ON THE LAND CONSOLIDATION PROJECTS AND CADASTRAL MUNICIPALITIES RANKING

Goran Marinković, Toša Ninkov, Milan Trifković, Žarko Nestorović, Goran Pejičić

Preliminary notes

The essential issues relevant for decision-making on the initiation, evaluation, selection and implementation of land consolidation project shall be considered in this paper. In case of limited resources decision-making about their allocation must be made after multivariate analysis and in order to maximize the effects of investment. Reduction of wrong decision-making risk requires consideration of a number of issues critical for land consolidation projects. This paper shall discuss the issues of importance for proper decision-making process for the selection of land consolidation projects.

Keywords: cadastral municipality; land consolidation; projects ranking

Komasacijski projekti i rangiranje katastarskih općina

Prethodno priopćenje

U radu se razmatraju suštinska pitanja od značaja za donošenje odluka o pokretanju, vrednovanju, selekciji i realizaciji komasacijskih projekata. U uvjetima ograničenih resursa donošenje odluke o njihovoj raspodjeli mora se donositi nakon višedimenzjskih analiza i s ciljem da se efekti ulaganja maksimiziraju. Smanjenje rizika donošenja pogrešnih odluka zahtijeva razmatranje niza kritičnih pitanja za uspeh projekata u području komasacije. U radu se razmatraju pitanja od značaja za pravilno odlučivanje pri izboru komasacijskih projekata.

Ključne riječi: katastarska općina; komasacija; rangiranje projekata

1   Introduction

Land consolidation is an expression having precise meaning and it is related to the enlargement of parcels. Land consolidation and relocate problems usually involve regrouping of fragmented parcels [1, 2]. Land consolidation is a system that includes planning, organizational, legal, economic and technical measures to be implemented in order to enlarge and improve the natural and environmental conditions of land [16].

The characteristics of modern civilization will inevitably lead to unequal conditions for the development of different areas. The growing inequality between rural and urban areas, lack of desire of people to invest their time, energy and money if they believe that their quality of life might be unsatisfactory, may lead to migration of successful agricultural business and families, resulting in the agricultural being left to very large agricultural enterprises or to those who have no other choice [2].

None of the resulting possibilities is desirable and it is necessary to take measures that will lead to increase of the quality of life. The increase of the quality of life in rural areas must include specific activities such as improvement of agricultural production, employment, infrastructure, public utilities, housing and natural resources [2, 17]. In essence, it is necessary to create value that will attract local people to remain in rural areas and to find enough opportunities for their development there. Space and land, as the most valuable resources of rural areas, due to the change of ownership and division, are, inevitably, chopping in time. The functionality of the structure of space and properties is reduced in time, which is a cause of reduced development of rural areas potential. Land consolidation projects should improve the structure and properties to increase the development of potential of certain area. The above mentioned lack of desire of people to invest their resources in uncertain projects to increase the quality of life implies that land consolidation projects must be realized through the state institutions.

The state appears as the sole investor in consolidation for two reasons:
-    If land consolidation projects were purely commercial or profitable then they would be subject to competition of private investors and,
-    Interested parties (farmers) do not have the capacity to implement land consolidation projects due to their complexity.

Land consolidation projects are in fact profitable in the long run (if created and implemented properly) but private investors are not interested to invest in other peoples' property. The agricultural population (farmers), on the other hand, does not have technical and financial capacities to create and implement land consolidation projects.

It follows from this statement that the state institutions and local authorities can only perceive the public interest and have adequate capacity to implement land consolidation projects. These facts suggest strategic means of land consolidation projects because of their long-term and multi-dimensional consequences. Generally, it may be said that land consolidation projects aim to increase the value of certain area. The value here can be interpreted in the social and economic senses. The value in social terms is the overall attractiveness of the area for the living conditions of the population while, in economic sense, the value is cash equivalence, i.e. revenue that can be obtained in the area concerned through economic activity.

The importance of land consolidation is reflected in gains or values that could be achieved by its application, i.e. the amount of increased overall value of the land on which it is implemented. If the increase of land value is considered then it follows immediately that other initial

information about the land on which the land consolidation could be realized must be known. First of all, the initial value of area and its potential for value increase must be known. This means that changes in the value of the area after land consolidation are expected.

The mathematical model describing this is as follows:

$$V(t_0) = V_0 \qquad\qquad (1)$$

$$V(t_0 + \Delta t) = V_0 + \Delta V = V_i \qquad\qquad (2)$$

where: V - value of the land consolidation area; t_0 - point in time before consolidation; Δt - time period of land consolidation implementation; ΔV - increase value of land consolidated area; V_0 - value of area before land consolidation; V_i - value of area after land consolidation.

The seemingly simple mathematical model opens up some very important questions:

- To which extent could the value of land consolidation area be increased after land consolidation?
- How to measure the value of land consolidation area?
- How to measure the change of value of land consolidated area?
- How long does it take to implement land consolidation?
- Is it better to consider the absolute or relative contribution of land consolidated area?
- Is it possible that the increased value of land consolidated area is negative, i.e. is it possible that the value of land consolidated area is decreased after land consolidation?
- What is the price of land consolidation, i.e. what resources are needed for its implementation?
- What are the absolute and relative relationships between the increased value of land consolidated area and cost of land consolidation?

The above set of questions reflects the complexity of land consolidation and suggests that land consolidation is not a process that may be easily implemented, meaning that one set of criteria must be defined according to which the decisions about selection of land consolidation projects will be made. The fact that land consolidation projects have long-term and multi-dimensional consequences on land consolidated area need to be stressed. This means that faults in land consolidation have long-term impact on land consolidated area and it is very difficult to eliminate their effects.

Available resources for implementation of land consolidation projects are a limiting factor. At the same time, the relationship between costs and gains of land consolidated area is very important. The logical condition for choice of land consolidation project is:

$$C_{lc} \le \Delta V, \qquad\qquad (3)$$

where C_{lc}– is the cost of land consolidation. Here, the cost of land consolidation does not only involve financial investment for its implementation but also other resources such as time and energy [2]. This means that land consolidation is not justified if the costs are higher than gains of land consolidation of certain area. It should be noted that the period of time for implementation of a land consolidation project is the source of risk. Risks mean that the expected values of target function could be reduced or the costs will increase over the planned level during the implementation of a land consolidation project.

Land consolidation produces economic and non-economic effects on land consolidated area. Measurable economic effects could be expressed in units of money and could be applicable in quantitative mathematical models. Effects that cannot be measured directly, such as, for example, the improvement of living standards and conditions in less developed areas and reduction of migration tendency (which in the long run may reduce the gap between developed and underdeveloped areas) are in the domain of socially acceptable values and could be subjectively interpreted. These facts suggest that in some cases the land consolidation projects must be considered apart from purely economic framework in the process of their ranking.

Bearing in mind the type of parameters that dominate the land consolidation projects, they can be divided into economically viable and socially justifiable projects. Economically viable land consolidation projects are those in which gains are measurable in economic sense, i.e. the projects whose increased value could be expressed in money units. Socially justified land consolidation projects are those where it is not possible to determine explicitly and with high certainty the cash equivalency of increasing value in certain area but which lead to increase of quality of life for population in accordance with their system of social values.

The decision on ranking of economically not profitable but socially justifiable land consolidation projects is of strategic nature and must be made with respect to corresponding set of parameters. The described differences for ranking of land consolidation projects indicate a very complex matter and that the approach must involve a large number of parameters.

The authors propose three potential approaches for ranking of land consolidation projects depending on their characteristics (depending on whether social or economic parameters are dominant):

- Economic equivalency of parameters describing the socially justified land consolidation projects determination and their equal ranking with other land consolidation projects;
- Separation of economically viable and socially justifiable land consolidation projects and their ranking within groups and
- Ranking of all land consolidation projects and then consideration of rejected socially justifiable land consolidation projects and their ranking according to adequate criteria.

Advantage of the method of equivalent values is that it simplifies the process of decision-making during the selection of land consolidation projects. The disadvantages of this method may be inadequateness in certain weights and values of equivalent parameters determination. The result of inadequate weight values may be inadequate ranking of land consolidation projects.

Separation of economically viable and socially justifiable land consolidation projects into two different

groups demands two different funds for their implementation, but also the development of two methodologies for ranking of land consolidation projects. The advantage of this method is elimination of competition between consolidation projects but the problem can occur at the level of determination of the amount of funds for one or other group of projects. This methodology may lead to possible political implications of the dominance of one type of projects over another.

Equal ranking of land consolidation projects according to economic viability and after that ranking of rejected but socially justifiable projects (or vice versa) has an advantage because it eliminates competition in respect of resources and increases chances of equal treatment for projects with different characteristics. Problems could occur when selected land consolidation projects absorb all funds. Then there will be no means for implementation of land consolidation projects rejected according to one set of criteria.

Bearing in mind the limited funds for land consolidation projects and if there is a competition between different areas for land consolidation projects, it follows immediately that the funds must be relocated in the manner that will maximize the contribution to total invested assets (whether land consolidation projects are economically viable or socially justified). This condition additionally complicates the decision on selection of land consolidation project.

It is possible to define the following terms of importance for the selection of land consolidation projects:
- Competitiveness of land consolidation project is defined by a set of adopted value criteria on a set of competing projects;
- Competitive land consolidation projects and
- Resources for the implementation of land consolidation projects.

These terms are graphically shown in Fig. 1.

Selection of land consolidation projects could be done as follows:
- Evaluation of parameters of all potential land consolidation areas;
- Competitiveness of each land consolidation project definition and
- Land consolidation projects implementation according to the level of their competitiveness and available resources.
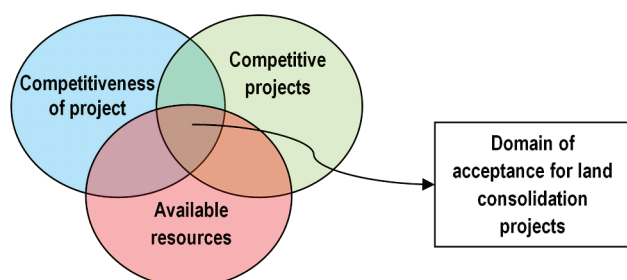

Figure 1 Ranking criteria for land consolidation projects

This process is at the high level of complexity if the goal is to maximize the return on available funds. This criterion may cause the complicated decision-making

system. In fact, it is possible that all funds could not be invested. Should, in this case, yield be considered according to total available funds or total funds invested?

Regardless of the approach, it is possible to prove that the number of options significantly increases with every new parameter introduced in the model.

2 Land consolidation goals

For many years the enlargement of parcels has been the main goal of land consolidation in order to increase agricultural production. In time the goal of land consolidation has become more complex and it is today an unavoidable instrument even in the domain of spatial development. Taking into account different historical, economic, agricultural and social conditions in Serbia, it is possible to conclude that the main tasks of land consolidation are:
- Elimination or reduction of parcels fragmentation;
- Increase of value of land consolidated area;
- Increase of yield of agricultural estates;
- Reduction of operating costs of land consolidated area (for example, through shortening of transport routes);
- Increase of proportion of the total arable land within the existing capacity of arable land;
- Land preservation;
- Determination of optimal size of farms;
- Development of agriculture and forestry;
- Environmental protection;
- Spatial development, etc.

The assembly of local self-government unit shall determine the territory of cadastral municipalities or part of it, which is regulated by land consolidation.

Territorial arrangement using land consolidation shall be based on the land consolidation programme established by the local self-government unit, which should be approval by the ministry of appropriate jurisdiction and according to law.

3 Methods and means for implementation of land consolidation objectives (strategy)

In Serbia the ministry of appropriate jurisdiction shall establish every year the Decree on Protection, Use and Regulation of Agricultural Land and announce a competition for grants to implement the activities related to land development, drainage, conversion of non-arable into arable land, irrigation and others. These resources shall range from 50 to 70 % in average, although they are often granted in 100 % amounts.

According to the level of negligence of rural areas caused, on one hand, by a variety of negative trends (lack of spatial development plans, illegal constructions, unabated migration from rural to urban areas, economic crisis, etc.) and the desire of the state to revive the ailing agriculture, on the other hand, it may be expected that the number of requests for land consolidation will be greater than the funds available for that purpose.

The goals of land consolidation analysis and necessary resources for their proper selection and implementation are:

- Expertise resources (multi-disciplinary approach: experts in geodesy, economics, agriculture and other necessary professions);
- Real and financial resources.

Under the circumstances of limited resources for implementation of land consolidation projects (lack of experts well acquainted with the issue, lack of experts well experienced in the matter, limited number of experts who can be engaged in implementation of parallel projects), there are increasing risks that projects will not be implemented at the satisfactory level (i.e. that the level of quality will not justify the investment). In such cases, the decisions about land consolidation projects have strategic importance at the state level. This fact causes that decision on funding land consolidation programmes and projects must be strategic issue at the state level.

4 Formulation of goal functions (criteria)

Goal functions or criteria for land consolidation projects should be consequently derived from the land consolidation goals and must agree with land consolidation project goals. Proper definition of criteria (goal functions) is necessary for proper decision on selection of land consolidation projects. It may be concluded that goals functions (criteria) formulation is necessary to be done for each land consolidation area in creative way and that this part of procedure must not be stereotyped.

According to the fact that land consolidation is a complex phenomenon, projects ranking could be done according to the economic criteria or according to criteria of social values. Economic criteria are explicitly valuated by the money amount while criteria based on the social values may be difficult for direct measurement and they are difficult for quantifying because of subjectivity.

For this reason, criteria for cost-effective land consolidation projects will be considered here. Also, these criteria may be consistently analysed according to multi-criteria analysis methods.

Some of goals functions for land consolidation projects that can be quantified are:
- The absolute amount of value for land expressed in currency units;
- The absolute amount of expected value increment on land consolidation area after land consolidation;
- The relative amount of expected value increment on land consolidation area after land consolidation;
- Land consolidation costs;
- The absolute and relative amounts of value increment on land consolidation area corrected for land consolidation costs;
- Participation of certain land consolidation project in total available funds.

Economic criteria for land consolidation projects should be based on the concept of time value of the money [18]. This means that the following factors for criteria for selection of land consolidation projects (giving the priority to a particular project) are important:
- Investment value;
- Project duration

- The earliest moment of return on investment
- Distribution of net cash flow (return value) in time.

5 Methods of land consolidation projects ranking

According to [5] many applied multi-criteria problems associated with land require decision-making. These problems are not solvable using conventional mathematics: they require logical research procedures that lead to an acceptable compromise.

Methods of land consolidation projects ranking aim to reduce the risks of wrong choice of project, which will engage the limited resources. In broader context, these methods belong to the theory of decision-making [11].

According to the literature [5] the question "Which is the best method for certain problem?" becomes the most important and the most difficult question to reply. That question is of very high importance because it implies that different methods lead to different decisions under the same circumstances. Bearing in mind that not all decisions lead to the best solution, it immediately follows that there is a risk of finding the best solution. This problem is particularly highlighted in land consolidation because the consequences of bad decisions are spread over a long period of time and consequently lead to the great loss.

In the literature [4] the adaptation of GIS which include spatial system for decision support is proposed. The problem of adapting GIS for spatial decision-making system is solved using the application programming interface (API).

In the literature [6] it is said that the multi-criteria analysis is a powerful tool for analysing complex problems such as choice of land consolidation projects.

According to [8] the methods of projects ranking are divided into two groups: qualitative and quantitative. Qualitative or so called experts' methods are based on the subjective assessment of parameters done by the experts with long experience in research and creative work while quantitative methods are based on the amount, intensity and exactly measured parameters.

In the literature and practice PROMETHEE (Preference Ranking Organisation Method for Enrichment Evaluations) and ELECTRE (Elimination and Choice Expressing Reality) methods are used as methods for land consolidation projects ranking [7]. In the paper it is also shown that different results shall be obtained when those two methods are applied on the same land consolidation area. The methods of project ranking based on multi-criteria decision analysis are well developed and include a large number of cases. There are several variants of PROMETHEE [9] and ELECTRE [11] methods for projects ranking, but their main features will be described here.

PROMETHEE and ELECTRE methods had their own development. ELECTRE method was developed in the sixties of the twentieth century and there are several variants of it [11], while PROMETHEE method appeared in the eighties of the twentieth century and was developed from PROMETHEE I model to PROMETHEE VI model [13, 14]. Characteristics of PROMETHEE model according to [13, 14] are:
- PROMETHEE I – partial ranking;

- PROMETHEE II – complete ranking;
- PROMETHEE III – ranking based on intervals;
- PROMETHEE IV – continuous ranking;
- PROMETHEE V – multi-criteria decision analysis including segment limits;
- PROMETHEE VI – human brain representation.

Also in [13, 14] the requirements that multi-criteria must meet are mentioned:
1. The amplitude of deviations between the evaluations of the alternatives within each criterion should be taken into account;
2. As the evaluations of each criterion are expressed in their own units, the scaling effects should be completely eliminated;
3. In the case of comparison of pairs an appropriate multi-criteria method should provide the information if a parameter is preferred, indifferent or if parameters are incompatible;
4. Different multi-criteria methods request different additional information and operate different calculation procedures so that solutions they propose can be different. It is therefore important to develop methods being understandable by the decision-makers. The Black Box procedures should be avoided;
5. An appropriate procedure should not include technical parameters having no significance for the decision-maker. Such parameters would again include the Black Box effects;
6. An appropriate method should provide information on the conflicting nature of the criteria;
7. Most of the multi-criteria methods allocate weights of relative importance to the criteria. These weights reflect a major part of the brain of the decision-maker. It is not easy to fix them. Usually the decision-makers strongly hesitate. An appropriate method should offer sensitivity tools to test easily different sets of weights.

The authors in [14] state that PROMETHEE methods and the associated GAIA visual interactive module take all these requirements into account. Obviously, PROMETHEE method may be used for land consolidation projects ranking because of its wide possibilities. PROMETHEE I (partial ranking) and PROMETHEE II (complete ranking) methods are a sufficient choice for land consolidation projects ranking for the purpose of this paper.

According to [11] ELECTRE methods are relevant when facing decision situations with the following characteristics:
1. The decision-maker wants to include in the model at least three criteria. However, aggregation procedures are more adapted in circumstances when decision models include more than five criteria (up to twelve or thirteen). And, at least one of the following situations must be verified.
2. Activities are evaluated (for at least one criteria) on an ordinal scale or on weakly interval scale.
3. A strong heterogeneity related with the nature of evaluations exists among criteria (e.g., duration, noise, distance, security, cultural sites, monuments,

etc.) This makes it difficult to aggregate all the criteria in unique and common scale.
4. Compensation of the loss on a given criterion by a gain on another one may not be acceptable for the decision-maker. Therefore, such situations require the use of non-compensatory aggregation procedures.
5. For at least one criterion the following holds true: small differences of evaluations are not significant in terms of preferences, while the accumulation of several small differences may become significant. This requires introductions of discrimination thresholds (indifference and preference), which lead to a preference structure with a comprehensive intransitive indifference binary relation.

According to [12] ranking and selection of projects is relatively common, yet often a difficult task. It is complicated because there is usually more than one dimension of measuring the impact of each project and more than one decision-maker. ELECTRE method has several unique features not found in other solution methods. These are the concepts of outranking and indifference and preference thresholds [12].

As shown in the quoted literature and characteristics of ELECTRE method, it is possible to conclude that this method is proper for land consolidation projects. It follows from the complexity of land consolidation projects both from their structure and goals to be reached. Land consolidation projects in the sense of [12] there are at least three decision-makers (state institutions, experts who make and implement land consolidation projects and land owners in the land consolidation area) and basic purpose of land consolidation projects is to affect the targeted area. These facts clearly suggest the adequacy of the application of ELECTRE method for land consolidation projects ranking and selection.

In literature [10] the model of conflict analysis is developed based on preference functions of PROMETHEE and ELECTRE methods and with conflicts analysis using ORESTE method [3].

Development of methods for multi-criteria decision-making analysis implies both their imperfection and great potential for their development. This indicates that it is very important to evaluate all possibilities resulting from quantitative methods for land consolidation projects ranking diligently. The analysis of all consequences is necessary because land consolidation projects have long-term effects on all dimensions of life of residents in the land consolidated area.

6   Case study

For the municipality of Modriča (the Republic of Srpska) classification and ranking of land consolidation projects has been made using PROMETHEE and ELECTRE in order to establish priorities of investments in implementation of land consolidation. It may be stated that these land consolidation projects meet the conditions of cost-effectiveness and social justification. For these reasons, attention will be paid to different results from different methods and their consequences.

Criteria are:

f_1 - Average heights above the sea;

f_2 - Average slope of land;
f_3 - Area of public land;
f_4 - Soil quality class;
f_5 - Share of active agricultural land in total area of cadastral municipalities (%);
f_6 - The percentage of individual farmers who have owned more than 5 acres.

Land consolidation projects ranking was carried out for two selected values of parameters p (the index of alternatives compliance) and q (index of alternatives non-compliance). The results show that practically two rankings were obtained. The results are shown in Tab. 1.

Table 1 Rank of land consolidation projects by ELECTRE method for different values of q and p parameters

Rank	For fixed q=0,40	For fixed p=0,65
1	Modriča	Miloševac
2	Modrički lug	Modriča
3	Riječani gornji	Skugrić gornji
4	Miloševac	Krečane
5	Pećnik	Modrički lug
6	Skugrić gornji	Riječani gornji
7	Krečane	Pećnik
8	Čardak	Botajica
9	Dugo polje	Jasenica
10	Garevac	Dugo polje
11	Donji Skugrić 1	Čardak
12	Jasenica	Donji Skugrić 1
13	Dobrinja	Garevac
14	Tolisa 1	Tolisa 1
15	Botajia	Jakeš
16	Jakeš	Dobrinja
17	Tarevci	Tarevci
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0

Zero values in the ranking table of land consolidation projects indicate that cadastral municipalities did not meet the thresholds of agreement and disagreements in the model.

According to the Tab. 1 and Tab. 2, it is possible to note the following facts:
- Only complete cadastral municipalities are evaluated and classified;
- For the same method it is possible to get different order of evaluation depending on the chosen values of parameters and
- For different methods order of land consolidation projects is different.

It immediately follows from this that the application of method of land consolidation projects ranking is a complex process, which must be developed with maximum care and that experts who participate in this process must be well experienced and have high and broad knowledge. Bearing in mind that learning and knowledge transfer in surveying is not a simple process

[15], it follows that major land consolidation projects (projects that bind considerable resources and whose consequences have long-term effects, which land consolidation projects certainly are) must join the best geodetic resources meaning appropriate geodetic technologies and experts with appropriate level of knowledge and experience.

Table 2 Land consolidation projects comparison using PROMETHEE and ELECTRE methods

Rank	PROMETHEE	ELECTRE
1	Miloševac	Miloševac
2	Modriča	Modriča
3	Skugrić gornji	Skugrić gornji
4	Donji Skugrić 1	Krečane
5	Čardak	Modrički lug
6	Riječani gornji	Riječani gornji
7	Garevac	Pećnik
8	Dobrinja	Botajica
9	Dugo polje	Jasenica
10	Botajia	Dugo polje
11	Kladari	Čardak
12	Donji Skugrić 2	Donji Skugrić
13	Tolisa 1	Garevac
14	Vranjak	Tolisa 1
15	Pećnik	Jakeš
16	Koprivna	Dobrinja
17	Modrički lug	Tarevci
18	Tarevci	0
19	Krečane	0
20	Jakeš	0
21	Tolisa 2	0
22	Jasenica	0
23	Babešnica	0
24	Riječani donji	0
25	Rajska	0
26	Zelinja srednja	0

The questions arising after these conclusions are:
1. Is it possible to form land consolidation areas in the regions or at municipality level including not only the whole cadastral municipalities in their boundaries, but a kind of land that can be consolidated as well pursuant to other criteria?
2. Is it allowed to make final decisions about investments in land consolidation projects following the results of land consolidation projects ranking using one or more methods or their combination?
3. Is it allowed to make decision on land consolidation projects selection without professionals who are at the expert level of knowledge and experience? [15].

The first question opens a new perspective of the land consolidation because so far the decisions about land consolidation projects were considered political and were made by the state institutions. The approach of land consolidation areas choice can be more effective and reduce numbers of acceptable alternatives but also reduce the possibility of wrong decisions.

The second question emphasizes the importance of use of software for decision-making and partial exclusion of experts from decision-making process. However, as experts are involved in the process of input data formation it is obvious that subjective factors influence the rank of land consolidation projects even within the same method.

The conclusion is that funds must not be engaged only on the basis of results of different methods for multi-criteria decision analysis.

The answer to the third question is that decision must not be made without participation of professionals who are experts in the field of land consolidation because it shall significantly increase the risk of land consolidation projects failure, which is the waste of resources and low level of social responsibility. Due to the complexity and sensitivity of issues connected with land consolidation projects the authors suggest that the final decision about the choice of land consolidation projects may only be done by experts.

7   Conclusions

Land consolidation projects are interdisciplinary projects and due to limited resources for their implementation and the great potential benefits for the society, have a strategic character and require an interdisciplinary approach in every phase from analysis to selection and implementation.

Since there is evidence in literature that results of two methods applied on the same land consolidation area have different results, it follows that it is necessary to select and implement land consolidation projects very carefully.

Bearing in mind limited resources for land consolidation projects implementation and high level of risk arising from the quantitative methods (uncritical application of quantitative methods reduced to the level of the Black Box can lead to suboptimal solutions), it is necessary to apply the approach including the expert opinion, i.e. it is necessary to apply basically qualitative approach, while quantitative methods should be used to support expert opinions and as some kind of control.

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Authors' addresses

Goran Marinković, Geod. Eng.
Faculty of Technical Sciences
Trg Dositeja Obradovića 6
21000 Novi Sad, Serbia
E-mail: goran.d.marinkovic@gmail.com

Prof. Toša Ninkov, PhD
Faculty of Technical Sciences
Trg Dositeja Obradovića 6
21000 Novi Sad, Serbia
E-mail: ninkov.tosa@gmail.com

Prof. Milan Trifković, PhD
Faculty of Civil Engineering,
Kozaračka 2a, 24000 Subotica, Serbia
E-mail: milantri@eunet.rs

Žarko Nestorović, Geod. Eng.
PE "Hidroelektrane Đerdap" d.o.o.,
19320 Kladovo, Serbia
E-mail: nzarko07@gmail.com

Goran Pejičić, Mast. of Civ. Eng.
Faculty of Engineering,
76000 Brčko Distrikt, Bosnia and Hercegovina
E-mail: gpejicic@gmail.com