3 ENVIRONMENTAL ATTITUDE IN RURAL AREAS OF THE BORDER REGION

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This chapter aims to provide an overview on "social conditions" of the Hungarian-Croatian cross-border area, focusing on Osijek-Baranja county (on the Croatian side) and Baranya and Somogy counties (on the Hungarian). The goal of this part of the RuRES research was to examine the attitude and the "available" environmental behaviour towards renewable energy and energy efficiency in the rural areas in this border region. The empirical research was two-fold - in the first part, a representative survey was conducted in two Baranya counties and in the second part, a representative survey at micro regional level was conducted in Somogy county in Koppány-Valley.

3.1 Measurement of the environmental attitude and behaviour

With the degradation of our natural endowment, and parallel to the appreciation of environmental protection and environmental policy, the study of the environmental attitude and "environmental behaviour" is more and more in the focus. In the view of Eagly and Chaiken (1993), the attitude is a "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly & Chaiken, 1993), and it is of vital importance in the forecasting of actual behaviour (Casaló & Escario, 2017), including the attitude concerning the environment (environmental protection) and behaviour as well.

A significant part of the environmental problems can be traced back to human behaviour, so most of research are targeted at the discovery of motivations and background of environmental actions. Several research have explored a tight correlation between an environmental attitude and environmental action (or non-action) (Bamberg & Möser, 2006; Kaiser et al., 2007; Levine & Strube, 2012). Németh et al. (Németh et al., 2018a; Németh et al., 2018b) focused, among other things, on the motivations of actions concerning environmental problems, "counter-measures", the issue of originally set objectives and the exploration of the actual achievements.

The factors influencing behaviour (also environmental behaviour) include other things besides the attitude. Most of the works on the environmental attitude (e.g. Gaterslaben et al., 2014, Steg & Vlek, 2009; Ertz et al., 2016) refer to the behaviour

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theory by Ajzen (1991) as a basic work, which refers, in addition to the attitude (also seen as a key factor), to a subjective norm (which refers to the pressure by the environment potentially influencing one's behaviour to implement or not implement some action), or to "experienced behaviour control" (referring to the past experiences and visible obstacles like money, schooling, knowledge available time) as a factor that also influences behaviour.

In the research of the environmental attitude, the role of several other factors, like the value system, identity, moral convictions, the already experienced advantages and disadvantages, context and habits, is also emphasized by some researchers, (Gaterslaben et al., 2014, Steg & Vlek, 2009).

Less attention is in literature paid to the examination of differences regarding the environmental attitude by territorial types. Freudenburg and McGinn (1989) found that previous research had quite a mixed opinion with respect to differences according to territorial character (urban vs. rural, industrial vs. agriculture-dominated areas) and environmental attitude. Some research did not find any difference between environmental conviction and the character of the respondents' territory, and there were some that found a positive correlation between the urbanization level and the environmental conviction. For the "measurement" of the environmental attitude and environmental behaviour, both interviews (e.g. Vicente Molina et al., 2018) and questionnaires are used (e.g. Buta et al., 2014). A sampling ranged from a multi-step or systematic random sampling (e.g. Buta et al., 2014) to quota sampling (e.g. Vicente Molina et al., 2018). Most research, however, do not use representative samples, irrespective of the size of the researched territory, so they are not suitable for drawing general conclusions for certain territorial units (even though attempts are made). The representative sampling procedure of our research, however, allows some generalizations concerning the inhabitants living in the rural areas of the Croatian and Hungarian Baranya counties. The analysis of representative samples related to the environmental attitude and behaviour is usually allowed by international questionings (e.g. Eurobarometer), but these are typically only representative of large territorial units like a country or large NUTS2 territorial level. This research was focused on the rural spaces of the Hungarian and Croatian Baranya counties and tried to answer the question of how the non-big city population related to the use of renewable energy sources, issues of environmental protection, how important they consider environmental issues and the issue of renewable energy. The respondents surveying was done in the rural areas of Baranya county in Hungary and Croatia (Osijek-Baranja county), where a quota sampling was carried out, representative of 4 settlement types, gender and generation. On both the Hungarian and Croatian side of the border, 400 persons (a total of 800) were questioned in the framework of an approximately 30 minute interview. The questions included

the respondents' environmental attitude in addition to social problems they have come across. Furthermore, we asked questions concerning certain environmental and energy efficiency actions. The questionnaire also included questions concerning the subjective material wellbeing of the respondents, their influence on the neighbourhood and demography issues. The settlement categories were defined as described in table 3.1 so that each settlement type should have the same weight in the sample.

Table 3.1: The number of and distribution of settlement types in the sample of the survey-Source: Calculate by the authors

	small village (below 500 dwellers)	small settlement (501-2000 dwellers)	medium-sized settlement (2001-5000 dwellers)	small town (5,001-10,000 dwellers)
HU	20 settlements; 112 persons	8 settlements; 150 persons	2 settlements; 88 persons	1 settlement; 50 persons
HR	12 settlements; 63 persons	12 settlements; 177 persons	2 settlements; 50 persons	1 settlement; 110 persons

To sum it up: a total of 31 settlements were included in the questioning session on the Hungarian side and 27 settlements in Croatia.

3.2 Environmental attitude and behavior – main findings of the representative questionnaire

When analysing the survey results, all questions were individually analysed and we also made complex variables from the respective questions so that the correlations of the environmental attitude should be more confidently analysed and the environmental attitude should not be represented by one single question. Accordingly, when composing the questions, we made efforts to address each attitude and behaviour pattern and all further characteristics with several questions using different wording but the same essence. The first block of the questioning was designed to discover the position of environmental problems among different societal issues and in the set of problems defined by the respondents. It was a general finding that the respondents on the Croatian side were more satisfied than their Hungarian counterparts and this difference was rather striking in certain issues (e.g. situation of the economy, issue of international terrorism, health issues). The issue of environmental pollution and the impacts of the climate change as social problems were considered as issues of a medium significance in both regions in our examination. An interesting contradiction can be found when comparing attitudes to the actions actually made or behaviours. On the whole, we can say that the survey revealed a

higher environmental attitude of the Hungarian respondents than the Croatian ones, i.e. the Hungarian respondents attributed a greater significance to the issue of environmental pollution as a problem. On the other hand, if we look at environmental behaviours on the basis of the questionnaire responses, we can see that the Croatian respondents acted more environment consciously, e.g. when they buy a light bulb, the energy consumption of the products matters more to them than its price (although this is also true for the Hungarians; the breakdown of the percentages shows considerable differences (table 3.2).

Table 3.2. Breakdown in the percentage of the responses to question 7 on the Hungarian and Croatian side

Hungary			
	Frequency	Percent	Cumulative percent
KT/NA	5	0.6	0.6
Quality	154	19.2	19.9
Energy consumption of the product	301	37.6	57.4
Environment protecting effect of the product	63	7.9	65.3
Price of the product	210	26.2	91.5
Origin of the product	51	6.4	97.9
The brand	19	2	99.9
Other	1	0.1	100
Total	801	100	
Croatia			
	Frequency	Percent	Cumulative percent
KT/NA	1	0.3	0.3
Quality	64	16	16.3
Energy consumption of the product	199	49.8	66
Environment protecting effect of the product	37	9.3	75.3
Price of the product	89	22.3	97.5
Origin of the product	3	0.8	98.3
The brand	6	1.5	99.8
Other	1	0.3	100
Total	400	100	

A similar but opposite disparity can be seen when purchasing a new refrigerator. 20.4% of the Croatian respondents took energy efficiency into account when buying a refrigerator, while the same proportion for the Hungarian respondents was 47%. In addition, the Hungarian respondents felt in a significantly higher proportion (σ=0.001 at 95% confidence interval) that the quality of their personal lives was influenced by economic factors (averages: HU=4.2; HR=3.79).

Further interesting analyses were allowed by the search of correlations among the respective responses and the socio-demographic features of respondents. We integrated the questions concerning environmental attitude here (besides communality that can be taken as good, the percentage value of variance explained can only be defined as very low), creating a complex variable from them. Another complex index was made concerning the judgement of the economic effects of energy efficiency, and also for the intention and real action. At these complex indices, both the co-movement of the responses given to the different questions and the percentage value of variance explained were much higher. The next step was to make regression analyses, i.e. correlations were sought among social demography indices (gender, age, education, income, subjective financial situation) and the responses given to the respective questions. The result of the regression model calculation showed that only schooling had a significant forecasting effect for a positive environmental attitude (the explanation value of the model is significant but not very strong; we were only able to explain 0.7% of the variations of the attitudes). The findings reveal that those with the lowest education level had the lowest attitude value and the highest attitude value can be seen at those who had higher education qualification, but the rising trend between the two extremes cannot be justified. Besides the environmental attitude, we find it very important to stress how the respondents acted, i.e. what they had actually done in the last year for the protection of the environment or for energy efficiency. The examination of the regression model revealed that, interestingly enough, incomes or the subjective financial situation had no significant impact on environment-oriented actions and in this respect, no difference can be seen between the older and younger generation. On the other hand, the education level and attitude predicted possible environmental protection or energy efficiency actions, i.e. the higher the respondents' education level and the more environmentally conscious they consider themselves, the greater the chance for some actual steps to be made.

A key issue of the project is energy efficiency, with its expected economic impact, and the issue of state intervention in energy efficiency. The results of the regression model examinations showed that those respondents attributed a greater significance to the economic role of energy efficiency and supported state interventions in this issue (who has stronger future intentions for making environmentally conscious actions,

who is more environmentally conscious and who already acted in an environmentally conscious way, who is older and who has a lower education level).

3.3 The results of the local population survey in Koppány Valley

A local population questionnaire survey was carried out in May, 2018 in 10 settlements of the Koppany Valley micro-region (n = 310, population quota based). A single and multiple choice, Likert scale and open answer questions were used in the survey questionnaire. A descriptive statistics method was carried out to analyse the results. The questionnaire consisted of several blocks, namely background (personal) information on the respondents, awareness about RES in general and specifically biomass-based energy sources awareness and acceptance.

3.3.1 Characteristics of the sample (background information)

The majority of the respondents were female 56% (172 people from the surveyed inhabitants) and 44% of the respondents were male (135 people). The gender ratio of the respondents was quite balanced.

From the age distribution point of view, the majority of the respondents belonged to the 46-60 age group. Figure 3.1 indicates that the majority of the respondents were older than 30 (88% of the total). Considering the education level of the respondents (figure 3.2), most of the people had a vocational or high school as the highest education degrees. Only 16% obtained a university degree.

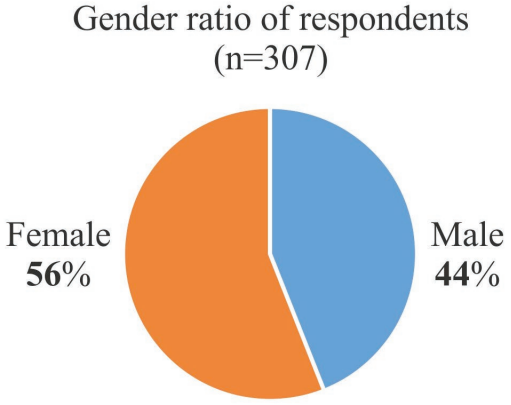

Figure 3.1 Respondents' gender.
Source: Own contribution

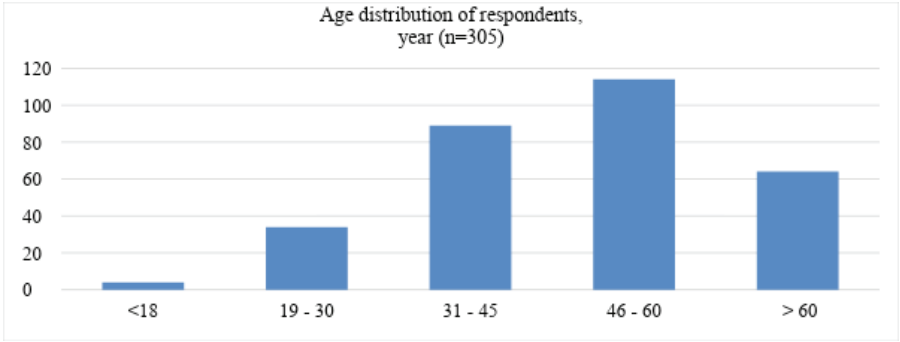

Figure 3.2 Respondents' age.
Source: Own contribution

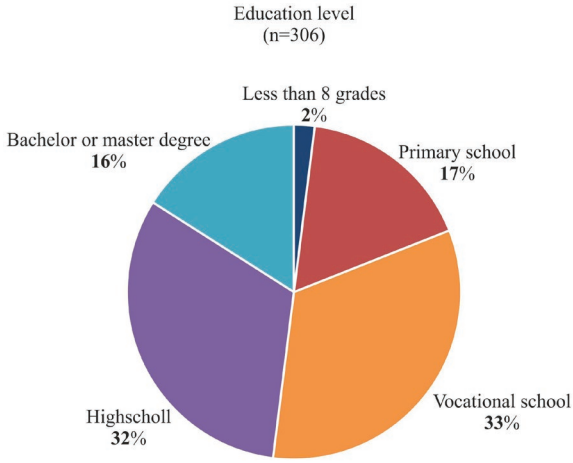

Figure 3.3 Respondents' education level.
Source: Own contribution

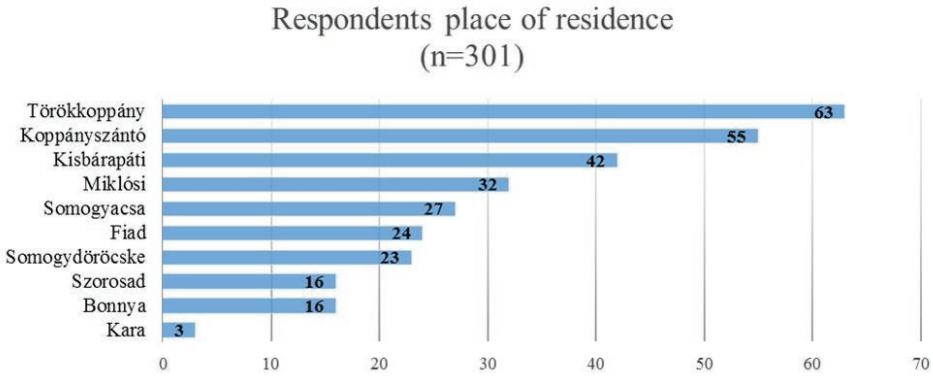

Figure 3.4 Respondents' place of residence.
Source: Own contribution

Based on the data presented in, we may conclude that the settlements with the highest number of the respondents are Törökkoppány, Koppányszántó and Kisbárapáti. In comparison, Szorosad, Bonnya and Kara are the villages with the lowest number of the respondents.

3.3.2 Awareness about RES

Among 300 surveyed inhabitants, 41 persons (13.7 %) have never heard about renewable energy sources (RES), while 259 persons (86.3 %) have heard about RES (Figure 3.5). It shows a high level of awareness about RES among stakeholders of Koppany Valley. Solar, wind and hydro energy are listed by the respondents as the most well-known sources as shown in Figure 3.6.

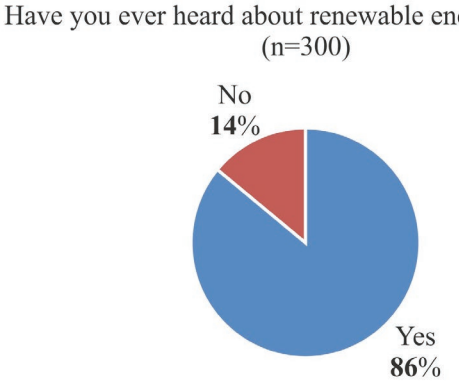

Figure 3.5 RES knowledge.
Source: Own contribution

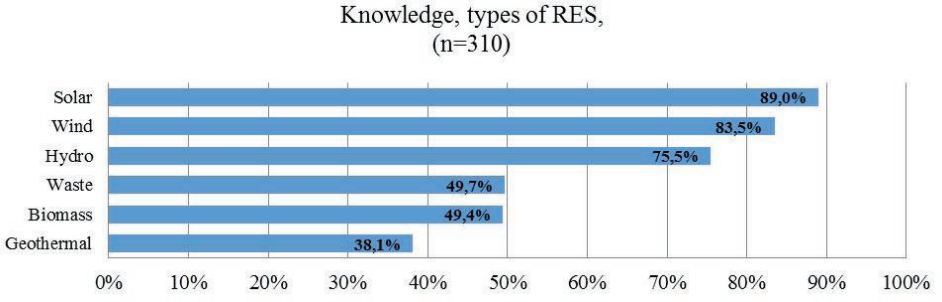

Figure 3.6 Knowledge about and types of RES.
Source: Own contribution

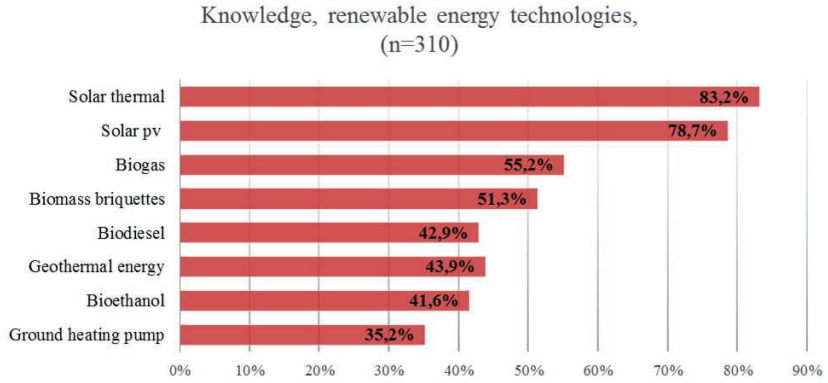

Figure 3.7 RES technologies knowledge.
Source: Own contribution

Figure 3.7 confirms the results presented in figure 3.6 by reflecting solar-based renewable energy technologies (solar thermal and solar PV) as the most recognized and well-known among the local population, 83.2 % and 78.7 % respectively.

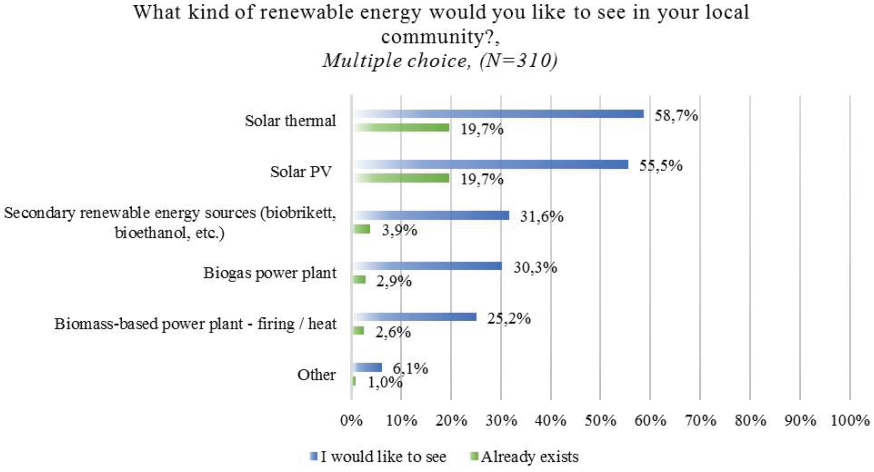

Figure 3.8 Acceptance of different RES.
Source: Own contribution

In accordance with the data illustrated in figures 3.6 and 3.7, we can see that the residents of Koppany Valley are willing to accept solar-based RES in their local community the most as shown in figure 3.8. Only 30.3 % of the respondents would like to have a biogas power plant.

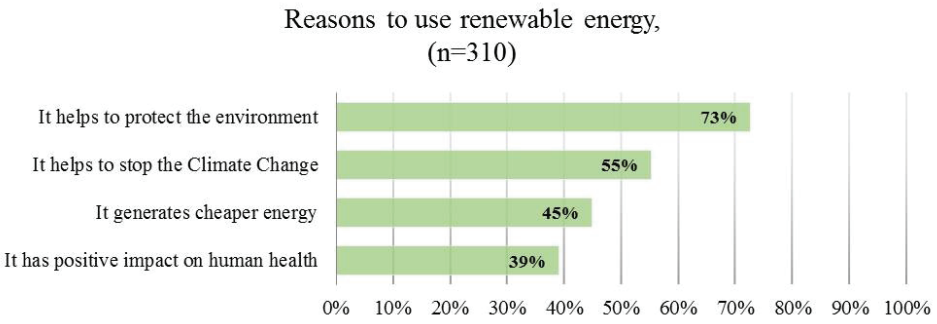

Figure 3.9 Reasons to use renewable energy.
Source: Own contribution

310 inhabitants were asked about the reasons of using RES using multiple choice questions as presented in figure 3.9. Among them, 73 % (the highest) selected the option which says "it helps to protect the environment". 55 % stated that "it helps to stop the climate change". 45 % of the respondents chose "it generates cheaper energy". Lastly, 39 % chose the "it has positive impact on human health" option.

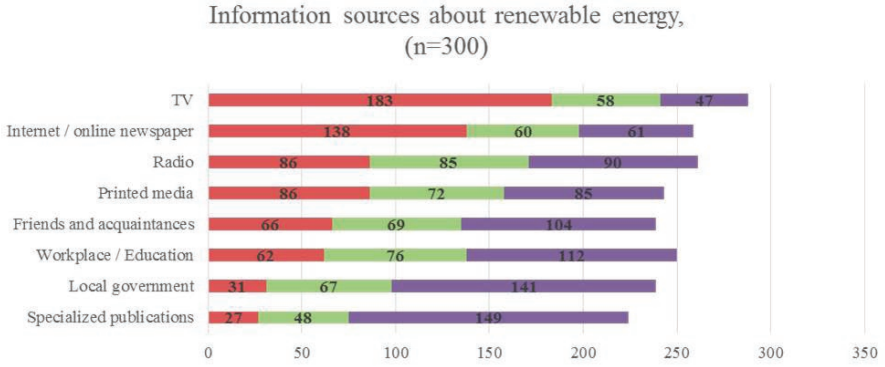

Figure 3.10 Information sources about RES.
Source: Own contribution

There are different sources to collect information about renewable energy. The graph examines, which sources are the most common or less important to provide the inhabitants with the information in the given area. TV was mentioned as the most common source to get information about renewable energy and the second is the Internet. The least important information sources, with respect to renewable energy, in the research area are local government and specialized publications as presented in figure 3.10.

3.3.3 Biomass-based energy sources knowledge and acceptance

61 % of the respondents claimed that they knowledge on biomass as shown in Figure 3.11. Among the biomass energy sources, biofuel, biogas and bio briquettes were mentioned as the most known types with more than 72 % of the awareness rate. 54 % of the population have knowledge about energy forest, energy grass and bio pellets as illustrated in Figure 3.12. Thus, general knowledge about biomass definition and bio-based energy sources among the inhabitants of Koppany Valley has basically a moderate level.

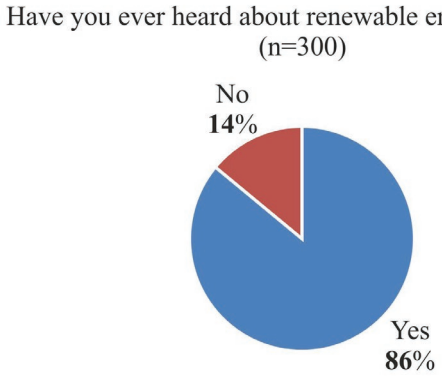

Figure 3.11 Basic biomass knowledge.
Source: Own contribution

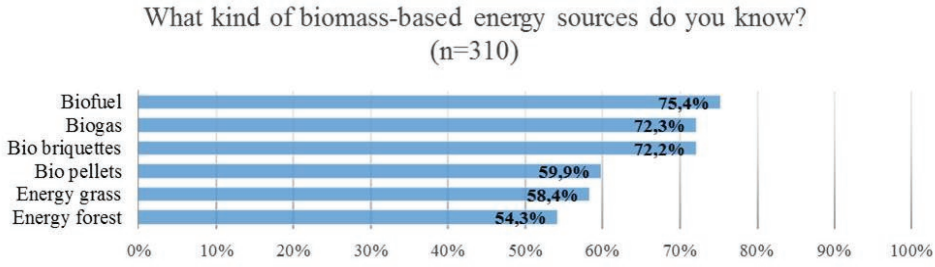

Figure 3.12 Bio-based energy sources knowledge.
Source: Own contribution

Then, we switched to the public acceptance questions part. We asked stakeholders if they would support the installation of a biogas power plant in their local community. 35% of the respondents answered “yes”, 20 % said “no” and the rest 45 % declared “maybe” (Figure 3.13). It means that the most of the respondents were not

quite sure about biogas plant installation. In spite of this, 73 % of the respondents were ready to collect plant residues from their garden in order to get raw materials for the proposed biogas plant (Figure 3.14).

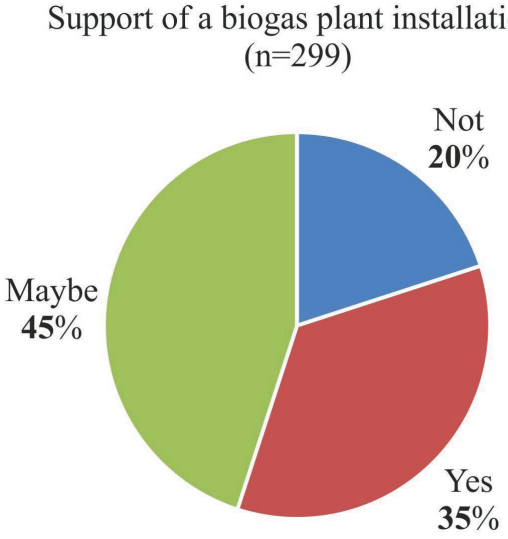

Figure 3.13 Support of biogas power plant installation.
Source: Own contribution

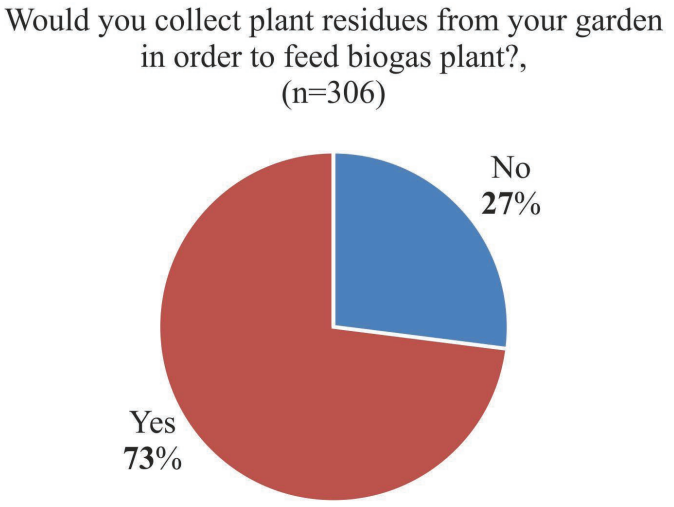

Figure 3.14 Collective activities.
Source: Own contribution

We asked the respondents to express their opinion about the statements using an estimation scale from 1 to 5, where 1 meant "completely disagree" and 5 meant "completely agree". The analysis of the different acceptance aspects as willingness to collect organic waste (this question was a Likert scale form as well), make financial contributions for the green energy utilization and readiness to participate in community activities related to biogas production is presented in figure 3.15. We can see that the respondents were much more likely to collect organic waste (so it confirmed our results presented in figure 3.14) than to work together or especially to provide financial aids.

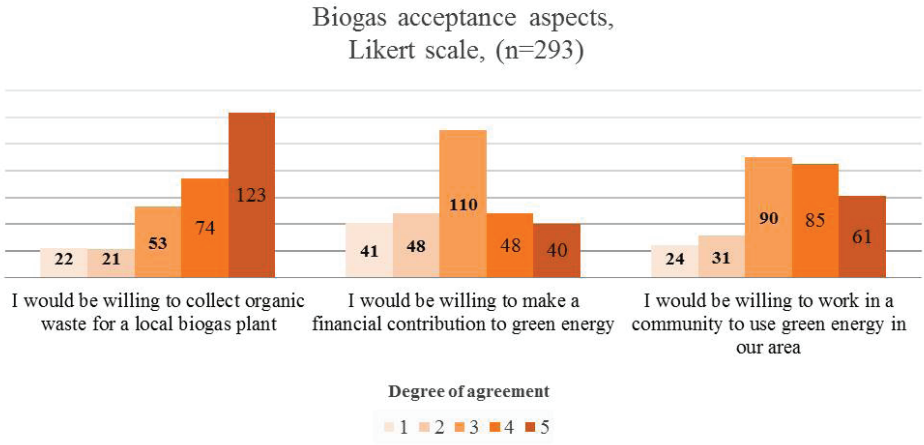

Figure 3.15 Different aspects of biogas plant acceptance.

Accumulation of raw materials is a crucial issue for the operational maintenance of a biogas plant. Therefore, the fact that the local population is willing to collect plant residues, organic waste and other bio sources for achieving a biogas plant purpose indicates a significant progress in the social potential of the area.