

Ecological subjectivity – Q-methodology Study in Rural Area of Dornelor Basin, Suceava County

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Abstract

The design and implementation of agro-environmental policies would have an increased social efficiency if it started from the opinions, attitudes, ideas and appreciations of social actors involved in the production of ecological goods. In this paper, the approach to ecological subjectivity was based on Q methodology, which is both a qualitative research method and a statistical one. The study made it possible to identify the main types of personal micro-universes, of subjective models constructed according to the existing ecological issues. The study was conducted in Dornelor Basin, Suceava county, an area characterised by ecological concerns and farming practices, and it identified four major types of subjective configurations built on the basis of the impact of adopting environmentally friendly farming practices on: i) local labour force; ii) rural economy; iii) working conditions; iv) provision of ecosystem services.

Keywords: ecological subjectivity, Q method, ecological farming practices, rural stakeholders' opinion, pyramid shaped matrix, factor analysis

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Introduction

Knowledge of personal mechanisms, starting from opinions and attitudes, offers the possibility to identify favourable or inhibiting elements of ecological subjectivity. Furthermore, the known subjectivity allows the involvement of social actors in the design and implementation of agro-environmental policies. In the case of ecological production activities, the scientific identification of subjective mechanisms, the evaluation of various aspects/domains can be made by using the Q methodology that “*combines quantitative and qualitative data and analytical techniques*” (Zabala, Sandbrook and Mukherjee, 2018).

The aim of the study was to identify the subjective factors, at the level of opinions and attitudes, of the main subjective micro-universes where certain subjective perceptions and especially subjective projections of ecological evolutions are present. The main objective was to identify the opinions and attitudes concerning the impact of adopting ecological farming practices in the following fields: rural economy, working conditions, labour market and provision of eco-system services. Practical data were collected from a group of 20 rural stakeholders with ecological production behaviours, persons who were interested in multiplying the ecological activities, involved in research activities or in promoting eco-friendly relations. The Q method was used, creating a “pyramid-shaped matrix”, together with the statistical analysis (factor extraction, rotation and estimation) and factor analysis and interpretation.

Review of the scientific literature

Q method has a rich history, starting with the psychological works by Stephanson W in 1936 and continuing with the conceptual development and its use in multiple scientific fields. Later, it was adopted, also, in political science (Watts and Stenner, 2012) and other fields (Zabala, Sandbrook and Mukherjee, 2018). Used to examine subjectivity and succeeding in obtaining response models on the basis of which efficient inductive reasoning can be developed, the Q method has the “*capacity to allow a more effective form of policy making and implementation process.*” (Barry and Proops, 1999). In the methodological approaches, Q Method has a special status due to the complexity and original mix between the valences of an instrument for qualitative and statistical research. Susan Ramlo and Isadore Newman (2015) explain that “*some call it*

a constructivist (or a qualitative) method, and some call it a positivist method (or a quantitative method)“ (Molenveld, 2020). Out of this reason, it is used in the studies on subjective ecology: “*The method demonstrates a way forward in ecological economics to better capture representative values and perspectives in ecosystem service management and help design climate and environmental policies with greater acceptance.*”(Grimsrud, Graesse and Lindhjem, 2020). The method has spread across the entire area of ecological knowledge, with increasingly sophisticated adaptations and refinement: “*Applications of the Q method have increased significantly in areas of ecological economics, environmental management and conservation research in recent years (see e.g. review by Zabala et al., 2018), some also using the ES framework directly or indirectly (e.g. Sy et al., 2018; Bredin et al., 2015; Pike et al., 2015; Armatas et al., 2017; Hermelingmeier and Nicholas, 2017; Simpson et al., 2016; Barrera et al., 2014)*”(Grimsrud, Graesse and Lindhjem, 2020). “*Q-method is frequently used to delineate and understand different stakeholder perspectives across such diverse fields as energy, land use, fisheries management, mining, wildlife conservation, agriculture, and water resource management, making it particularly salient as a means to inform sustainability practice and policy*” (Sneegas, et al., 2021).

Research methodology

The study was conducted in a rural area dedicated to agricultural activities that use eco-friendly farming practices, namely *Dornelor Basin*. Located in the south-western part of Suceava county, it is mainly characterised by high altitude and wet cool weather that are favourable for forests and grassland that cover large areas, being the most important natural resources. At the same time, organic farming is a constant presence in this area, both in terms of organically certified area and number of certified cattle. The extensive farming based on environmentally friendly practices prevails in Dornelor Basin, with positive effects on the environment.

The approach to ecological farming practices can have (hypothetical) effects on the provision of ecosystem services, on the working conditions of farmers and hired farm workers, on the rural labour market and rural economy. The study of opinions and attitudes was made with the help of: i) group (R-set) consisting of 20 rural stakeholders - experts, farmers users of eco-friendly practices, informed persons involved in ecological farming issues. The group of respondents was characterised by: prevalence of women (70% of total participants), persons with consolidated/significant experience (the share of persons with 5 – 20 years of experience in practical or theoretical ecological issues was 90%); ii) Q-set consisting of 26 statements* referring to the hypothetical effects of using ecological practices in the four areas. The statements referred to the likely impact over the next 10 years. According to the literature, we considered that R-set represents “observations” while Q-set represents “variables” (Grimsrud, Graesse and Lindhjem, 2020).

The likely impact of ecological practice approach was analysed on the basis of appreciations/evaluations on the four areas. The evaluations were ranked on a scale from - 4, totally disagree to + 4, totally agree. All questions received valid responses. The “pyramid shaped matrix” was used.

The steps taken in using the Q method approach were those recommended by PQMethod, a statistical programme dedicated to this type of study. In this sense, the factor analysis was used for the analysis of interactions; a correlation matrix was constructed between the number of respondents and the number of Q-sorts. “*The number of eigenvalues above one, produced at the correlation matrix stage (or all factors containing more than one Q-sort) can be used as heuristics to inform the number of factors*”(Thomas and Watson, 2002). All possible factors were established, the factors representing “groups of persons with similar response patterns during sorting, while loading a certain respondent on a certain factor indicates the level of agreement or disagreement”(Thomas and Watson, 2002). In this stage of the analysis, only 2 non-rotated factors were retained, statistically significant, the cumulated variation of own values being 50% (eigenvalues).

The centroid method was used to extract the non-rotated factors. The quantification made it possible to establish 4 factors, by which we grouped and segmented the opinions/ subjective evaluations of the 20 respondents. By factorizing individuals, we captured and analysed the existing subjective similarities, in relation to the common variation by investigated subjects. By rotating the factors (Varimax analytical rotation was used), specific loadings were obtained that made the interpretations possible. “*Application of factor analysis across a whole data set typically leads to emergence of a small number of such factors, which, taken together, can be used to facilitate a great simplified (or reduced) explanation of the many manifest associations captured in the original correlation matrix. It is an elegant and potentially very effective methodological system*”(Watts and Stenner, 2012). To deepen the defining characteristics of each factor, the z score was calculated (equation 1): “... give more precision about how strongly engaged each perspective is with each item. They are also used to determine whether an item is a consensus (with similar

z scores across factors) and whether the item distinguishes a factor (significantly different *z* score in a factor compared with the rest.” (Zabala, Sandbrook and Mukherjee, 2018).

$$Z = \frac{x-\mu}{\sigma} \tag{1}$$

where:

- Z = standard score
- x = observed value
- μ = mean of sample
- σ = standard deviation of sample.

Results and discussions

From the perspective proposed by the present study, the obtained results describe four different micro-universes, sometimes with subjective intertwining spaces. “*The results shed light on different points of view, as well as conflict and consensus between groups*” (Zepharovich, Ceddia and Rist, 2020).

The first results obtained by using the “pyramid-shaped matrix” consisted in the identification of clearly defined opinions/attitudes, differentiated according to subjective positioning in full disagreement or agreement (Figure no. 1).

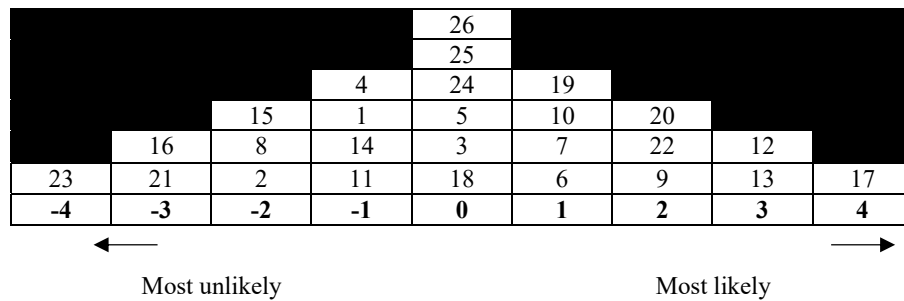


Figure no. 1. Q Ranking pyramid – Example from case study area
Source: authors’ processing

In this sense, the strongly negative opinions and/or attitudes, assessments (subjective positioning of respondent at -4 on the scale) are found in the following areas: a) labour force: “*There is low probability that the family labour will decrease in the next years. On the family farms, family will continue to be the basis for farming activities, all the more so as seasonal labour will be increasingly difficult to find locally*” (R.16). The reasons given are in the following order: specificity of the ecological system in the investigated area ,tradition, and organization of agricultural holdings; b) multiplication of ecological farms – the motivational arguments are based on the difficulty of such a process: “*I believe that the target of 50% of farms in the area adopting ecological farming practices in the next 10 years cannot be reached*” (R 18); c) rural economy resilience – perceived in terms of permanent decrease: “*The Romanian village will no longer be as resilient...*” (R5).

There are strongly positive opinions and/or attitudes (subjective positioning +4) in the following areas: a) strict certification of organic farms; b) increase in the number of seasonal workers; c) multiplication of farms – the opinions referring to the increase by 10% of the number of ecological farms, in the next 10 years, are strongly positive. The reason is the specificity of the investigated area: “*In the next 10 years, I believe that at least 10% of farms in the study area will adopt ecological practices, Suceava county being among the top counties in terms of ecological potential (large HNV areas)*” (R20).

The results of the statistical analysis (specific to Q method) consisted in the self-referential construction of 4 factors. At the level of each factor, there is a mix of economic and ecological assessments and opinions. The best outlined factors, the most consistent subjective micro-universes are 1 and 2, because they have significant loads: for Factor 2 [the values are 0.9265 (R2), 0.8599 (R4) and 0.8213 (R5)] while for Factor 1 [0.7154 (R8), 0.8069 (R11) and 0.6241 (R13)]. The analysis of correlations between factors reveals a moderate level; a significant direct relationship was found between Factor 1 and 3 (0.68); the correlation between Factor 1 and 2 (0.52) is also noteworthy; Factor 4 had the least significant correlations.

Factor 1 – Pragmatic with economic attitudes, normative ecological tendencies, is that of respondents with clear opinions on the labour market: “*The use of family labour will decrease*” (value is -4), “*Farmers will have to increase their level of skills*” (the value is 3), and working conditions – “*The nature of work on farms will be more physically demanding*” (-3). Respondents believe that the number of ecological farms

will increase – “10% of farms in the case study area will adopt ecological farming practices,” (value 4), in the conditions in which “There will be a tight certification to define farms as ecological” (value 3).

Factor 2 – Pragmatic with economic and ecological attitudes, bring together the subjective perspectives of those who particularly appreciated, like those captured by Factor 1, labour force market and ecosystem services. Definitely, respondents appreciate, family labour will not decrease, “Family labour will decrease” (value -4) but “Farmers will have to increase their level of skills” (value 3). The use of ecological practices will have a well-targeted impact, “water quality will improve” (value 3), the rural areas will be not significantly affected - “The rural areas will become no more attractive for residents and users” (value -3). Like in the case of Factor 1, there is a positive valorisation of ecological certification, at the level of farm: “There will be a tight certification to define farms as ecological” (value 4).

Factor 3 – Pragmatic ecological, with economic tendencies – respondents perceive that there will be an increase in the number of ecological farms: “10% of farms in the case study area will adopt ecological farming practices”, value 3, in the conditions in which “There will be a tight certification to define farms as ecological”, value 3 but there will be no relationship between them, “Ecological farms will form clusters of closely connected farms” value-3. The changes triggered by the wider use of ecological farming practices will not have a significant impact on the space for using the ecosystem services, “The rural areas will become no more attractive for residents and users”, value -4, but they will bear an influence on rural economy, because “Consumers will not buy a lot more of their food locally” value-3.

Factor 4 – Pragmatic economic – bring together the opinions of those who fully disagree with the statement “The wider rural economy will be more resilient” value -4; their opinion is that “10% of farms in the case study area will adopt ecological farming practices,” value4, but they will not be organised “Ecological farms will form clusters of closely connected farms”, value-3. The changes triggered by the wide use of ecological practices will have a significant impact at farm level “Family labour will decrease”, value 3, but not at zonal level, “The rural areas will become no more attractive for residents and users”, value 3; they will not influence the agricultural labour market “Employment opportunities in farming will increase” value -3.

The z-score values are not high, indicating a moderate attachment of the 4 perspectives to the items; the highest value of z-score is 2.142, in the case of Factor 3, item “There will be more need of seasonal labour”. If we analyse the results obtained by each factor and the items specific to Q-sets, we can find that:

- Factor 1 – **Pragmatic with economic attitudes, ecological tendencies** – there is a significant/strong relationship to items referring to labour market, to certain labour force issues: “Family labour will decrease”, z score: -1.972, “There will be more demand for female labour for manual operations” z score: -0.812, “There will be more need of seasonal labour”, z score: 1.164.

- Factor 2 – **Pragmatic with economic, ecological attitudes** – the strongest perspective is on items referring to the provision of ecosystem services, more precisely on the ecological aspects: “There will be a tight certification to define farms as ecological” z score: 1.960, “Water quality will improve”, z score: 1.608, “The rural areas will become no more attractive for residents and users”, z score: -1.297.

- Factor 3 – **Pragmatic ecological** – attachment to items referring to the provision of ecosystem services: “The rural areas will become no more attractive for residents and users”, z score: -1.758, “There will be a tight certification to define farms as ecological”, z score: 1.521, “Water quality will improve”, z score: 1.164

- Factor 4 – **Pragmatic economic** stands out by the z scores obtained by items focusing on rural economy – “The wider rural economy will be more resilient”, z score: -1.745 and labour force, “The use of family labour will decrease” z score: 1.624, “Employment opportunities in farming will increase”, z score: -1.624

The calculation of z scores and of differences between them in particular allowed a more accurate identification of subjective perspectives (Chart no.1).

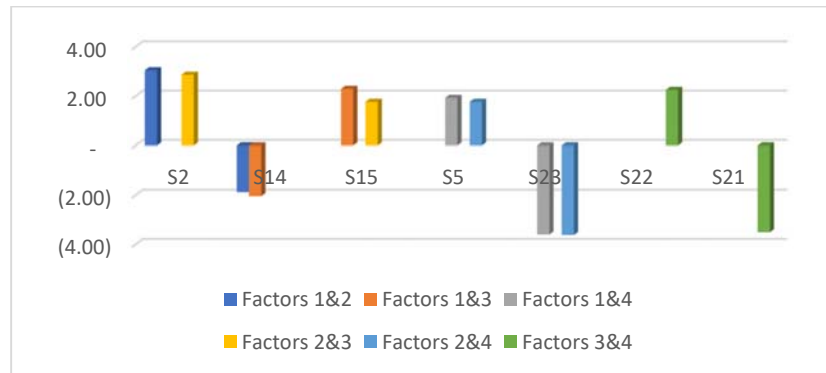


Chart no. 1. Descending array of differences between factors

Source: authors' processing

Statements' legend: S2- "10% of farms in the case study area will adopt ecological farming practices."; S14- "Farmers will cooperate more with neighboring farmers and farms close to them."; S15- "Consumers will not buy a lot more of their food locally."; S5- "Water quality will improve."; S23- "The use of family labor will decrease"; S22- "There will be more need of seasonal labor."; S21- "Rural areas will become no more attractive for residents and users."

Between Factor 1, *Pragmatic with economic attitudes, ecological tendencies* and Factor 2 *Pragmatic with economic, ecological attitudes* there is consensus for the items "The use of family labour will decrease", the difference is 0.021, "Little change will happen to soil quality", the difference is 0.041, "Employment opportunities in farming will increase", the difference is 0.045; there are striking differences for items "10% of farms in the case study area will adopt ecological farming practices, the difference is 3.048, "More livestock farmers will use mob/strip grazing", the difference is 1.725.

The result of comparing the four factors led to the identification of similar opinions as well as to determining the subjective distance, expressed by disagreement. The existence of zero scores indicates the lack of importance that respondents attach to these items; the values assigned to statements reflect the importance of one aspect or another of the investigated issues. In this sense, we think that the presence of 0 score denotes indifference or strong disinterest in one aspect or another (Table no.1).

Table no. 1. Consensus versus Disagreement

Category	Statements	Factor 1	Factor 2	Factor 3	Factor 4
Ecosystem services	Water quality will improve.	2	3	2	-1
	There will be little change in the landscape appearance of rural areas.	1	2	1	2
	Little change will happen to soil quality.	1	1	1	1
	There will be no change in the number and/or size of hedgerows.	0	-2	0	-1
Rural economy	50% of farms will adopt ecological farming practices.	0	2	-1	-2
	10% of farms in the case study area will adopt ecological farming practices.	4	-3	3	4
	Ecological farms will form clusters of closely connected farms within the case study area.	-1	1	0	-3
	The wider rural economy will be more resilient	-1	-2	0	-4
	Farmers will cooperate more with neighbouring farmers and farms close to them.	-3	1	1	0
	Consumers will not buy a lot more of their food locally.	1	0	-3	-1
Labour market	Employment opportunities in farming will increase.	1	0	-1	-3
	The need for labour work of an individual farmer will be spread throughout the year.	-1	1	-2	-2
	Farmers will need to increase their level of skills.	3	3	2	2
Working conditions	The farmer's daily routine will become more varied.	-2	0	-2	1
	The nature of work on farms will be more physically demanding.	-3	0	-1	0

Source: authors' processing

Obtaining some subjective factors generating configurations has been achieved both in environmental management and ecological economy's studies; for example, the perception and opinions regarding ecosystems have generated five types of factors: the non-economic utilitarian, the critical idealist, the anti-utilitarian, the methodologist and moderate economist (Hermelingmeier and Nicholas, 2017). The values and perspectives, representative for managing ecosystem services, fundamental for factors, are present in ecology's economy studies (Grimsrud, Graesse and Lindhjem, 2020, Zepharovich, Ceddia and Rist, 2020)

Conclusions

The four patterns of opinions and attitudes reveal, in an objective way, the subjective perspective on issues referring to the impact of adopting ecological farming practices on the provision of ecosystem services, working conditions on the farms, labour force market and rural economy. It is obvious that there is an intense subjective relationing to the acute problem of labour force, rural area and provision of ecological services; in all the 4 subjective configurations, we can find opinions and projections referring to the situation and evolution of labour force and ecosystem services. The indirect subjective relationing to the structure of rural economy, that can be changed by the increase of the number of ecological farms, reveals the major interest in the evolution of the share of these farms. There is also an indirect appetite for the institutionalization and normativity of ecological farms, denoting the modern behaviour of those engaged in the organic farming process. Without forcing upon the significance of results, we can advance the hypothesis that the agro-ecological policy measures will find a point of support, for their implementation, in these opinions and attitudes oriented, first of all, towards labour market, institutionalisation of ecological farm certification and provision of ecosystem services.

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