



Agroforestry development in Europe: Policy issues

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ARTICLE INFO

Keywords:

CAP
Pillar I
Pillar II
Sustainability
Measure 222

ABSTRACT

Agroforestry is considered a sustainable form of land management that optimizes the use of natural resources (nutrients, radiation, water). Agroforestry is defined as the deliberate integration of woody vegetation with agricultural activities in the lower story. It provides a higher biomass production per unit of land, while providing more ecosystem services than woody-less agricultural lands, such as the reduction of soil erosion and nitrogen leaching, and increase carbon sequestration and landscape biodiversity. The objective of this paper is to evaluate the past and current European Union Common Agricultural policies aiming at promoting the afforestation or reforestation of lands, as the introduction of trees can be seen as a first step to carry out agroforestry practices in former agricultural or forest lands. Agroforestry was a traditional land use system in Europe before modern times. However, before the sixties land intensification and consolidation destroyed millions of trees all over Europe. On the contrary, some good examples of agroforestry promotion are found in Eastern European countries in order to reduce the effect of extreme events such as winds, flooding at the beginning and mid of the last century. In Western European countries, the introduction of trees in the land has been promoted by agroforestry, afforestation and reforestation at the end of the last century. Afforestation of agricultural lands have been the most successful CAP measure (over 1 million hectares) while agroforestry measures were not extensively adopted which may be explained by the funds associated to afforestation measure which compensated the losses of income 15 or 20 years in afforested lands. Agroforestry was poorly adopted in the CAP 2007–2013, having a better success in the CAP 2014–2020 due to the recognition of woody vegetation and the compensation of 5 years given for maintenance once agroforestry is established. However, policy rules ensuring Pillar I payment when agroforestry measure is adopted such as a management plans ensuring that maximum tree density (100 trees per hectare) is not reached, should be pursued.

1. Introduction

Global policies are currently aware of environment problems caused by agricultural intensive systems (FAO, 2009). The Millennium Ecosystem Assessment highlights that human society benefits not only from products delivered by ecosystems, but also from regulating and cultural services (MEA, 2005). Examples of regulating services provided by agroforestry practices include soil enrichment (Kirby and Potvin, 2007;

Young, 1997; Buck et al., 1998; Schroth and Sinclair, 2003), air and water quality (Udawatta et al., 2002; Lee et al., 2003; López-Díaz et al., 2008; Anderson et al., 2009), carbon sequestration (Sharrow and Ismail, 2004; Kirby and Protvin, 2007; Mosquera Losada et al., 2012) and biodiversity conservation (Mosquera Losada et al., 2012; Herzog, 1998; Rigueiro-Rodríguez et al., 2009; Bergmeier et al., 2010; Rois et al., 2006). Cultural services include maintenance of landscape beauty, cultural heritage, and recreation (McAdam et al., 2009; Papanastasis

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<https://doi.org/10.1016/j.landusepol.2018.03.014>

Received 18 August 2017; Received in revised form 6 March 2018; Accepted 6 March 2018
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et al., 2009; Tsonkova et al., 2012; Plieninger, 2011). Thus, agroforestry practices fully respond to the need to implement multi-functional agriculture as requested by the most relevant International (Buttoud, 2013) and European development strategies and agreements (Primdahl et al., 2010) such as the declaration of Cork 2.0 (Cork, 2016) and the Sustainable development goals (United Nations, 2015) in Europe (Bruyninckx (2016). Therefore, adequate policies promoting agroforestry practices and systems at plot and farm level, respectively should be developed in order to increase agriculture and forestry sustainability should be established worldwide as recommends the FAO (Buttoud, 2013).

Agroforestry is one of the most common land use practice worldwide (den Herder et al., 2017). Such integrated systems have formed key elements in European rural landscapes until modern agricultural practices were introduced and adopted at wide scale in the last decades. Before modern times, woody vegetation was deliberately retained or included in the cultivated or grazed lands by European farmers as it has traditionally served various purposes in the agrarian economy through multiple production as well as delivered environmental benefits (Eichhorn et al., 2006; Rigueiro-Rodríguez et al., 2009; Nair, 1994; Mosquera-Losada et al., 2016). Unfortunately, during the second half of the 20th Century, trees and shrubs were progressively removed from the cultivated land of Europe as a result of mechanization and intensification of agriculture, but also as a consequence of land consolidation schemes to increase the size of agricultural parcels carried out all over Europe. Woody vegetation destruction was further promoted when CAP funds were associated to farm surfaces, as the concept of land eligibility appeared linked to low tree density and not to agricultural activity promotion integrated with woody vegetation allocated in different designs in the plots (i.e. hedgerows, isolated trees.). Consequently, the adoption of modern management techniques, the introduction of new crop varieties adapted to open lands, the use of fertilizers and large-scale machinery and the establishment of inadequate policies in European Agricultural policies -mainly based on production promotion- caused the destruction and removal of large areas of the woody component from the European Union rural landscape, causing undesirable environmental consequences such as loss of biodiversity, soil erosion and water table pollution, among others as also happened in most developed countries.

Since the end of the 20th Century, the important role of trees in producing valuable products and environmental benefits has been progressively recognized worldwide (Mosquera-Losada et al., 2006; Rigueiro-Rodríguez et al., 2009). Specific Common Agricultural Policies (CAP) schemes favoring the preservation of large trees on farms have been implemented as part of the conditionality or cross compliance in Europe. However, most of Pillar I rules affected negatively to the preservation or promotion of woody vegetation, and caused indirectly the destruction of millions of trees by farmers, in order to get the direct payment funds by their farms. Conditionality rules for retaining landscape features, including woody component (isolated trees, hedgerows, copses) in European Union agricultural systems have become inefficient due to the associate control complexity (European Court of Auditors, 2009). Therefore, there is currently a huge potential to introduce woody vegetation in agriculture to transform European Union agriculture in sustainable systems and promoting smart climate agriculture (Mosquera-Losada et al., 2016). Agroforestry practices should be promoted because they are able to increase productivity and profitability (Graves et al., 2007; Fernández-Núñez et al., 2010) per unit of land in a sustainable way, providing various environmental benefits (Palma et al., 2007; Rigueiro-Rodríguez et al., 2009), and increasing ecosystem services delivery (reducing soil erosion and nitrogen leaching, and increasing carbon sequestration and landscape biodiversity (European Commission DG Environment, 2006; Rigueiro-Rodríguez et al., 2009). The introduction of trees in forest or agricultural lands as a way to promote the woody component of agroforestry was recently promoted by the European Union Rural Development programs (Measures 221,

222 and 223 and Sub-measures 8.1 and 8.2 in the CAP 2007–2013 and 2014–2020, respectively). These measures that initially aimed at introducing trees in arable lands, later on included the establishment of silvopastoralism and recently they have been modified to include maintenance and improvement of already existing agroforestry practices. This paper aims at evaluating the implementation of policies related with the introduction of trees in European Rural areas as first step to establish agroforestry after reviewing policies dealing with the promotion of woody vegetation within the eastern and western policies countries during the XX century.

2. Methodology

This review has been carried out after consulting the reports and main EC normative including Regulations, Delegated acts that conducted to tree establishment in agricultural and forestlands and/or agroforestry promotion within the CAP Pillar II or Rural Development Program (RDP) Policies. Activating afforestation and reforestation is considered as a first step to implement agroforestry in tree-less lands. Main evaluated Regulations were 2080/1992, 1257/1999, 1698/2005 and 1305/2014. We also searched the European Union web pages, reports and other papers to evaluate the impact of these policies on the afforested and reforested land from an agroforestry perspective and made a deep analysis of the 88 and 118 (including the National ones and 109 from regions) for agroforestry promotion during 2007–2013 and 2014–2020, respectively. The review initially describes the “road” that led the Common Agricultural Policy (CAP) at recognizing the advantages of preserving and introducing woody vegetation at farm and landscape level in Eastern and Western European Union countries, followed by the study of (i) the main reasons and constraints that affected the implementation of the measures 221, 222 and 223 in the 2007–2013 RDPs at European Union level and ii) the current extent and new perspectives for the current year of adoption of submeasures 8.1 (previous 221 and 223 measures) and 8.2 (previous 222 measure) in the RDPs for the period 2014–2020.

3. Woody agroforestry component and CAP during the XX century

Policies promoting agroforestry implementation in the last century were primarily and negatively affected by the previous policy and socioeconomic contexts of different European Union countries, placed in the western and eastern part of Europe. Moreover, a common progressive and extensive destruction of the woody component in agricultural systems is clearly shown all over Europe. Eastern and western policies dealing with the introduction of trees and concepts were very different in the past, which affect the impact of the present and future land use policies on their respective lands. For example, more than 50% of Eastern European Union country forests are publicly owned with the exception of Slovenia (29.8%) (European Union, 2003). On the contrary, forest western countries are mostly privately owned with the exception of Germany (536%) and Greece (819%). Both facts affect to the impact of the implementation of CAP in the west and east countries. For example, afforestation and reforestation measures do not fund the loss of income to those publicly owned areas, which affects to budgets and perspectives of forests in some European countries.

3.1. Eastern countries

Eastern agricultural lands currently included in the CAP faced important problems related to intensification and modernization of agriculture in the last century. Land was traditionally farmed with plenty silvopasture on orchards and forestlands, but the collective farming and social reform carried out after 1945 destroyed most of the agroforestry systems. As happened in Western European countries, enlargement of plots and destruction of boundaries became also important in the Eastern part of Europe. However, the agriculture of some areas in the

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