Biomass, an opportunity for our forests

by Roque PEREZ PALAZON

Energy consumption in the Mediterranean is increasing and so is the need and demand for renewable energy sources. Forest biomass can be used to produce sustainably electricity and heat. Promoting the use of forest biomass can also contribute to rural development by creation of jobs and attenuation of rural exodus. The Proforbiomed project is a good example of promotion of forest biomass.

Introduction

The main goal that makes Mediterranean forest managers to boost the recovery of forest biomass cannot be forgotten: it is no other than the conservation of forests.

The forest treatments with energy purposes generate a rich set of ecological benefits, including three key issues that are measurable in ecological and economic terms and are described here below:

– decrease of the forest fire hazard;

– decrease of the potential surface erosion rate;

– increase in the CO_2 fixation rate by the treated trees and forest areas.

The PROFORBIOMED project was finished last year. It was a strategic project funded by the European Territorial Cooperation Programme MED. It had 17 partners from France, Italy, Slovenia, Greece, Portugal and Spain and it was led by the Directorate-General of the Environment of the Ministry of Agriculture and Water of the Region of Murcia (Spain). The project aimed at promoting the use of biomass as a renewable energy source, recovering the forest biomass potentials in the Mediterranean. One of its challenges was to create a production of biomass and promote its energy market, as economic, clean and generating employment energy. The project concluded with a dissemination campaign that took place in several European regions aimed at both the rural population of the regions where biomass was to be exploited as well as at schoolchildren (Patras, Greece, or Valencia, Spain).

Picture 1:
Forests in Moratalla (Murcia).
Author Joaquin Zamora.

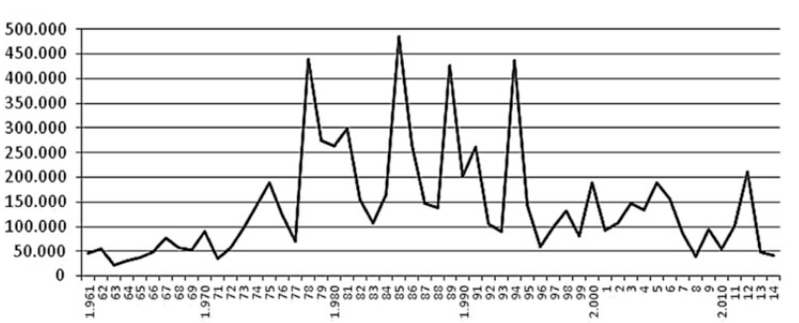
The sustainable use of our forests is a guarantee of their preservation. The conservation of Mediterranean forests is closely related to man-activities: the forest species that grow there need for their conservation the traditional use that the inhabitants of the villages have made from the beginning.

Biomass will allow us to finance these treatments/works that over the years have become expensive and that have plunged the forests into a state of disrepair with terrible consequences such as forest pests and wild fires.

The forest fires

Forest fires are the main scourge that Mediterranean forests suffer. The chart below shows the evolution of forest fires in Spain from 1961 to 2014 and can be divided into three periods.

Figure 1:
Evolution of forest fires in Spain between 1961 and 2014.
Source: Ministry of the Environment, Spain.



The first period would be from 1961 to 1972, at this early stage forests in Spain were subject to intensive forest management, the rural population was abundant and the rural population worked and lived close to the forests. The investment in means for fire-fighting was low.

The second period would be between 1973 and 1994. This period includes the dark years of forest fires in Spain, due to several concurrent causes: the first is the migration of the population from rural areas to cities; the second is the abandonment of forest management for a misunderstood conservationism, as it is the identification of conservation with no forest management, an idea that fortunately is beginning to be discarded; the third would be stopping using the natural resources such as firewood being replaced by fossil fuels. The result is clearly shown in the graph. This is not an opinion but actual data. The combination of an abandoned forest and adverse weather variables results in over 400,000 hectares of burnt surfaces. At that rate we would have run out of forests in Spain in a few decades.

The third period is between 1994 and nowadays. From the serious fires in 1994, investment in firefighting was increased, especially by improving aerial means, increasing the number of staff, beginning to professionalize personnel, and improving training. This situation is reflected in the graph where the burnt area does not reach the macro figures of the previous period, however, there are still three years coinciding with extremely warm summers with burnt surfaces over 150,000 hectares, and even in the summer of 2012 above 200,000 hectares were burnt.

Thanks to the efficiency in firefighting, the burnt surface has been reduced by 50%, but firefighting is not enough to achieve the figures from the first period, and investment in forest fire prevention is also needed. See figure 1.

Forest pests

Although even today there are people who still have doubts about the theory of climate change, several episodes that occurred recently should be highlighted. For example, the Spanish eastern region has suffered in

the last year the worst drought since rainfall records exist. In some parts of the Region of Murcia rainfall has not exceeded 60 litres per square metre in a year, and as a result thousands of trees have dried and drillers as *Ortomicus* and *Tomicus* have caused tree mortalities as important, or even more, as those caused by wildfires.

The fundamental cause of pest attacks has been the extended droughts which cause the weakening of trees and facilitate the attack of boring insects. Besides, the increasing temperatures and warm periods result in the lengthening of the summer, providing the procreation of borers, increasing the number of life cycles.

But another reason for a greater pest risk is the abandonment of the forests, especially reforested pine forests. They still keep the initial planting densities, often reaching 2000 feet per hectare, becoming stagnated stands with little chance of survival facing traumatic episodes like the one that devastated the Spanish Mediterranean regions.

The EAFRD programme 2014-2020: the European Commission is committed to Bionergy

Two of the six priorities of the new Common Agricultural Policy for the next six years are:

1. Restoring, preserving and enhancing ecosystems depending on agriculture and forestry.

2. Promoting resource efficiency and encouraging the transition to a low-carbon economy, able to adapt to climate change in the forestry sector.

After analysing the EAFRD measures in depth, we can see that the program presents a unique opportunity for the development of bioenergy in the Mediterranean.

Seizing the opportunities of the new EAFRD programme and gathering the work done with PROFORBIOMED project, the Region of Murcia has drafted a plan that takes advantage of the future funding opportunities offered by the programme for the local development of bioenergy.

Picture 2:
Proforbiomed notice board: « Our forests are full of energy. The Region of Murcia is committed to the sustainable use of biomass ».
Author Portavoz S.L.

Forestry Bioenergy Plan of the Region of Murcia

Planning

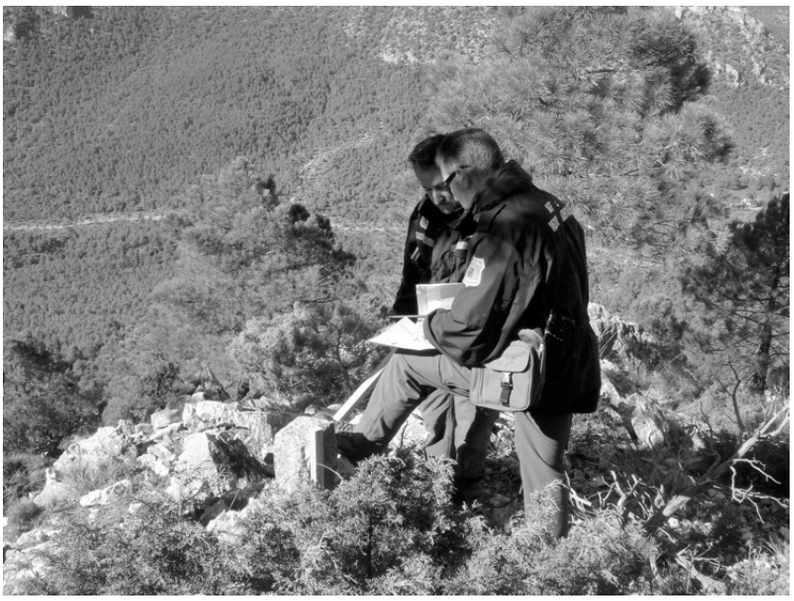
The Directorate-General of the Environment of the Region of Murcia developed within PROFORBIOMED Project an innovative methodology for elaborating the Biomass Forest Management Plans. It is based on a stratified survey that allows using the data collected in the 4th National Forest Inventory, which means that the volume of data to be collected on site is reduced almost to the 50%. This methodology allows reducing expenses and work time in the field .

Also, specific software has been developed for a quick processing of the collected data. The software calculates the biomass volume and other important results for the forest management, based on the collected data and adding the data included in the 4th National Forest Inventory. The methodology is now available on the website in Spanish and English. According to this methodology the first Biomass Forest Management Plans have been drafted.

Sustainable forest management

It is important for the sustainable exploitation of the Mediterranean forests to take into account the fact that there is a financial support from the public administration for both public and private forests. In this sense, the EAFRD programme will be a key tool.

Depending on the quality of the trees, the distance from harvesting to biomass trade centres and several other factors, the final



Picture 3:
Forest Inventory in Murcia.
Author Mar Ruiz.

price of biomass will be impacted but profitable if properly made. Bioenergy obtained can be a tool that funds fully or partially the forest treatments.

Facing a sector that is clearly needing investment, valorising biomass and having financial support for the management and conservation of our forests is an opportunity that cannot be refused.

Support for the small and medium-sized enterprises and the importance of distribution centres

The marketing of an agricultural product in the Mediterranean regions is a traditional and common activity. Networks for marketing those products already exist at three levels: local, European and even global. However, marketing a product as firewood that has not been removed from the forests for decades, it is not an easy task.

Picture 4:
Wood chipper in Slovenia.
Author Slovenian Forestry Institute.

The support for forest investments, as well as for the transformation, mobilization and marketing of forest biomass is the cornerstone of this process. Without the institutional support, this process never ends to start up.

There are producers who want to sell their products, and also consumers, both domestic and industrial, who want to consume that biomass, but without the distributions agents the supply chain is broken.

The Bioenergy Plan of the Region of Murcia gather both supporting small forest enterprises engaged in performing forestry works and financial support for processing, sorting and marketing the biomass obtained.

Cluster establishment

The entire production chain requires the involvement of all the engaged stakeholders and several actions are foreseen:

– Supporting associations, whose collective approach provides synergies and greater dynamism of the sector than the one achieved by individual behaviour of economic agents, so that they can organize joint work processes and share facilities and resources.

– Creating a Bioenergy Cluster, which aims to develop joint solutions and combine resources to take advantage of market opportunities among all those stakeholders involved in the exploitation, distribution and marketing of forest biomass (companies, research institutes, research centres, government agencies, etc.) sharing the same infrastructure, suppliers and distribution networks. The creation of this cluster is aimed at promoting technological development and knowledge of biomass as a renewable energy source, and to strengthen the sector in order to build a strong industry that integrates a wide range of activities in the value chain of biomass.

– Horizontal and vertical cooperation among actors in the biomass distribution and in the local promotion of the product. This axis is oriented both to collaborative projects for the development of new products, processes and technologies in the forest sector, and to projects with fewer stakeholders, but as the results are disseminated, we aim at achieving thus the goal of dissemination of new practices, processes or products.

Forest Certification as a guarantee of sustainability and marketing success

The development of a System of Sustainable Forest Management at regional level for the Region of Murcia has been planned. This system shall apply to the management that takes place in the region and shall apply to every forest area of the Region of Murcia that decides to be linked to this system. The system will provide information that allows the assessment of criteria and indicators of Spanish Forest Certification (PEFC or FSC) according to the corresponding rules and therefore to be certifiable and auditable. The content of the system will be as follows:

– Drafting the Regional Technical Guide: if necessary, from existing documentation. If defects are detected, the necessary documents will be drafted to complement the existing ones.

– Developing control procedures ascribed to the system: in particular, the control procedure will collect the rules, forms and records that shall be periodically provided by those ascribed to ensure compliance with the obligations assumed. It will also contain mechanisms for admission control, maintenance or removal of those assigned to the system. Therefore, it will be an auditable document pursuant to itself and the adopted Forest Certification System.

– Drafting transverse general and specific procedures related to forest management, built on the already existing ones, and if necessary, completing those ones whose deficiency is detected. Specific procedures for proper forest management will be of concern as far as possible, to previously written documentation that may be usable, of course under evaluation, correction, modification or extension for its inclusion in the Regional System / Group of sustainable Forest Management.

– Encouraging and promoting the adhesion to the System of Sustainable Forest Management of as much forest area as possible, both public and private.

Main outputs: Employment

Currently, the use of forest biomass for energy purposes is showed as an opportunity to promote rural development in mountain areas of the Mediterranean regions.

Picture 5:
Communication campaign with school children in Patras (Greece).
Author ADEP SA.

Aware of this, the Directorate-General of the Environment of the Region of Murcia is working to arrange the potential market of timber and firewood for thermal purposes and power generation.

Here below (see table 1), the most relevant annual data extracted from the Plan of Forest Bioenergy of the Region of Murcia for the potentialities are presented.

The importance of communication

It is essential, before applying on the territory a plan of these characteristics, to design a communication campaign. This must aim at the population in order to explain the benefits of biomass and the need to manage our forests performing the tasks that have traditionally been done but with current methodologies and knowledge.

Thus, the Directorate-General of the Environment developed between June and October 2014 an awareness raising campaign around the slogan: « Let's give our forests another chance. » It reported the mul-

Table 1:
Annual data extracted from the Plan of Forest Bioenergy of the Region of Murcia for the potentialities.
*T: Green tonnes

	Potential biomass Extraction rate 20% (T*)	Silvicultural treatments (ha)	Budget (€)	Direct work days	Indirect work days	MWh/ ha
Region of Murcia	29.138	3.000	3.000.000	30.000	15.000	87,42
Public forests	13.386	2.000	2.000.000			40,17
Private forests	15.752	1.000	1.000.000			47,25

tiple benefits of the use of biomass for our region and will serve as a model to other Mediterranean regions.

The key messages of this campaign were focused on how biomass can help to conserve our forests, on why it is a green, clean and sustainable energy, on how it contributes to rural development and why it is a local, renewable and exploitable resource. Economic cost savings for the consumer as a cheaper energy with a stable price were also highlighted.

For this purpose, several activities have been done in rural areas of the region, such as an information booth with activities for children touring in 5 municipalities, a regional campaign on Facebook (with 1300 "likes"), a photo contest and the design and printing of all the graphic materials needed (corporative image of the campaign, roll-ups, notice board, etc.). Besides, several press releases have been published in regional media and also radio interviews were conducted, aiming at raising awareness about biomass as a renewable energy.

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Summary

The conservation of Mediterranean forests, besides the usual problems such as wild fires and pests due to the adverse weather and aggravated by climate change, has to overcome a major barrier, the necessary but costly forest management.

Biomass has been a breath of fresh air just recently, as a key collaborator financing forestry works, which have been traditionally performed by the inhabitants of our mountain villages since ancient times.

The PROFORBIOMED project was the first step in the implementation of the value chain of an abandoned resource in our forests, as biomass is, and has set the foundations for the development of the bioenergy sector in the Mediterranean area.

At present, we are seizing the opportunities offered by the European Agriculture Fund for Rural Development (EAFRD) and the European Cooperation Programmes. In this context, several plans have been drafted, as for instance the "Forestry bioenergy plan of the Region of Murcia". This plan can be used as a model to any Mediterranean region, and when carried out it will show how it is a valuable tool to boost the forestry sector in the region. The initiative is described briefly in the present article.