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Economics of Agricultural Carbon Sequestration in Soils

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Opinion

Signatory States to the 2015 Paris Agreement have set a common goal of achieving carbon neutrality. According to a logic of net emissions flow adopted by several European countries, France has adopted a Climate Plan in July 2017 with a target of zero net emissions (ZEN) of greenhouse gases, at the 2050 horizon [1]. Carbon sequestration in soils is one of the means proposed to achieve common goals of reducing greenhouse gas emissions while improving the productivity and sustainability of agricultural land in both developed and developing countries. developing countries [2]. In addition to their soil carbon storage capacity, sustainable land management technologies benefit farmers by increasing yields and reducing production costs. Thus, for farmers in developing countries by 2030, their private profits would be valued at US $ 105 billion for Africa, US $ 274 billion for Latin America, and US $ 1.4 billion for Asia [3]. However, certain socio-cultural or economic factors can significantly reduce the physico-chemical carbon storage capacities based on agro-ecological practices, including in developed countries. For example, in the United States, farmers are among the most conservative socio-professional categories: many question the likelihood of anthropogenic causation to climate change [4]; in California, farmers are more concerned about the regulatory constraints resulting from climate change than by any other climatic factor impacting their production or exploitation [5]; these farmers are skeptical of non-farmer experts who are unaware of the economic and regulatory challenges they face [6]. In the US, the cost of carbon capture through Natural Resources Conservation Service programs is estimated at US $ 32-442 per tonne of CO2, with an average of US $ 183 [7]. Given the agronomic potential, ownership structure and farmland tenure in the US, only 2-5% of cropland receives funds under the two largest conservation programs with carbon storage and only 2% of agricultural land is offered annually for sale [8].

For the European Union, a group of experts from the European Commission on agricultural markets also proposes to encourage farmers to store carbon on the basis of adapted agricultural practices [9]. However, on one hand, the evolution of the CAP's regulatory frameworks by 2020 shows that the proposed instruments alone cannot support large-scale projects on the agricultural soil carbon storage in Europe: in fact, there is very little likely that the future CAP budget is sufficient [10]. On the other hand, the EU Climate and Energy Package for 2020 does not fully take into account the reduction potential resulting from land use and land-use change (LULUCF), prohibiting Member States from use land management measures to offset emissions from other sectors [11]. A carbon price much higher than the present value (around € 5), as well as a regulation to direct the financial flow of industrial and energy emitters to the agricultural sector would be necessary and in line with the polluter pays principle (Article 191, TFEU, 2009). The introduction of an option to use offset credits from agricultural projects in the European Emissions Trading Scheme (EETS) requires the drafting of a regulation requiring the establishment of the initial level of carbon in the EU. soil and verification of the amount of CO2 sequestered by eligible projects. Commitment periods must be established over ten-year rather than annual periods, and legally notified so that future purchasers are required to meet the commitment over the remainder of the period. Additional instruments should also target consumers, in particular instruments aimed at directing consumers' food choices towards products other than meat, for example via a meat tax, since this alternative approach must be designed in World Trade Organization [12].

Ultimately, the decision to adopt one or another of the sustainable land management alternatives should not be based solely on their respective benefits in terms of climate change mitigation but rather based on the consideration of the

workshops. farm, assessing comprehensively the productivity, resource utilization and environmental impact of the productive system. For example, land-use changes that reduce agricultural production may lead to increased carbon emissions if the reduction in production implies an increase in feed or food imports [11]. However, the French approach [13]) is one of the first attempts to evaluate a wide range of technical measures (agroforestry, hedge planting, simplified soil cultivation, cover crops, extension of temporary meadows or intensification of low productivity grassland) aimed at the additional storage of carbon in agricultural soils [14-18].

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