

ISPRA ROLE IN THE PROFORBIOMED PROJECT

Lorenzo Ciccicarese¹, Carmela Cascone¹, Piera Pellegrino¹

¹ISPRA, Istituto Superiore per la Protezione e la Ricerca Ambientale, Roma; lorenzo.ciccicarese@isprambiente.it

Led by the Spanish region of Murcia 18 different institutes and research bodies belonging to six different countries of the Mediterranean basin applied to the MED programme strategic call “Improving of the energy efficiency and promotion of renewable energy sources” submitting the project, PROFORBIOMED (PROMotion of residual FORestry BIOMass of the MEDiterranean basin). Main aim of the project is to promote renewable energies in rural areas by developing integrated strategy for the sustainable use of forest biomass as a renewable energy source, improving forest management systems, recovering forest biomass potential and developing new opportunities and better governance. It involves all the stakeholders of rural areas and develops clusters and networks that bring together private and public sectors, developing pilot projects on 13 issues that strength cooperation among actors. In this context, ISPRA role in the project is to assess the impact of Short Rotation Forestry plantation, in particular of alien genotypes, on the environment, landscape and biodiversity. For this purposes, some studies and field samples have been conducted. Also the impact of forest biomass harvesting/extraction on forest functionality and biodiversity at different trophic and ecological level have been monitored in 8 forest areas distributed in Tuscany, Latium and Campania. Finally, ISPRA is promoting the “cascading use” of wood and construction of local clusters by organizing dedicated workshops and involving local stakeholders. Dissemination of results has been achieved making documentary videos.

Keywords: forest, short rotation forestry, biomass, impact, cluster.

Parole chiave: foresta, piantagioni a ciclo breve, biomassa, impatti, filiera.

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1. Introduction

Led by the Spanish region of Murcia (Department of Nature Heritage and Biodiversity) and with the support of EuroVértice, a consultancy firm specialized in European projects whose aim is to help public and private institutions willing to access programs and initiatives of the European Union, 18 different institutes and research bodies belonging to 6 different countries of the Mediterranean basin applied to the MED programme strategic call “Improving of the energy efficiency and promotion of renewable energy sources” submitting the project, which was then successively selected without any condition, PROFORBIOMED PROMotion of residual FORestry BIOMass of the MEDiterranean basin (PROFORBIOMED, 2010).

At EU level, the European Environment Agency reports (6/2013, 10/2008, 7/2006) give data about the share of energy consumption in EU and provide assessment of potential production of bioenergy without negative environmental impacts (around 10% by 2020). Using forestry residues as feedstock is more resource efficient than many other types of raw material, as it does not add pressure on land and water resources and offers very high greenhouse gas savings. The Renewable Energy Directive (RED, EC, 2009) sets a general binding target for the European Union to derive 20% of its final energy from renewable sources by

2020. Within this framework, PROFORBIOMED is linked to the promotion of the use of renewable energies by the development of an integrated strategy for the use of the forest biomass as a renewable energy source that demonstrates, applies and transfers sustainable management systems adapted to the different MED forest conditions. The strategy relies on the valorisation of the forests and their consideration as potential sources of incomes in rural areas that need proper management and maintenance (in environmental terms). It implies the involvement of all stakeholders of rural areas, the development of clusters and networks and the strengthening of the cooperation between public and private actors, developing political and social commitments and joint initiatives.

1.1 Geographic coverage

PROFORBIOMED involves 18 partners from 6 countries and 16 MED regions (Figure 1). Consequently the project has reached a complete geographic coverage integrating national, regional and local partners that cover the most important forest areas in the MED territories, including 4 national institutes, 5 regional bodies and 3 local authorities (and their 6 different structures). This strategy has tried to imply in the project all related stakeholders, to include all needs of the MED areas and actors in the project and to increase the transferability of the project results. This multi-level

approach is replicated in every country participating, where at least two of the different levels (national, regional, local) are represented and where the partners have been chosen to represent different key forest areas and/or to complement its work in the same area.

1.2 Summary of the project

PROFORBIOMED promotes renewable energies (RE) in MED areas by developing an integrated strategy for the use of the forest biomass as a RE source, recovering the forest biomass potential, developing technical and legal aspects and promoting the use of forestry biomass for energy. The strategy relies on the involvement of key stakeholders in a forestry biomass production chain that takes into account sustainability and compatibility with other uses and provides new economic opportunities. It has a multi-sectorial dimension, working with public and private stakeholders related to forestry biomass chains at all levels (from European to local) and affecting 5 key policies: industry, energy, forests, agriculture and environment. It works on the valorisation of the forests as active sources of income that need proper management. The innovative aspects of the Project are related to the involvement of the diverse public and private stakeholders in the development of forestry biomass sector policies and actions.

The project has focused on the current weak points that prevent forestry biomass to be relevant for a sustainable development of territories, developing technical issues, supporting tools and policies, involving all stakeholders and creating structures that support the cooperation between public and private actors. On the other hand, it will develop pilot experiences on 13 topics, trying to reinforce the cooperation among stakeholders and serving as demonstration and transfer tools of know-how on technical and management issues. The project has brought on strategic long term impacts in rural areas on social, economic and environmental conditions and public policies. The main outputs will be technical proposals on practices and policies, a model on public support scheme and financing opportunities in forest biomass chain, development of agreements between public and private actors, transfer and application of know-how regarding forest and biomass management, creation of clusters and networks in rural areas and implementation of the smart grids concept to the biomass production chain.

The most relevant result is the promotion of RE and the involvement of key stakeholders in a forestry biomass production chain that improves governance of rural areas, reduces natural risks and fosters new economic opportunities. Moreover, results will contribute to restore the potential and conservation status of Mediterranean forests, halting their declining and promoting their active management and conservation.

2. Strategic Impacts

The project is expected to support changes in MED rural areas that bring on strategic long term impacts in the MED area. These strategic impacts are related to two different aspects:

- 1) the project promotes a new management approach in forest areas, proposing a closer cooperation and joint work between the different stakeholders and strengthening the cooperation between private and public actors;
- 2) the project results can create a totally different new dynamic in rural areas, creating new opportunities and relationships leading to the revitalization of MED rural areas based on the promotion of the sustainable energy use of biomass.

This means a major structural change in the rural areas, currently declining since forests have not reached the multifunctionality characteristics that European rural policies have set as an objective for sustainable management. The necessary changes these rural areas need to reach the objectives include administrative, technical, social, legal and communication issues.

2.1 Economic impacts

The enhanced forest activity would be an essential element to obtain rural incomes and permit the existence of an important industrial base. It would create new business opportunities, private investments, new job opportunities and revenues in the area.

2.2 Social impacts

The implication of all the actors and the development of networks, plans, actions and tools that support the joint activities of the different stakeholders of the forest chain and the coordinated work of public and private sectors means a major change in the rural areas, where the lack of cooperation and the different approaches that private and public actors develop in forest management is considered as a major problem. On the other hand, the creation of economic opportunities would help to set population in rural areas.

2.3 Environmental impacts

A sustainable use of forest to produce energy from biomass would reach to a reduction in the current risks that threaten MED forests, specially tree diseases and pests and forest fires due to the lack of maintenance works. This is caused by the lack of profitability of the forests. A change on this situation would mean a clear positive impact on biodiversity and the environmental value of rural areas. On the other hand, the promotion of wood biomass use for heat and power would support the EU objectives on renewable energies.

2.4 Policy impacts

The success of the new approach proposed would change the way public administrations works in rural areas, changing policies and supporting tools, creating a new framework that could extend to national and European policies.

The sustainability of the project is assured due to the issues of the project, the partnership composition, the involvement of all stakeholders of rural areas in the project activities and the expected results of the project.

On one hand, forest management policies need a long term planning and strategies so the project is designed with a long term perspective. Besides this, the partnership includes local and regional administrations (with compe-

tences in forest management) of all countries included in the project. These administrations are in charge of forest policies and its needs, strategies and current activities have been used for the development of this project. This assures that the activities and results of the project will be integrated in local and regional policies and initiatives.

On the other hand, the integrative approach of the project, including all kind of stakeholders, means a guarantee for a sustainable implementation and sustainability of the project. One of the main tasks of the project is the development of networks that promotes the joint work of different actors. There is a specific axis in the pilot activities focused on the development of the territorial framework, strengthening the stakeholder's implication and the building up of clusters, the setting up of agreements, political commitments between local and regional administrations and the rest of stakeholders and permanent structures to dynamize the rural areas.

The creation of strong, permanent links among stakeholders will boost future cooperation, supporting the sustainability of the activities after the end of the project. Project results will serve as demonstrative actions to promote the innovative approach that PROFOR-BIOMED proposes. This will support the development of new activities and the continuation of the project beyond the end of the European financing.

Finally, the partnership includes partners with specific assets in communication and dissemination activities at international level that will strengthen the transfer actions.

3. ISPRA role

'Fondazione Lombardia per l'Ambiente' (FLA), 'Istituto Superiore per la Protezione e la Ricerca Ambientale' (ISPRA) and 'Dipartimento Regionale Azienda Foreste Demaniali' Regione Sicilia (DRAFD) are the Italian partners in the project. The role of ISPRA in the project is to assess the impact of forest biomass harvesting/extraction on forest functionality and biodiversity at different trophic and ecological level and monitor the impact of Short Rotation Forestry (SRF) plantation on the environment and biodiversity. In particular the Institute has carried out pilot actions: 1.1, 1.4 and 1.6.

3.1 Pilot action 1.1 Assessment of the structural diversity of forest habitats

Data on forest structure has been collected also with the aim of quantifying the level of biomass harvesting/extraction (Bianco and Ciccicarese, 2013; Ciccicarese *et al.*, 2014).

It should serve as a basis for developing a method for assessing the biological and socio-economic amount of forest and out of forest biomass that can be taken in a sustainable manner (within the limits of natural renewability of the resource) and allocable to the supply of energy plants. Thus, in the reports we firstly describe general features of Lazio, including topography and geology, climate and land use, as well as societal and economic characteristics. Then we assess the bioenergy potential of forest and out of forest in the

region. The main factors driving the increase in Latium's dendro-energy potential are productivity increases and the additional area available for dedicated short rotation forest plantations. However, unless the correct incentives and safeguards are put in place to mobilize the potential in an environmentally-friendly way, even a significantly lower exploitation of the biomass resource than projected could lead to increased environmental pressures, especially if sites are severely disturbed.

This results will provide policymakers the needed information and data to develop clear regional-level policy goals for forests and energy that reflect the principles of sustainable development and sustainable forest management.

3.2 Pilot action 1.4 Assessment of the environmental impact of forest biomass harvesting or extraction

To be able to properly assess the impact of forest biomass harvesting/extraction on forest functionality and biodiversity vascular plants have been monitored in particular using floristic assemblage, Ellenberg indicators, Emeroby index. (Cipollaro and Colacino, 2005; Crosti *et al.*, 2010). To evaluate the impact of forest biomass harvesting/extraction on forest functionality and biodiversity at different ecological level 8 forest areas distributed in Tuscany, Latium and Campania have been monitored. Data suggest the importance to calibrate the tree-cutting maintaining the woodland structure to avoid the radiation (L) increase and the consequent disturbance (H).

The analysis of the ecosystem through the humus/soil parameters and Ellenberg ecological indicators applied to flora and vegetation demonstrated to be an effective tool to detect and monitor the conservation forest status.

3.3 Pilot action 1.6 Demonstration plots with short rotation energy plantations

To monitor the threat of energy plantations on biodiversity the impact of already established plantation of SRF has been investigated in different region with the aim of assessing the potential impact on the environment and also to monitor effects of using alien invasive genotypes on the biodiversity (Crosti and Forconi, 2006; Crosti *et al.*, 2010). Moreover, guidelines to reduce the impact of SRF on biodiversity has been produced (CoE, 2009, Bianco *et al.*, 2014). Also CO₂ accumulation pools in a short rotation forestry plantations and its impact on GHG emissions has been estimated applying the CO₂FIX model (Ciccicarese *et al.*, 2014).

3.4 Other Results

Finally, ISPRA is promoting the use of woody biomass among local stakeholders for heat and power purposes, thereby reinforcing the message of the BIOENERGY CLUSTER in the territory of Viterbo to develop biomass and bioenergy use for a greener and more prosperous local and rural economy. The development of the territorial framework, strengthening the stakeholder's implication and the building up of clusters, the setting up of agreements, political commitments between local and

regional administrations and the rest of stakeholders and permanent structures dynamize the rural areas.

The creation of strong, permanent links among stakeholders will boost future cooperation, supporting the sustainability of the activities after the end of the project. ISPRA also produced the position paper titled FAVOURING THE CASCADE USE OF WOOD FOREST PRODUCTS, about cascading use of wood as stated in the EU Forest Strategy (EC, 2013).

The “cascade” principle implies the use of wood material according to a priority based on the added value that can be potentially generated, so raw material from the forests should be preferably used for building, furniture and other products with long life span, while bioenergy should preferably derive from the use of waste wood, wood residues or recycled products.

The energy use of wood (after recycling opportunities to produce other products have been exhausted) is thus considered as the least valuable option among several uses.

Dissemination of results has been achieved making documentary videos:

- FORESTE DI ITALIA (<http://www.youtube.com/watch?v=ttqZAqznsKU>)

- FOREST, WOOD, ENERGY - A FILIÈRE (<http://www.isprambiente.gov.it/it/documentariispra/documentari>).

Message of the videos is about the possibility of stocking the wood for months, even years if necessary, and reuse it later on; this is not possible with other renewable energy sources, such as solar or wind. That’s why biomass is a very interesting source with a considerable potential.

In this framework PROFORBIOMED project was intended to evaluate the potential of this sustainable and renewable energy source in the Mediterranean countries, where the supply chain that involves first of all the management of the woods, then the management of the fuel and of the energy plant, is less developed than in central and northern Europe countries.



Figure 1. PROFORBIOMED involves 18 partners from 6 countries and 16 MED regions.

Figura 1. PROFORBIOMED coinvolge 18 partner da 6 paesi e 16 regioni MED.

RIASSUNTO

Il ruolo di ISPRA nel progetto PROFORBIOMED

La Regione Murcia e 18 diversi istituti ed enti di ricerca appartenenti a sei diversi paesi del bacino del Mediterraneo hanno presentato nell’ambito del programma MED denominato “*Improving of the energy efficiency and promotion of renewable energy sources*” la proposta

di progetto PROFORBIOMED “*PROmotion of residual FORestry BIOmass of the MEDiterranean basin*”.

Lo scopo principale del progetto è promuovere le energie rinnovabili nelle zone rurali attraverso lo sviluppo di strategie integrate per un utilizzo sostenibile della biomassa forestale come fonte di energia rinnovabile, migliorando i sistemi di gestione forestale, recuperando il potenziale della biomassa forestale e sviluppando nuove opportunità per una migliore *governance*. Il progetto si sviluppa attraverso azioni pilota che rafforzano la

cooperazione tra i paesi *partner* coinvolti e mirano a mettere in rete i soggetti pubblici e privati interessati nelle zone rurali sviluppando *cluster* e filiere.

Il ruolo ISPRA nel progetto è valutare l'impatto delle piantagioni forestali a ciclo breve (SRF - Short Rotation Forestry), in particolare genotipi alieni, sull'ambiente, il paesaggio e la biodiversità. Per tale fine, sono stati condotti alcuni studi e rilievi sul campo.

È stato monitorato anche l'impatto dell'estrazione / raccolta della biomassa forestale sulla funzionalità del bosco e sulla biodiversità a diversi livelli trofici ed ecologici in 8 aree forestali distribuite in Toscana, Lazio e Campania. Infine, ISPRA sta promuovendo il "cascading use" del legno e la realizzazione di *cluster* locali attraverso l'organizzazione di workshop dedicati e il coinvolgimento degli *stakeholder* locali. La diffusione dei risultati viene effettuata anche grazie alla realizzazione di video documentari.

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