluated at the stumpage price. It is an expression of the change in value of forest assets and it has been calculated as difference between the allowable cut and the actual cut (JOBSTL, 2005). As previously mentioned, failure to measure the unrealized values should be regarded as a deviation from the general accounting principles. The value of growing standing forest is considered as a revenue, so it influences the net profit of the forestry enterprise. Following the double-entry bookkeeping rules, the revenues contribute to the increase in the net assets (difference between the assets and the liabilities of the firm). So, the growth
of the standing forest is included as a part of current assets in the high standing forest value.

A further concern regards the difference between stumpage price and market price (Carbone and Savelli, 2010). When high standing trees (evaluated at the stumpage price) are harvested and sold at a market price, it is possible to have a capital gain or loss, depending on the difference between the two values. In this case the market price was higher than the average stumpage price used for the first evaluation of forestry asset before the cut and a capital gain has been recorded as “Capital gains”.

In this case, subsidies are very important: in 2010 they have permitted to cover an important part of the costs.

The net profit calculated in this way is higher than the one obtained excluding the growing stock and the capital gain due to the difference between stumpage and market price. This means that all the financial indicators of the enterprise change if the calculated profit is accounted.

In case of forestry and for long rotation period, a more completed information could result by the consideration of the calculated net profit (Hyder et al., 1996; Hyder et al., 1999) resulting by the sum of the net profit and the (positive or negative) value of the change in forest value, the adjustment of net interest and the compensation for own work. The re-evaluation is necessary when the inter-annual variation of stumpage price is very high. Since it is impossible to have relevant changes in price of timber from year to year, it seems reasonable to assume that the real stumpage prices change over the next five to ten years.

### 4. Conclusions

Monitoring the economic situation of farm forestry is needed in order to assess the profitability of the sector as well as the impacts of rural development measures. In Italy a clear estimation of the net revenue or the added value per hectare of forestry farms does not exist because no accounting survey for the forest sector exists. One of the main problems in the assessment of farm profitability is to have a clear representation of the farm costs and revenues. In agriculture and forestry sector there is not a developed use of bookkeeping practises. Moreover there are difficulties in the evaluation of some items, as for instance the increase of the value of forest stands due to the annual growth. The inclusion of this value in the balance is crucial as it influences the final results and the level of profitability indicators.

The exclusion of the forestry enterprises from the FADN survey and the lack of an extended monitoring system for forestry farms at a national level make implementation of a forestry accounting network very difficult. The lack of a set of accepted accounting rule for forestry firms, together with the lack in bookkeeping procedure, influence the accuracy and quality of the results and makes monitoring very expensive. This high level of data collection costs has been a problem in the implementation of the survey. Moreover, the difficulties in the sampling phase disconcert the statistical validity of the final results (Tarasconi et al., 2010). As a consequence, it will be difficult to have a representative result of the whole regional situation in the selected
pilot area. Notwithstanding these difficulties, some results referred to individual units have been very interested in the survey.

This positive feedback could drive to an adaptation of the questionnaire for the next surveys in order to set a standard procedure that allows to gather only the data required suitable for the structural analysis and for costs and revenues estimation.

RIASSUNTO

L’uso del sistema contabile RICA/FADN per il calcolo della redditività del settore forestale

In Italia il settore forestale rappresenta una realtà controversa del mondo rurale. Mentre la superficie forestale copre circa un terzo della superficie nazionale, il settore ha un ruolo molto marginale nell’economia del Paese. Ad ogni modo, come asserito dalla strategia Forestale dell’UE e da Agenda 2000, le foreste possono giocare un ruolo importante nel mantenere una buona struttura sociale e nel favorire lo sviluppo economico delle aree rurali. L’augmento della quota di budget europeo dedicato alle misure forestali dei Piani di Sviluppo rurale conferma in qualche modo l’importanza di questo ruolo multifunzionale. Come conseguenza, negli ultimi anni si è registrato un crescente interesse nel monitoraggio e nella valutazione degli effetti socioeconomici generati dalle misure forestali. Interesse che ha sollevato una maggiore esigenza di informazioni di carattere economico sul settore forestale. In particolare, i risultati della contabilità che si realizza a livello aziendale possono essere considerati come proxy di indicatori socioeconomici. L’INEA, responsabile della Rete Italiana di Contabilità Agraria (RICA) (FADN), ha sviluppato la raccolta di dati RICA (FADN) a livello regionale ricorrendo ad un software denominato GAIA la cui struttura segue lo schema di contabilità della partita doppia ed include i principi internazionali della contabilità. In questo lavoro vengono presentati i risultati di una prima applicazione dello schema di contabilità RICA per la valutazione della redditività di un’impresa forestale attiva nella regione Veneto. Due diversi schemi di contabilità vengono presentati: quello tradizionale e quello “forestale” che computa anche i costi e i redditi non realizzati che generalmente non sono presi in considerazione negli schemi tradizionali. Il paper tratta anche gli aspetti principali della contabilità forestale.

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