Applying Information Quantity Analysis to the Ecological Conservation Development

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Abstract. The ecological conservation development is fital to the natural surroundings and environmental progection. Due to the advantages of conference and confidentiality of traditional questionnaires, the purpose of this study aims to investigate and compare the various factors that influence the development of ecological conservation by means of Fuzzy Delphi Method. In addition, various professionals, including real estate marketers, university professors and relevant government officials, take part in the questionnaire for our analysis.

Keywords: Ecological conservation · Evaluation of development
Fuzzy delphi method

1 Introduction

This study aims to investigate and compare the various factors that influence the development of ecological conservation by means of Fuzzy Delphi Method. To build a strong foundation and a solid stepping stone for future research, we analyzed our data by insightful interviews with ecology and environment experts and professors, literature reviews, and the analysis of Fuzzy Delphi Method. The findings is significant in that it is critical for any legistrations or law making on the development of ecological and environmental development.

2 Literature Reviews

The locations of ecological and environmental development are usually targeted on higher mountains, which are more geologically fragil and steep. Most of them are reservation area for the aboriginal tribes. In addition, these areas of environmental protection include natural conservation zones, upstream river banks, ecological locations, water and soil conservation areas, water collecting area, fragil areas and restricted areas. Thus, it is important to take this matter seriously because a slight of careless and misevaluation will be detrimental to the land, the nature, the water and the animals that reside on these areas. The purpose is to investigate the optimal solution about how the

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best interest and profits can be gained without harming the land and the nature. The findings will shed new lights on how environmental laws and relevant laws are made.

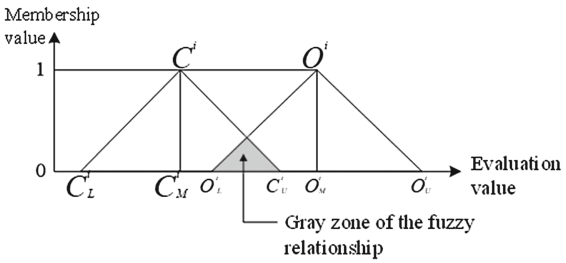
3 Methodology

3.1 Setting Up the Factors and Criteria

The objective of this study is to investigate and compare the various factors that affect the register of real estate sold price by means of Fuzzy Delphi Method. To maintain the authenticity of the current study and to keep its originality of the multi-criteria decision making, we invited real estate marketers, university professors, government officials, and experts to talk at interviews and to take part in our questionnaire. After collecting and analyzing these relevant factors, we used Fuzzy Delphi Method for quantification and description.

3.2 Fuzzy Delphi Method

Fuzzy Delphi Method was proposed by Ishikawa et al. and it was derived from the traditional Delphi technique and fuzzy set theory. Delphi method can direct measure perception of service, performance service quality measurement. Noorderhaben indicated that applying the Fuzzy Delphi Method to group decision can solve the fuzziness of common understanding of expert opinions. As for the selection of fuzzy membership functions, previous research was usually based on triangular fuzzy number, trapezoidal fuzzy number and Gaussian fuzzy number. This study applied the Two Triangle Fuzzy Numbers method and the Gray statistics method theory to solving the group decision. This research applied FDM for the screening of alternate factors. The fuzziness of common understanding of experts could be solved by using the fuzzy theory and could be evaluated on a more flexible scale. The efficiency and quality of questionnaires could be improved. Thus, more objective evaluation factors could be screened through the statistical results. The scores we got will fall on a continuum between the smallest value and the largest value. The latter is called the most optimistic value whereas the former is called the most conservative value.



Two Triangle Fuzzy Numbers Method Source：Zheng Changbin, 2001

Table 1. Scores obtained by screen results of evaluation under the "Economic development" dimension

Evaluation item	Conservative value		Optimistic value		Single value		Geometric mean			Verification value			Expert consensus
	Min	Max	Min	Max	Min	Max	C^i	O^i	a^i	M^i	Z^i	M^i-Z^i	G^i
Industrial development	6	9	9	10	5	10	7.94	9.32	8.03	1.38	0.00	1.38	8.63
Transportation	6	9	8	10	6	10	7.70	9.38	7.59	1.68	1.00	0.68	8.51
Telecommunication equipment	7	9	8	10	6	10	8.22	9.10	7.79	0.88	1.00	−0.12	8.59

Table 2. Scores obtained by screen results of evaluation under the "Land use" dimension

Evaluation item	Conservative value		Optimistic value		Single value		Geometric mean			Verification value			Expert consensus
	Min	Max	Min	Max	Min	Max	C^i	O^i	a^i	M^i	Z^i	M^i-Z^i	G^i
Functions of land	5	8	7	9	5	10	6.28	8.28	8.03	2.00	1.00	1.00	7.43
Rules on land use	3	8	9	9	6	10	5.95	9.00	7.59	3.05	−1.00	4.05	7.48

Table 3. Scores obtained by screen results of evaluation under the "Environmental impact" dimension

Evaluation item	Conservative value		Optimistic value		Single value		Geometric mean			Verification value			Expert consensus
	Min	Max	Min	Max	Min	Max	C^i	O^i	a^i	M^i	Z^i	M^i-Z^i	G^i
Rules on environment	5	9	9	10	5	10	7.74	9.32	8.03	1.58	0.00	1.58	8.53
Construction environment	3	8	8	9	6	10	5.90	8.45	7.59	2.55	0.00	2.55	7.18
Plants	3	8	8	9	6	10	5.87	8.45	7.79	2.58	0.00	2.58	7.16
Animals	5	8	8	10	7	9	6.21	8.91	7.7	2.70	0.00	2.70	7.56

Table 4. Scores obtained by screen results of evaluation under the "Citizen participation" dimension

Evaluation item	Conservative value		Optimistic value		Single value		Geometric mean			Verification value			Expert consensus
	Min	Max	Min	Max	Min	Max	C^i	O^i	a^i	M^i	Z^i	M^i-Z^i	G^i
Tribe meetings	5	9	9	10	5	10	6.82	9.32	8.03	2.50	0.00	2.50	8.07
County meetings	5	8	9	9	6	10	6.94	9.00	7.65	2.06	−1.00	3.06	7.97
Representatives meetings	3	7	7	9	6	10	5.64	7.94	7.79	2.30	0.00	2.30	6.79
Leaders opinions	5	8	6	9	7	9	6.21	7.63	7.7	1.42	2.00	−0.58	6.95

Source: this study

3.3 Instrument

The purpose of this study is to examine the various factors that affect the development of ecological conservation by means of Fuzzy Delphi Method. Based on the previous studies related on the evaluation of the ecological conservation development, before the designing of our questionnaire, we also take into the consideration the evaluation criteria, the appropriateness, the feasibility and legislation of the environmental laws. We divided the questionnaire into four primary themes or categories. They include Economic Development, Land Use, Environmental Impact, and Citizen Participation.

3.4 Participants

The study proposed to investigate the various factors that influence the development of ecological conservation by means of Fuzzy Delphi Method. On the condition of its professionalism, various professionals, including ecology experts, conservation experts, environmentalists, university professors, local residents, and relevant government officials, take part in the questionnaire for our analysis.

4 Data Analysis and Results

Based on our questionnaire, the scores are obtained by the Fuzzy Delphi Method. Both geometric mean and verification value are calculated. The findings are as follows: Tables 1, 2, 3 and 4

5 Conclusion

The aim of this study is to investigate and compare the various factors that influence the development of ecological conservation by means of Fuzzy Delphi Method. The findings have revealed that among those which serve the most critical factors that influence the evaluation of ecological conservation development are industrial development, rules on land use, rules on environment, tribe meetings. The findings can shed new lights on the evaluation of the development and on the legistration of the environmental laws. Furthermore, effective developments will hing on long-term observation and various evaluations.