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EIP-AGRI Focus Group - 28

“Enhancing production and use of renewable energy on the farm”

Minipaper: ***“Societal aspects of renewable energy technologies on farm”***

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1. Introduction

The scope

The scope of this minipaper is to describe the most common and widespread social issues related with the implementation of renewable energy technologies (RET) on farm and at community level. It aims to outline circumstances, dominant characteristics and effects on RET implementation of farms and, finally define ways of their improvement and/or minimisation from an environmental, economic and social point of view.

The significance of the societal aspects

New tensions are taken place in the countryside regarding farming, ethics and production models that are challenged by new entrants, rural poverty (unemployment, refugees) and diverse entrepreneurship (agro-tourism, biofuels). The analysis of relations and interactions among farmers, communities, policy makers and advisors when a technology (renewable in our case) integrates into farming (energy issues) makes the assessment of social aspects of "RES on farm" an indispensable and challenging endeavour.

Societal impact is the third pillar of the sustainability and it should be taken into consideration for the implementation of projects throughout renewable energy sources (RES) technologies. Many EU funding initiatives and funding instruments (Horizon 2020, ESIF, LIFE) largely involve social issues and human sciences in their annual budgets. Societal aspects and their significance are also evaluated at a cross-cutting dimension in various Community Initiatives (LEADER/CLLD' evaluation indices).

2. Dissertation

The most common and widespread societal aspects of the RET implementation on farm and at community level are social acceptance, technology uncertainty – knowledge transmission and quality of life. Each one is characterized by specific effects and traits and strong interconnections are outlined among them, sometimes overlapping its meaning and complicating its impacts.

2.1 Social acceptance

Social acceptance is evaluated against the following elements: personal attributes, psychological factors and contextual concepts (Hofman E., 2015). The literature consistently reports, including studies of farmers, that the main drivers of RES adoption are economic factors such as an expected increase of income because of increase of their crop production or input savings as a result of adopting RES or rational use of energy (Michelsen & Madlener, 2013; Schelly, 2014; Tampakis et al., 2017; Brudermann et al., 2013).

2.1.1 Personal attributes: they refer to socio- demographic characteristics of farmers such as age, gender, level of education and income (farm size, farming type).

Status:

The socio-demographic characteristics of farmers (education level, knowledge of innovative farming practices, economic status and age, gender structure of the household) considerably affect their perception regarding the insertion of new technologies in farming.

The older farmers tend to be more conservative and reluctant to use new technologies because their education level is low or because they are too old to gain the benefits of their investments before their retirement. On the other hand, younger farmers that have access to technology breakthrough and smart agriculture cannot invest on new technologies, like wind turbines for example, either because they cannot afford it or because they do not have the financial credibility to get granted the necessary bank loans and other financial aids. Middle-aged farmers, with good education level, with history on

adopting innovations and with capital to support joint ventures are the ones who could potentially invest on RES technologies in agriculture.

The female leadership of the farm enterprises as well as the youth entrepreneurship could potentially constitute positive factors on the penetration of RES, although these social categories are keen on exercising diverse entrepreneurships, for instance agriculture and agrotourism. In Scotland it was found that female led farms tend to be smaller, and more are much more likely to be recreational – both characteristics make investment in renewable energy less likely (Sutherland et al., 2016). The same research in Scotland demonstrated that the farmers who took up renewable energy production shared important characteristics with farmers who engaged in agri-environmental schemes – both were younger, better educated, highly information seeking and planning to remain on the farm longer than five years.

At an individual level, early adoption of RET has been related with environmental commitment that causes a “willingness to pay” more for energy produced from sustainable sources (Bigerna and Polinori, 2014; Hanemann et al., 2011). Early adoption has also been positively related with higher levels of education (Tate et al., 2012; Tranter et al., 2011; Aoki, 2014) access to information (Aoki, 2014; Beckman and Xiarchos, 2013), recent incorporation to farming (Frantál and Prousek, 2016; Beckman and Xiarchos, 2013) and risk tolerance (Trujillo-Barrera et al., 2016).

Abatement of impacts / enhancing actions:

Several provisions in the framework of Rural Development Programs (Reg No 1305/2013) or national financing instruments encourage the succession of older farmers by younger ones or support of the new entrants (e.g. Young Farmer Payments -YFP; Start-up aid for young farmers). Although in Scotland, at least, farmers are not eligible for both subsidies to purchase renewable energy technology and subsidized output prices e.g. feed in tariffs, so they usually opt for the feed-in tariffs. Generally, youth entrepreneurs are encouraged by funding means through various ways such as eligibility criteria, surplus ranking and financing rates.

2.1.2 Psychological factors: they concern the degree of awareness and understanding, the political and environmental beliefs (Huijtsa N.M.A., et al, 2011) and the perceived fairness and trust (Musall F.D, Kuik O., 2011).

Status:

Farmer’s awareness on global issues of concern (climate change, desertification, food safety, geo-environmental disasters) motivate them at a large extent in adopting low carbon practices in farming (non-tillage techniques, anaerobic management of wastes, rotation of crops) and implementing RES technologies on farm. The familiarity of the farmer with the detrimental effects of climate change in his daily life and working environment, with the risks of desertification in the arid and unfertile areas that are left abandoned for years, with the geo-environmental disasters that could be also affected by human intervention (floods due to overgrazing or land use changing towards tourism or urban development activities) is highly expected to lead the farmer adopting and actually implementing RET on his farm and also influence his neighbors to follow his example.

Individual environmental concerns and interests can be directly affected by political beliefs. Liberals could endorse more open-minded perceptions on technology transfer even if they are followed by economic or managerial risks. The perceived fairness of a project is directly connected with the trust grown among the involved actors (policy makers, providers, operators, investors, etc).

Abatement of impacts / enhancing actions:

The awareness of farmers on global environmental and social aspects can be achieved and enhanced with info-promotion actions and campaigns, such as events, workshops, round table discussions, open days and exhibitions. Training courses in person or web seminars, massive open online courses – MOOC, etc are also a very effective way to improve awareness, along with other, more general social media (twitter, facebook, etc)

Trustworthy procedures during the planning, licensing and implementation phase of a RE application project generally improves the perception of fairness (project, endeavor, measure, governmental priorities) and at the same time increase farmers' trust on the projected benefits.

2.1.3 Contextual factors: They consist of factors and conditions are entitled as feeling of 'locality', 'community alliance' and administrative burdens.

Status:

Each technology deploys different natural resources, in different ways and to an extent can cause different social impacts. A biomass plant may relate with noise disturbance and emissions of track movements (particularly in residential areas) as well as aesthetic disturbance of the plant buildings (Chatziathanasiou, et al, 2000). Furthermore, the visual intrusions of a wind park in the feeling of 'locality' and detraction of high value agro-environmental areas may sound more important for a given community than the electromagnetic interference caused to the communications (CRES, 2000).

Farmers' decisions to produce renewable energy is influenced to varying degrees by social norms and accepted standards of behavior in their local community and/or community of practice. Local communities are increasingly objecting to renewable energy e.g. through lodging their concerns when planning permission is sought.

In a study in Scotland, Sutherland and Holstead (2014) found that farmers who were producing wind energy attributed most of the objections to their wind turbine applications to 'newcomers' to rural areas. Farmers expressed the belief that long-term rural residents would better understand how important renewable energy production was to maintaining successful farm business. However, there were also a number of farmers identified who decided not to install wind turbines because of the negative response they believed they would receive from their neighbors.

Local involvement (citizens) in RES projects through energy co-operatives can result in the substantial added value of local development (RED II proposal). The Energy Co-operative Body of Karditsa (Central Greece) is a civic cooperative of 350 members aiming at the use of RES (DAK S.A., 2018) and despite various administrative burdens its shareholders' persistence and the support of the local stakeholders has recently start producing pellets provoking positive impact on regional and local development opportunities.

In the NL, farmers that are members of local energy community co-operatives, can gain extra income, good connections with the local community, local support in other environmental and sustainability challenges, creating thus a more resilient ecosystem. Discussion between farmers and civilians on the impact of the RET applications on environment, landscape, life quality of the neighbours (NIMPY syndrome) can block a RE project, especially in densely crowded regions as north – west Europe have been conducted (Interreg ECCO project, 2018).

Abatement of impacts / enhancing actions:

In recent years, formal and informal incentives have been put in place to enable local communities to benefit more from renewable energy production (either directly as the owners of the installation, or indirectly as recipients of a 'community fund' or other income source that is tied to the income from the installation). RES that offer financial rewards to communities are thought to find it easier to access planning permission.

Planning with participatory approaches is recommended so that public engagement is achieved, in order to at least minimize social conflict if not secure community acceptance.

Policy measures to improve contextual factors of RES' penetration in agriculture can be considered the energy communities as are described in the RED II proposal. Especially the Commission's RED II proposal introduced provisions regarding organisations entitled "renewable energy communities" (article 22) that can contribute (under specific criteria) in the deployment of RES at local level. These projects would be more crucial in a context of increasing renewable energy capacity in the future (Council of EU, 2017).

To overcome the NIMBY syndrome the involvement of the local community in the realization of the RE project often seems a successful strategy with local economic and social benefits.

2.2 Knowledge transmission - Technology uncertainty

The transfer of knowledge and innovation in rural areas has to overcome the bottlenecks of complexity, conflict and unpredictability that are dominant in countryside. Besides, technology innovation involves characteristics of uncertainty based on risks and benefits.

Status:

The transfer of knowledge is facilitated by the typical dissemination networks and the agricultural extension systems. Nevertheless, there are discourses about how these can be more effective and appropriate from an economic and social point of view.

Adult learning is promoted as a reasonable way of knowledge transfer and sometimes is focused on the significance of 'social learning', that is mutual understating, effects of participatory processes, individual or collective activation (Koutsouris A. & Papadopoulos P., 2003).

Abatement of impacts / enhancing actions:

Focus should be placed on co-designing of innovation, as its multiple dimensions (productive, technological, and managerial) demands the knowledge of the proper transmission system that can efficiently affect the farming process.

The conventional status of extension advisors and rural service consultation has to be substituted more or less by new forms of innovation transmission operators, the so-called "brokers", "facilitators" or "intermediates". When the target group of transmission innovation are individual farmers, then the participatory techniques have to be exercised by competent actors (policy makers, local rural authorities, collective groups).

EU has launched the EIP-Agri Platform as a motivation to stimulate innovation in rural areas through various communication ways, such as round tables, web discussions and expert groups. Moreover, in the framework of the Rural Development Policy, Operational Groups (OG) have been activated, which try to define and address specific topics for knowledge transmission and challenges for innovation, on the basis of multi-actors discussions and trans-disciplinary approaches.

Additionally there are policy tools, such as funding means (ESIF, operational programmes), and/or initiatives, such as Inno-4-AgriFood platform, which help in joining consultants and exporters/ agro-enterprises on the same round table to discuss and challenge several innovation topics.

2.3 Quality of life

The quality of life of individual farmers and rural communities could be summarised in high living standards that is outlined by public and social services (health care, education, childcare facilities), ICT local access, cultural activities and generally local "basic economic canvas". All these elements may contribute to the upgrading of rural attractiveness.

Status:

The quality of life in countryside is determined by two components, livability and livelihoods (EENRD, 2010). The first concerns the work-life balance and job environment (local employment, working conditions, job satisfaction) and the access to basic services and infrastructure (health, education, security). The latter concerns the differentiation of local economy (green electricity, agro-tourism) and the valorization of performance (local products, biomass resources potential, state of environment, networks, local governance).

Abatement of impacts / enhancing actions:

In many cases, RES interventions constitute basic indicators promoting the 'Barometer' of the environmental friendly impact of an entire Program (eg Rural Development) during the evaluation phase. The RES on farm improves the flow of benefits (earnings, carbon deletion, external costs) adding stocks of capital (social, economic and ecological) that are interwoven to create living conditions in countryside.

Landscape and rural environment of high quality, which are natural heritage, are the most important aspects to be taken into account at planning of RES applications such as wind parks, solar and PV panels, etc. Especially, OECD encourage governments (OECD, 2017) to define clearly the non-market goods and services sought (aesthetics), in order to improve environmental performance, or other societal concerns such as leisure services and culture heritage.

Although European Commission aims through funding means to mobilise and develop rural communities (indigenous development) through initiatives such as LEADER initiative. The basic characteristics of that "community led – local development' (CLLD) are local public-private partnerships (local action groups), bottom – up planning and low impact interventions (low budget private and public projects, nature and tradition info – promotion actions).

3. Conclusions

It is significant to be taken priorities of social inclusion and local development in rural areas (The Cork Declaration, 2016) as well as directions that the renewable energy projects have to be beneficial to farmers and local society than investors and market agents (European Court of Auditors, 2018). The involvement of local communities and engagement in the process is the simple way to overcome the local disturbance (OECD, 2012). Certainly the main driver for on-farm RES adoption has been the expectation to obtain positive economic returns on the investment (Yaqoot et al., 2016) moreover that farmers who are already engaged in agri-environmental schemes are a good target for renewable energy production. The elimination of negative social aspects (conflicts, uncertainty, low transmission, slight liveability) can be generally a basic target for "enhancing production and use of renewable energy on the farm".

Finally policy measures (energy communities, rural programmes) that help reverse psychological factors could very efficiently improve attractiveness of RET applications on farms and increase the confidence of the local/farming communities to the whole endeavor.

4. Discussion key-points

The key-points that can be discussed in Operational Groups and are arisen by this minipaper "Societal aspects of the RET implementation on farm" should be:

- a. Despite the typical dissemination networks and the agricultural extension systems, the transfer of knowledge could be facilitated by new forms of innovation transmission operators (brokers, facilitators & intermediates).
- b. Which forms of energy communities (size, status, activities, connections) can be created at local level in order to develop strategies of social acceptance and quality of life regarding RES on farm.
- c. The definition and address of the environmental and socio-economic risks of bioenergy for rural areas at the community's level.
- d. Definition of policy measures in order to eliminate the negative social impacts of the implementation of RES on farm.

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