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RENEWABLE ENERGY SOURCES USED FOR AGRICULTURAL PURPOSES AS EXEMPLIFIED BY A RURAL MUNICIPALITY

Joanna SZYSZLAK-BARGŁOWICZ, Grzegorz ZAJĄC, Monika STOMA, Andrzej KURANC, Jacek WASILEWSKI
University of Life Sciences in Lublin, POLAND
E-mail of corresponding author: joanna.szyszlak@up.lublin.pl

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ABSTRACT
The aim has been to assess social acceptance and the opportunity to use renewable energy sources by rural area residents, as exemplified by the rural municipality of Dołhobyczów. The results of the questionnaire survey on renewable energy sources used by farmsteads have been presented. Solar energy (solar collectors, solar dryers) is most often used in this area. Some farmers have come into possession of biomass boilers in their farmsteads.

INTRODUCTION

Renewable energy sources play a key role for current global greenhouse gas emission reduction strategies, as well as, to some extent, for fossil fuel replacement projects (Stolarski et al. 2015; Burg et al. 2016; Obidziński et al. 2016). Actions aiming at using new arrangements in the production or manufacture industry and energy management industry, including renewable energy sources, contribute to the achievement of the objectives set out in the climate and energy package (3x20%) enforced by the European Parliament in 2007 (Zarębski et al. 2015; Zając et al. 2017). The agreement made by seven EU Member States for the aforementioned purposes makes the European Union a top leader for changes in the global economy.

Agriculture is the sector that has a considerable impact upon natural environment as well as living standards, and thus constitutes the area in which the sustainable development-oriented actions are needed. (Szubska-Włodarczyk 2012). The idea of the sustainable development imposes reconciliation of two opposite targets such development, progress, economic growth on the one hand and balance, security, and natural environment protection on the other (Mystkowski 2005). Development of the renewable energy sources industry may be the opportunity for rural areas to develop sustainably. These are local sources of renewables, so they may contribute to improvement of energetic security by means of decreasing fossil fuel exports. Creation of new jobs, particularly in small and medium-sized enterprises, and regional development promotion is still another advantage arising from the renewables development. Furthermore, production of biofuel in agricultural areas, for instance, allows to use severely polluted soil that is not fit for growing edible plants (Gotowska, Jakubczak 2011).

The aim has been to assess social acceptance and the opportunity to use renewable energy sources for rural area residents, as exemplified by the rural municipality of Dołhobyczów. The results of the questionnaire survey on renewable energy sources used by farmsteads have been presented. The results indicate whether the surveyed respondents make use of this type of energy, which of the renewables they are most interested in, and which technology is most feasible to develop in the surveyed area.

MATERIAL AND METHODS

The survey was conducted in the rural municipality of Dołhobyczów that is located in the south-eastern part of the Lubelskie Voivodeship, in the area of Hrubiewszowski District. The survey was conducted by means of the questionnaire including open-ended and closed-ended questions concerning renewable energy used in farmsteads, development prospects in the surveyed area, and benefits arising from the renewable energy sources.

The survey was conducted among the farmers in the municipality of Dołhobyczów. That was a direct survey in which the incidental community participated. The survey was conducted for the group of 140 people and its results have indicated the profile of respondents in terms of sex, age, education, and size of a farmstead. The majority of the surveyed have farmsteads of 5-10 ha in area (31,5%) and 10-30 ha in area (31,5%). Those having farmsteads of 30-50 ha in area (4%) and above 50 ha in area (4%) are the minority. The majority of the surveyed grow cereal (48%), and sugar beat (16%), vegetables (mainly beans) and fruit (10%) and corn (3%) are grown to a lesser extent. 6% of them grow other crops - oilseed rape is mainly grown. Farmsteads running animal husbandry are in minority: 12% of farmers breed cattle, and only 3% breed swine, and 2% breed poultry.

RESULTS AND DISCUSSION

On the basis of the resulting figures arising from the survey, it has been plausible to state that the majority of respondents make use of charcoal boilers (94%) in which wood is burnt as substitute fuel apart from charcoal in their farmsteads. As few as 6% of the surveyed respondents make use of biomass boilers and burn wood (6%) and wooden chips (1%), whereas none of them makes use of gas boilers or oil boilers. The majority of the respondents do not have renewable energy sources facilities/installations (71%). Amongst the surveyed farmers, 20% of them make use of solar collectors for warming up water, 6% of them have biomass boilers and as few as 3% of them have solar dryers in their farmsteads. None of them uses other renewable energy sources. The respondents are most interested in solar energy (63%). Lower interest is_aroused by: wind energy (20%), biomass (8%), biogas (5%) and production of biodiesel for own purposes (4%). None of the respondents has been interested in water energy or heat pumps.

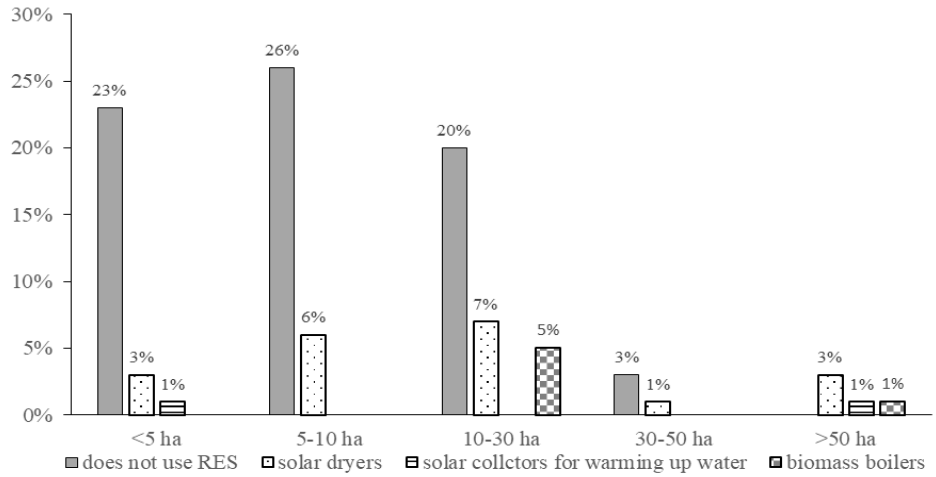

Fig. 1. Renewable energy sources facility/installation and size of farmsteads [own study]

As it has been presented in the Fig. 1, renewable energy sources are most often used by owners of farmsteads of 10-30 ha in area (7% of solar collectors for warming up water, 5% of biomass boilers). Each of the surveyed farmers who owns a farmstead of above 50 ha in area has a renewable energy source facility (3% of solar collectors, 1% of solar dryers, 1% of biomass boiler).

The majority of the surveyed respondents think that the use of renewable energy sources has a positive impact upon the natural environment protection (37%) and brings about energy savings (32%). Fewer respondents have ticked the response concerning the dependence on rising fossil fuel prices (12%), local/regional development (6%), energy security and gradual independence from external sources (6%) and greenhouse gas emission reduction (6%). As few as 1% of respondents have stated that the use of this type of energy does not bring any benefits.

CONCLUSIONS

Development of the renewable energy sources industry may contribute to development of rural areas. It contributes to creation of new jobs, agricultural production diversification and in consequence - to structural changes in agriculture. Furthermore, it results in positive changes in the agricultural background and natural environment, aiming at the global sustainable economic development (Gotowska, Jakubczak 2011; Maj 2015; Szyszlak-Bargłowicz, Zając 2015). In Poland the use of renewable energy sources is regularly growing in the rural areas. This is the effect of numerous economic, energetic, and ecological factors as well as our commitments shared under agreements made by international organisations in the European Union.

The surveyed farmers from the Municipality of Dołhobyczów are interested in renewable energy sources, however they use them to a very limited extent. Due to easy application, it is mainly solar energy and, according to respondents, solar energy is regarded as most likely to develop in the area of the municipality. Apart from solar collectors, biomass boilers and solar dryers are also used for warming water. As far as solid biofuel for boilers is concerned, mostly wood and less often wooden chips are used as fuel for boilers.

Farmers are indeed aware of the benefits arising from the use of renewable energy sources. The majority of them think that the use of this type of facility has a positive impact upon natural environment and furthermore, it brings about energy savings. Farmsteads of above 50 ha in area may be the examples for the fact that all of those surveyed have had renewable energy sources facilities (mainly solar collectors used for warming water, solar dryers and biomass boilers).

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