ISSN 2549-3922 EISSN 2549-3930

Journal of Regional and Rural Development Planning
(Jurnal Perencanaan Pembangunan Wilayah dan Perdesaan)
Februari 2025, 9 (1): 72-86
DOI: http://dx.doi.org/10.29244/jp2wd.2025.9.1.72-86

Scenario Planning for Future Development of Rural Areas in Iran: Case of Rural Areas Around the City of Varzegan

Lachin Samadi[1*]

[1]Graduated in M.A degree from Azad University of Tehran Markaz, Velayat Complex in Sohanak, Iran;
[*]Corresponding author. e-mail: Lachin_samadi@yahoo.com
(Received: December 6th, 2024; Accepted: September 11th, 2024)

ABSTRACT

Development in rural areas is affected by internal and external factors. These factors are making the structure of the system within which decisions are made. Since the policies and decisions adopted in rural plans affect the process of development in the rural areas, the role of them has been considered in the future of rural areas in Iran. Different scenarios and options have been suggested with the use of GIS to clarify the future outcome of these decisions. This study selected three rural areas around the city of Varzegan to consider the effect of both internal and external factors in the future of these areas. Internal factors directly influenced by the independent variable (Population Growth Rate suggested in rural plans), while external factor is beyond the control of it and affects it. Scenario sets shows that the rural area's sustainability is affected by the population growth rate (actor of the structure), the damages in agricultural lands and employment composition. This fact is not considered in rural plans of Iran because of the need for residential areas due to reverse migration.

Keywords: future development, GIS, Iran, reverse migration, rural areas, scenario planning, Varzegan

INTRODUCTION

Rural areas in Iran have experienced significant changes in recent decades. These changes encompass conversion of agricultural areas into residential ones due to reverse migration (Urban-Rural) and its effect on the number of employments in rural areas. These changes are the results of decisions that are made in rural plans.

Development is a multi-dimensional process that requires fundamental changes in the cultural and social structure on the one hand and economic growth and reduction in poverty and social inequality on the other hand (Rabieinezhad & Argan, 2017). There are various theories about development and several plans and policies such as rural plans in Iran that are premised on them.

The theories and prospects such as Growth Pole theory which is assumed on the concept that development in regions is the result of urbanization, and premises that growth does not emerge everywhere simultaneously, but it is visible in "poles" or "points" of growth (Perroux, 1950) (Perroux, 1955), as cited in (Mandla, 2008). A preceding trend has been proved with evidence from the industrialized and developed countries, indicating that development and growth originates from points of concentration and accumulation within a geographic area (growth poles). The logic is that these growth poles have the capability of producing other centers of accumulation and concentration. This procedure is known as a typical progress in the process of urbanization (World Bank, 2000), as cited in (Mandla, 2008).

It has been a matter of debate that strong urban economies are the foundation and drivers of a country's wealth. This concept results from the growth pole theory. The growth pole theory gives the impression that as nations get more industrialized or urbanized or and less relying on agriculture, urban areas probably gain more importance for promoting external benefits, sustained innovation, preparing a trading hub, and promoting accumulation of human investment (Mandla, 2008). Nevertheless practical researches presume that urbanization is not the driver of income growth by itself. (Bloom & Khana, 2007), as cited in (Mandla, 2008).

In Iran the outcomes of unrestricted urbanization have a close connection with rural areas. Reverse migration is one of the significant impacts of unplanned urbanizations in Iran. Recently rural – urban migrants who are confronted with moderate difficulties in the cities are migrating back to their rural origins (Mandla, 2008).

Reverse migration is generally as a result of some driving factors in the urban context including pollution of air, rising prices of land and accommodation, and the high price of living, along with some drawing factors in rural areas such as fine weather conditions, low prices of land and accommodation, and low price of living (Rezvani et al., 2023). These factors would affect the migration intention among migrants.

Migration intention is formed as an initial step of the migration, that probably leads to physical migration (Abdelwahed et al., 2020), as cited in (Hidayat et al., 2022). Indeed any actual migration would experience physical distance so as to happen, emphasizing the essential attention needed upon location and distance in the building-up process of migration intention. (Correa & Pavez, 2016) (Groot et al., 2011) (Docquier et al., 2014), as cited in (Hidayat et al., 2022).

Accordingly, investigation of the effect of distance-oriented matters over the creation of migration intentions is necessary (Hidayat et al., 2022). Experts have approved that distance between the starting points and endpoints is a determining factor of migration (Bogue & Thompson, 1947) (Schwartz, 1973), as cited in (Hidayat et al., 2022). Generally, a farther distance submits to greater obstacles into the creation of migration intentions (Maleszyk & Kedra, 2020), resulting in a reduced probability in the occurrence of the migration procedure (Lee, 1966), as cited in (Hidayat et al., 2022).

Practically, the effect of physical distance to a potential endpoint (destination) cannot be evaded by any potential migrant while making their migration decisions (Roca & Uebelmesser, 2021), as cited in (Hidayat et al., 2022). Over the process of making decisions, distance plays a role as an uncontrollable and external factor influencing the basic creation of migration intentions (Hidayat et al., 2022).

Distance is not the only factor that will consider in this article. As mentioned before, the aim of this article is to consider the policies and decisions made in rural plans and foreseeing their impact on the future development of rural areas and it seems that without having strategic planning approaches, this would be impossible. Accordingly, planners are concerned about the future of rural areas and their existence. Their considerations extend from socio-economic to ecological ones.

Rural planning in Iran does not take place in the era of strategic thinking, to solve the problem of these areas, initially it should be understood as a strategic one and the organizations that want the development of rural areas should have strategic attitude (Eftekhari et al., 2011).

Analyzing the studies conducted in this field in Iran shows the lack of trends and limited theoretical and fundamental references. The only domestic study that dealt with the future of rural areas is the book by (Eftekhari et al., 2011). The only factor that has been dealt with in this book is the perspectives related to physical issues. There are also other studies considering strategic issues, but most of them again deal with physical issues and there is no

comprehensive research about the future of rural areas in Iran.

At the global level, with the exception of limited studies that will be mentioned here, any detailed and comprehensive study has been done. Among these studies - the results of which have been published in the form of articles- it can referred to articles such as: (Westhoek et al., 2006), A scenario study that is called EURURALIS was conducted by Wageningen University and Research Centre in association with the Netherlands Environmental Assessment Agency (MNP) in order to inspire the strategic debates between both national and European Union level policy makers considering the future of Europe's rural areas and importance of political means at 2006.

Other study by: (Ghisa et al., 2011), provides the following work of the workgroup meeting from the Mutual Learning Workshop "Integrating Future Methodologies" from the "Bucharest Dialogues" Series that occurred in the 9th–11th of June 2010.

The studies mentioned above also have been carried out at large scopes and have adopted general principles regarding the future of rural areas.

For the purpose of stimulating the strategic discussions over the future of the rural areas in Iran, considering two factors would be helpful. One of these factors is the impacts of policies that are adopted today, and the other one is the factor of distance that these rural areas have from the main cities.

This article will try to forecast the developments occur as a result of rural plans in some of the rural areas which are located with different distances around the city of Varzegan. To achieve this, recent study has chosen scenario planning in the frame of strategic planning to depict the effects of mentioned factors in the future of these areas with the use of GIS program.

After choosing the field of study- rural areas around Varzegan- the time frame is set. Since the time frame of rural plans in Iran is about ten years, so -2033- is considered to be the appropriate target for the study.

Considering the future of rural areas and their existence, the importance and necessity of that, we raise the follow-up questions:

- What are the consequences of different planning and policies on the rural area's land – use?
- Can main cities affect the future of rural areas around them?

METHODOLOGY

Responding to the key questions mentioned above, the methods should be flexible enough to consist all of the factors, indicating how to choose them properly, supporting both quantitative and qualitative results, having the capacity for visualization the results for decision-makers and planners. Therefore integration of methods is needed to be applied in this study which is figured in the conceptual model [Figure 1].

Futures studies include a broad range of studies and approaches and the field has been considered a 'very fuzzy multi-field' (Marien, 2002), as cited in (Borjeson et al., 2006). Scenario is one of the most fundamental, though contestable, notions in this area (Borjeson et al., 2006). RAND corporation was the pioneer of scenario planning (Kahn, 1962), as cited in (Chakraborty & McMillan, 2017). Some of the methods for future – focused studies that are being common in urban planning are: forecasting, scenario planning, visioning, and alternative testing (Bartholomew, 2005) (Isserman, 1985) (Shipley et al., 2004) (Throgmorton, 1992) (Quay, 2010), as cited in (Chakraborty & McMillan, 2017). Scenario planning enables us to contemplate several aspects of a complicated problem, imagining the alternative prospects, and studying the future effects of decisions that are made today considering significant uncertainties and unknowns (Chakraborty & McMillan, 2017) as well as identifying new

strategies and insight (Malinga et al., 2013), as cited in (Chakraborty & McMillan, 2017). Using scenario planning is a regular and adaptable approach for forecasting probable future developments. Various researches applied scenario planning for strategic spatial planning in business landscapes, natural resources management, agricultural land use, and hazard mitigation (Couture et al., 2021) (Pasqualino et al., 2021) (Raji et al., 2022), as cited in (Kaminski et al, 2023). Scenario planning is used by policymakers and urban planners in various cases, but comprehensive regional planning is its most typical use. (Chakraborty & McMillan, 2015). Scenario planning depends on tools that provide planners the capability of viewing complicated data, visualizing possible results of decisions and forecasting their effects and sharing them to the broader public. At the center of these tools are the ones that can anticipate or demonstrate and assess the conversion of land – use over time and space. These tools provide stakeholders and planners the capability of viewing and evaluating possible future results of policy decisions or options for investment before implementing the final decisions. Concisely, scenarios can be constructed and demonstrated with the aid of GIS tools (Chakraborty & McMillan, 2017).

Fig.1 illustrates the process of the study. This process relies on the type of scenarios and factors. These factors have impacts on land-use of rural areas. In order to visualize these impacts the scenario planning method is integrated with Arc GIS program.

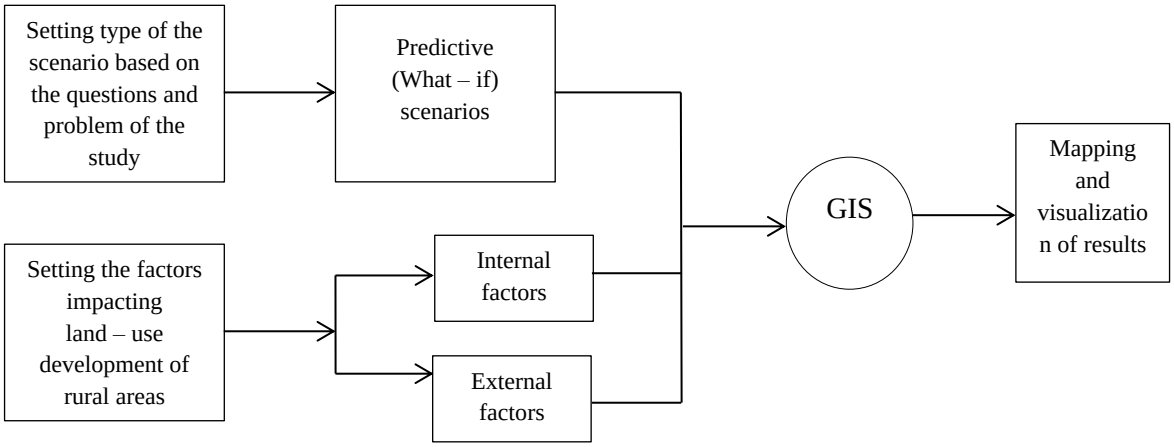

Figure 1. Conceptual model of the study
Source: study findings

Typology of scenario planning

Typologies of scenario planning are built on various classifications of Predictive, Explorative and Normative. The mentioned classification is also used in this article, since it is believed that these classifications consider three ways of thinking about future which are basically different. (Dreborg, 2004), as cited in (Borjeson et al., 2006).

These main classifications of scenarios have been distinguished according to the basic questions one may propose about the future. These questions are *what will happen? What can happen? And how can specific targets are reached*? The answer is then improved by dividing each classification into two different types of scenarios [Figure 2] (Borjeson et al., 2006).

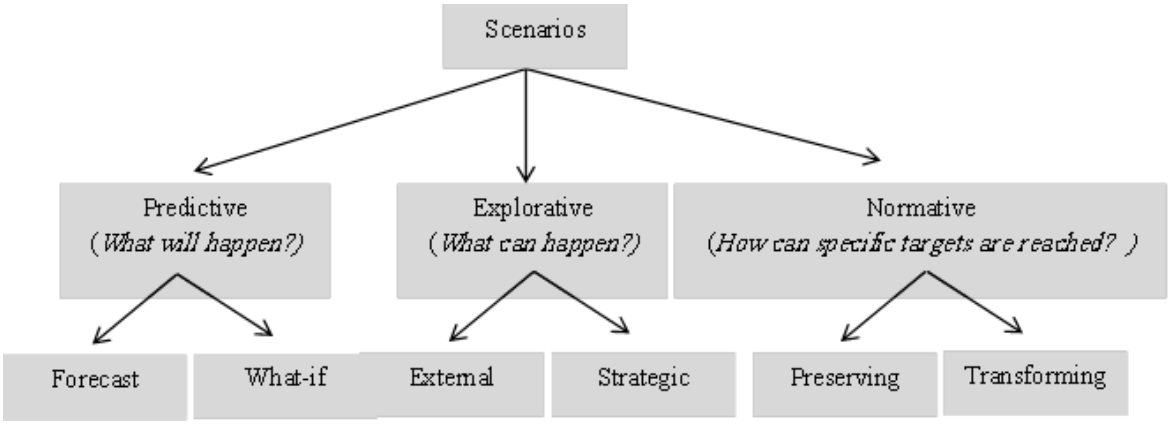

Figure 2. Typology of scenarios based on three classifications and six types
Source: Borjeson et al. (2006)

The typology of scenario planning have been used in this article depends on the principal and basic questions that are raised about future. As well as the basic questions mentioned, it is especially significant to consider two more features of the system under study when characterizing scenarios. The first one is the principle of *system structure*, which is considered as the relations and connections between the various sections of the system, as well as the conditions of boundary, that manage the development of the system. When building a mathematical model of the system is possible, the system's structure is explained by the equations (it could e.g. be linear or non-linear). Distinguishing between internal and external factors is the second significant feature of the system. Internal factors are considered as factors that can be controlled by the actor of the system, whereas external factors are beyond the control of the actor (Borjeson et al., 2006).

Considering the principles mentioned above, leads us to choose the type of scenarios for this study. Regarding the time frame in rural plans in Iran, we use *what-if* scenarios under the branch of predicative scenarios. This type of scenarios examine *what will happen* considering some specific near future occasions which have considerable value for future development. The specific occasions can be external occasions, internal decisions or both external occasions and internal decisions. (Borjeson et al., 2006).

Selecting factors

In the process of study, the first step is generating data. Surveys and Library Studies are the techniques have used for generating data set in this study. Reports of rural areas plan have been used for selecting internal factors. These are *growth rate of population*, *employment rate*, *access to infrastructures* and *land – use*. There is linear connection between the independent variable (population growth rate) and others. External factor includes the *distance from main city (here is Varzegan)*. There is almost a linear connection between this variable (population growth rate) and external factor. These factors are making the structure of the system within which decisions have been made to influence the future of rural areas.

Integration of Data

Assumptions lead us to select the kind of processes for integration of data. For analyzing future developments in rural areas, a systematic method is proposed that links GIS and scenario planning (see fig.1). Scenario planning is a principally qualitative sort of approaches for the systematic and methodical creation of imaginable future conditions called scenarios. Accordingly, the techniques that link scenarios with GIS are expanded (Kaminski et al., 2023).

Excel program has been used for supporting quantitative results. Due to the need

for visualizing the results, GIS tools and Google earth program are used as well for visualizing the connection between the environment that currently is built and future outcomes of current made decisions.

RESULTS AND DISCUSSION

The field of this study includes the rural areas around Varzegan which have been selected according to their distance from the main city of Varzegan in the range of near, middle and long distance. These are: *Barazin, Ruzi and Mehtarloo*. The time frame for scenario planning is 10 years in accordance with the rural plans of these areas (Sharboom Bana consulting engineers, 2023). Type of scenarios is made according to the independent variable (*population growth rate*). These scenarios are: *suggested in the rural plan (extreme amount), the least possible and Intermediary amount* of two options above. Other internal factors and variables are calculated according to the *population growth rate* in each scenario. The population growth rate itself has been affected by the distance from the main city of Varzegan.

Population growth rate and internal factors:

Scenarios have been selected for each of the rural areas mentioned above and the amount for each of the other internal factors has been calculated according to the amount of population growth rate [Table 1, Table 2, & Table 3]. The results have been visualized in GIS maps to illustrate each scenario's outcome [Figure 3, Figure 4, & Figure 5].

The first rural area is *Barazin*, which is located at the longest distance to Varzegan city (55km). The population growth rate which is used in the plan of this rural area and which was approved in the commission is 1, which is considered as the extreme amount in our scenarios. The number of employments in agriculture differs in each scenario. The amount of population growth rate consumes agricultural land of rural area for building infrastructures and residential areas. As the main aim of these plans is providing access to infrastructures for people who settles in these areas (which they suffer from the lack of them), the kind of infrastructures and the amount of land used by them in scenarios did not change. But the amount of residential areas differs in accordance with the amount of population growth rate. Conclusively, with the reduction of the population growth rate the amount of agricultural lands used for residential purposes also decrease [see Table 1 & Figure 3]. It should be mentioned that the yellow spots in each map indicate the proposed residential areas.

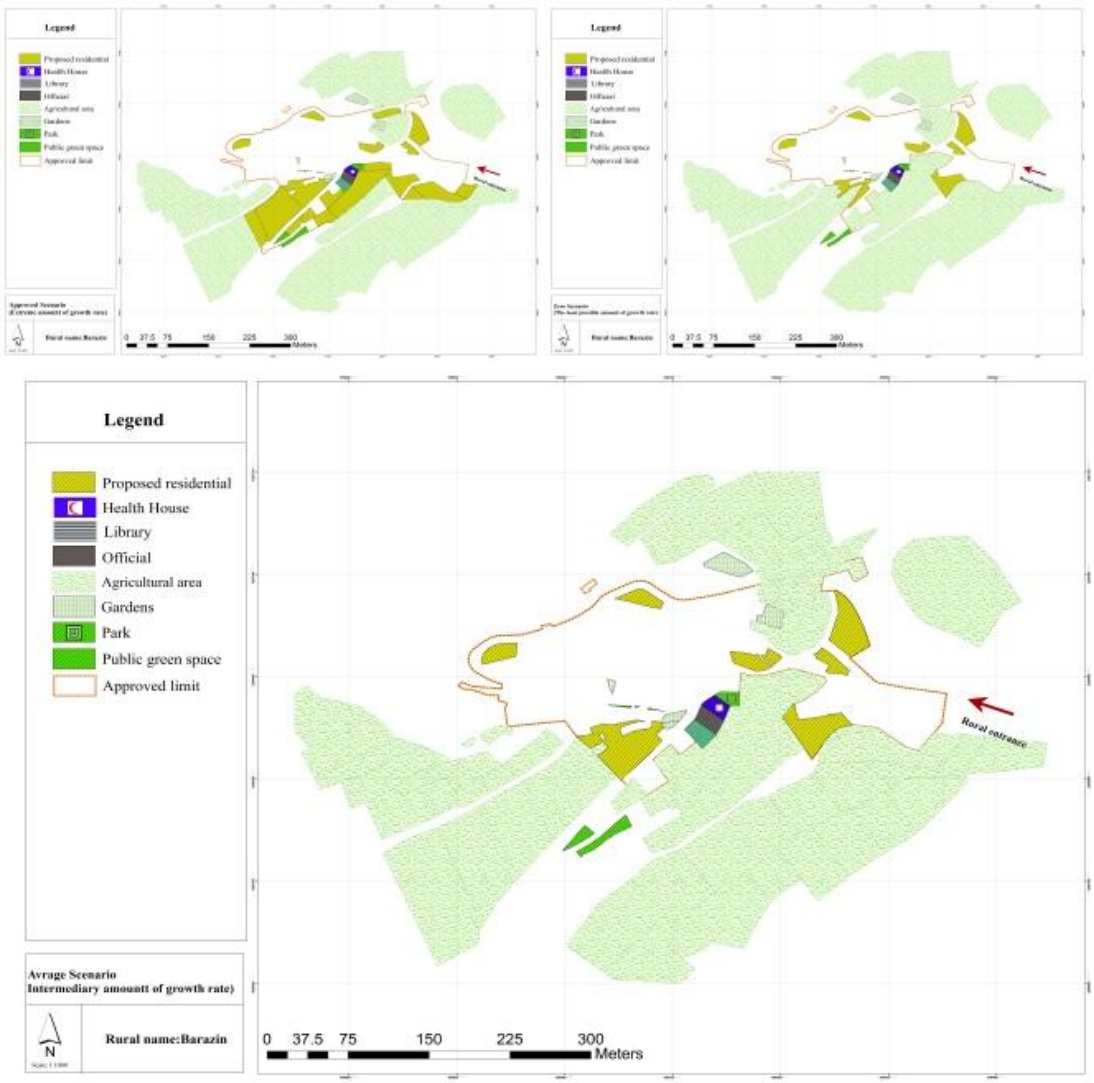

Figure 3. Scenario sets outcome for the rural area of *Barazin*

Table 1. Review of scenario sets and their summary selected for the rural area of *Barazin*

Scenario Summary	Extreme amount of GROWTH RATE=1	The least possible amount of GROWTH RATE=0.5	Intermediary amount of GROWTH RATE=0.75
Changing Cells:			
Number of employments in agriculture	81	75	78
Access to infrastructures (proposed)	Library, Dehyari(Official), Health house, park	Library, Dehyari(Official), Health house, park	Library, Dehyari(Official), Health house, park
Conversion of agricultural land to infrastructures (%)	0.9%	0.9%	0.9%
Residential required m2	6852.76	4352.76	5352.76
land – use (Proposed residential area)	23373.28*	5798.98	6834.33

Scenario Summary	Extreme amount of GROWTH RATE=1	The least possible amount of GROWTH RATE=0.5	Intermediary amount of GROWTH RATE=0.75
m2			
Conversion of agricultural land to residential area (%)	14.60%	0.00%	0.80%

Notes: *Approved in rural plan: this amount it more than the actual need and estimated area

Source: Findings of the study

The second rural area is *Ruzi*, which is located at the medium distance to Varzegan city (18km). The amount of population growth rate which is used in the plan of this rural area and was approved in the commission is 2. The number of employments in agriculture differs in each scenario and with the increase of population growth rate, the number of employments also increases. In this settlement there is no conversion of agricultural land for establishing infrastructures. The whole amount of land which is allocated to these structures is provided from wastelands located in the area. In this area the amount of land allocated to residential decreases in accordance with the population growth rate. There is the same condition about the percent of agricultural land converted to residential areas (see Table 2 and Figure 4).

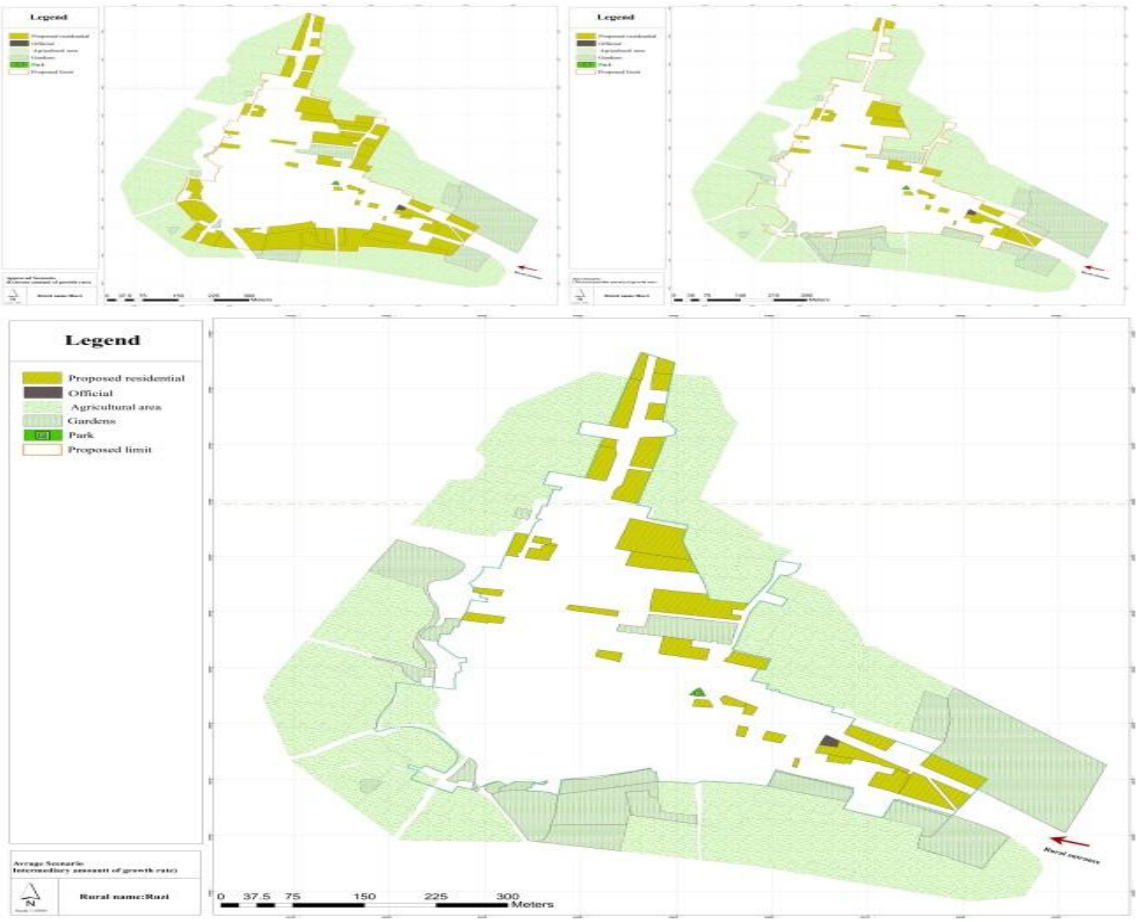

Figure 4. Scenario sets outcome for the rural area of *Ruzi*

Table 2. Review of scenario sets and their summary selected for the rural area of *Ruzi*

Scenario Summary	Extreme amount of GROWTH RATE=2	The least possible amount of GROWTH RATE=0.5	Intermediary amount of GROWTH RATE=1
Changing Cells:			
Number of employments in agriculture	114	89	97
Access to infrastructures (proposed)	Dehyari(Official), park	Dehyari(Official), park	Dehyari(Official), park
Conversion of agricultural land to infrastructures (%)	0.00%	0.00%	0.00%
Residential required m2	60436.6	17936.6	31061.6
land – use (Proposed residential area) m2	80987.58	19495.03	31530.86
Conversion of agricultural land to residential area (%)	22.60%	0.00%	3.10%

Notes-

Source: Findings of the study

The third rural area is *Mehtarloo*, which is located at the nearest distance to Varzegan city (5km). The amount of population growth rate which is used in the plan of this rural area and which was approved in the commission is 2. Again in this area there is a growth in number of agriculture employment in accordance with the increase of population growth rate. At the same time there is 1.2% conversion of agricultural land for establishing infrastructures. The amount of land allocated to residential areas decreases is in accordance with the population growth rate. There is the same condition about the percent of agricultural land converted to residential areas (see Table 3 and Figure 5).

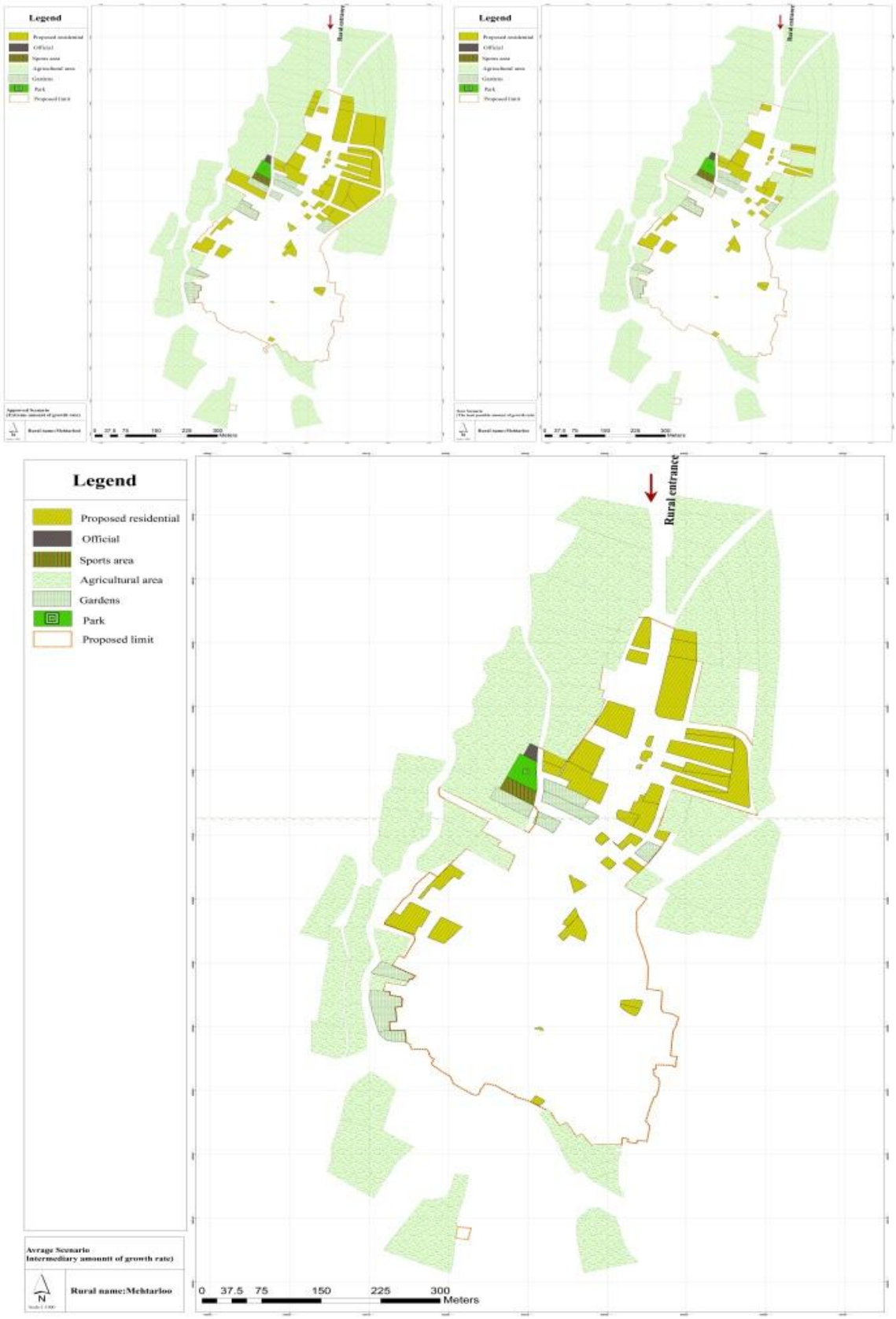

Figure 5. Scenario sets outcome for the rural area of *Mehtarloo*

Table 3. Review of scenario sets and their summary selected for the rural area of *Mehtarloo*

Scenario Summary	Extreme amount of GROWTH RATE=2	The least possible amount of GROWTH RATE=0.5	Intermediary amount of GROWTH RATE=1
Changing Cells:			
Number of employments in agriculture	178	141	152
Access to infrastructures (proposed)	Dehyari(Official), park, Sports areas	Dehyari(Official), park, Sports areas	Dehyari(Official), park, Sports areas
Conversion of agricultural land to infrastructures (%)	1.20%	1.20%	1.20%
Residential required m2	50182.45	14744.95	25682.45
land – use (Proposed residential area) m2	50215.59	18658.9	31463.68
Conversion of agricultural land to residential area (%)	14.30%	0.00%	5.80%
Notes-			

Source: Findings of the study

In this article GIS-based maps were employed to compare and assess scenarios. In each map residential areas, agricultural lands and infrastructures are displayed. The approved limit around each rural area is also clear in all of the maps. These items are symbolized with definite colors. What makes these maps different from each other is the amount of agricultural land which is converted to residential areas. By comparing these maps in each rural area and considering the data sets obtained from this tools it becomes clear that there is almost a linear connection between independent variable (population growth rate) and other internal factors. In all of the case studies, the scenario of suggested amount of population growth rate for the future population results in the largest loss of farmland, this happens while there is an increase in the amount for employment in agriculture, whereas we face with the lack of farmlands. This amount is suggested in the commissions because of the reverse migration which has happened nowadays and the increasing demands for residential areas which also changes the ecology of these areas and affects the future sustainability of them. The scenario of least amount of population growth rate is considered just to consume the wasteland of these rural areas not agricultural ones and therefore results in the lightest loss of farmlands. As there is a need to provide the future population with the residential areas, a third scenario is suggested with the moderate population growth rate.

Population growth rate and external factors:

As mentioned above rural areas have been selected according to their distance from the main city of Varzegan, which ranges from the nearest to the longest distances. Here we consider the correlation coefficients of approved amount of population growth rate in rural plans (extreme amount) for each rural area and its distance from the main city of Varzegan [Table 4 & Figure 7]:

Table 4. The amount of population growth rate and distance from the main city of Varzegan in each rural area

	Rural name	Approved amount of growth rate	Distance from the main city
1	Barazin	1	55
2	Ruzi	2	18
3	Mehtarloo	2	5

Source: Findings of the study

Using Excel to calculate the correlation coefficients between two variables of population growth rate and Distance, the amount is -0.9681. It indicates that there is a direct and reverse relation between them as illustrated in Figure 6.

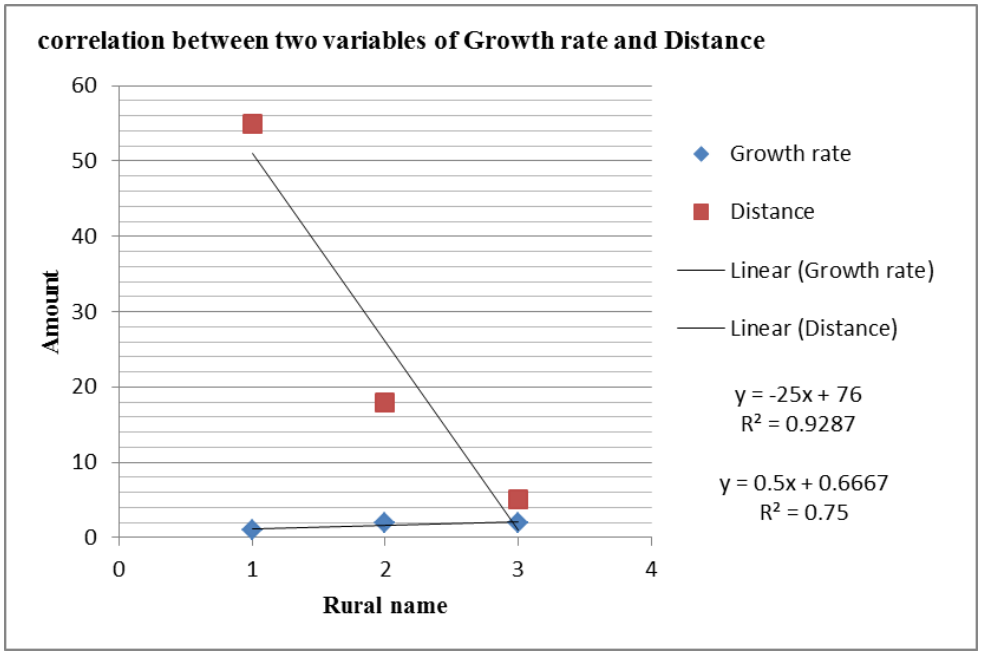

Figure 6. Correlation between two variables of population growth rate and Distance

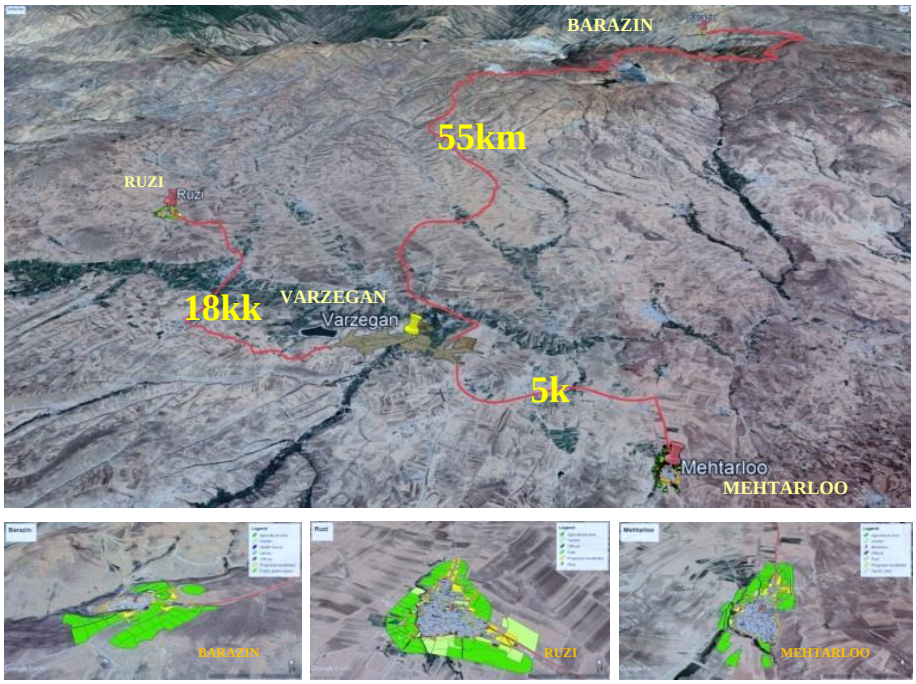

Figure 7. Distance of each rural area from the main city of Varzegan

CONCLUSION

Scenario planning plays a key role in understanding the potential impact of decisions made today and at the same time using GIS to visualize these scenarios makes it possible for stakeholders and planners to see the importance of decisions that they are making.

Iranian rural settlements especially those that have sufficient capacities of soil quality and natural environment, face different challenges such as losing farmlands due to the increasing demand for residential areas because of the reverse migration that has happened in the recent decades. If this process continues there will be difficulties such as losing rural nature, changes in employment and demographic composition which are in contrast to the goals of sustainable development. Accordingly, strategic thinking is essential in rural plans because without future perspectives we are not able to make appropriate decisions.

Population growth rate is the important factor which will have the greatest effect in the future of rural areas so the amount of it should be decided with the aid of strategic thinking such as scenario planning. Visualizing tools also are essential for illustrating the results of these scenarios as there is a close relation between this factor and other internal ones in the system of decision making. The other factor which is external to the system of decision making and is beyond the control of planners is the distance of rural areas from the main cities which plays an important role in the formation of migration intentions toward rural areas. This happens because of the need for infrastructures. Considering the growth pole theory, the main cities can provide infrastructures for the rural areas around them; hence the demand for reverse migration and intention among migrants increases. As the distance gets farther demand for residential settlements decrease so there is a lower need for population growth rate.

REFERENCES

Abdelwahed, Amr, Goujon, A., & Jiang, L. (2020). The migration intentions of young Egyptians. *Sustainability 12*, 9803.

Bartholomew, K. (2005). Integrating land use issues into transportation planning: Scenario planning. *Federal Highway Administration*.

Bloom, D., & Khana, T. (2007). The Urban Revolution. *Finance and Development*, 8-14.

Bogue, D., & Thompson, W. (1947). Migration and Distance. *American Sociological Review 14*, 236–44.

Borjeson, L., Hojer, M., Dreborg, K. H., Ekvall, T., & Finnveden, G. (2006). Scenario types and techniques: Towards a user's guide. *ELSEVIER(futures 38)*, 723-739.

Chakraborty, A., & McMillan, A. (2015). Scenario planning for urban planners: Toward a practitioner's guide. *Journal of the American Planning Association 81(1)*, 18-29.

Chakraborty, A., & McMillan, A. (2017). GIS and Scenario Analysis: Tools for Better Urban Planning. *ELSEVIER*, 1-10.

Correa, T., & Pavez, I. (2016). Digital Inclusion in Rural Areas: A Qualitative Exploration of Challenges Faced by People from. *Journal of Computer-Mediated Communication 21*, 63-247.

Couture, J. L., Froehlich, H. E., Buck, B. H., Jeffery, K.R., Krause, G., Jr, J.A.M., Perez, M., Stentiford, G.D., Vehvilainen, H., Halpern, B.S. (2021). Scenario analysis can guide aquaculture. *ICES Journal of Marine Science, 78(3)*, 821–831.

Docquier, F., Peri, G., & Ruyssen, I. (2014). The Cross-country Determinants of Potential and Actual Migration. *International Migration Review 48*, 37–99.

Dreborg, K. (2004). *Scenarios and Structural Uncertainty.* Stockholm, Sweden: Department of Infrastructure, Royal Institute of.

Dreborg, K. (2004). *Scenarios and Structural Uncertainty.* Stockholm, Sweden: Department of Infrastructure, Royal Institute of.

Eftekhari, A. R., Firuouznia, G., & Badri, S. (2011). *Vision and management system of physical development planning of rural areas of*

Iran. Tehran: Islamic Revolution Housing Foundation.

Eftekhari, Abdolreza rokneddin, Badri, S., & Sajasi gheydari, H. (2011). *Theoretical foundations of physical planning in rural areas.* Tehran: Islamic Revolution Housing Foundation.

Ghisa, M., Goux- Baudiment, F., Dator, J. A., & Cole, S. (2011). Designing a foresight exercise for the future of rural communities in Romania. *ELSEVIER(Futures 43)*, 996-1008.

Groot, C. D., Clara H., Marjolijn Das, M., & Manting, D. (2011). Life Events and the Gap between Intention to Move and. *Environment and Planning A: Economy and Space 43*, 48-66.

Hidayat, A., Rohman, T., Kenichiro, O., Corinthias, P., Sianipar, & Satoshi, H. (2022). Distance-Dependent Migration Intention of Villagers: Comparative Study of Peri-Urban and Remote Villages in Indonesia. *Administrative*, 48.

Isserman, A. (1985). Dare to plan: An essay on the role of the future in planning practice and education. *Town Planning Review 56(4)*, 483.

Kahn, H. (1962). *Thinking about the unthinkable.* New York: Horizon Press.

Kaminski, K., Schaffert, M., & Torakai, P. (2023). Scenario Planning and Participatory GIS for Place Research on Rural Transformation. *R Westerholt and FB Mocnik (eds.), Proceedings of the 4th International Symposium on Platial Information Science (PLATIAL'23),*, 53-59.

Lee, E. (1966). A Theory of Migration. *Demography 3*, 47–57.

Maleszyk, P., & Kedra, A. (2020). Intention to move and residential satisfaction: Evidence from Poland. *Equilibrium 15*, 341–60.

Malinga , R., Gordon, L., Lindborg, R., & Jewitt, G. (2013). Using participatory scenario planning to identify ecosystem services in changing landscapes. *Ecology and Society 18 (4)*.

Mandla, S. (2008). Cities as growth Poles Implications for rural development. *The Bank at 60: Six Decades of Driving Sustainable Economic Growth in Africa*.

Marien, M. (2002). Futures studies in the 21st Century: a reality based view. *Futures34(3-4)*, 261-281.

Pasqualino, R., Demartini, M., & Bagheri, F. (2021). Digital transformation and sustainable oriented innovation – a system transition model for socio-economic scenario analysis. *Sustainability,13(21)*.

Perroux, F. (1950). Economic space: theory and applications. *Quarterly Journal of Economics, Vol. 64*, 90-97.

Perroux, F. (1955). Note sur la notion de poles croissance. *Economic Appliquee, 1 & 2*, 307-320.

Quay, R. (2010). Anticipatory governance: A tool for climate change adaptation. *Journal of the American Planning Association 76(4)*, 496–511.

Rabieinezhad, T., & Argan, A. (2017). Investigating the effects of the growth poles model on the formation of large urban centers and unbalanced regional development in Iran. *1st International & 3rd National Conference on Managment and Humanistic Science Research*.

Raji, S. A., Odunuga, S., & Fasona, M. (2022). Spatially explicit scenario analysis of habitat quality in a tropical semi-arid zone: case study of the Sokoto–Rima Basin. *Journal of Geovisualization and Spatial Analysis, 6(1)*, 11.

Rezvani, M., Tahmasi, B., & Jamshidi, F. (2023). Spatial-Temporal Analysis of Reverse Migration (from Urban to Rural Areas) in Iran. *Journal of Rural Research*, 422-442.

Roca Paz, R., & Uebelmesser, S. (2021). Risk attitudes and migration decisions. *Journal of Regional Science 61*.

Schaffert, M. (2011). *Szenariotechnik und GIS: ein Beitrag zur demographierobusten Planung in Kommunen.* Technische Universität Darmstadt.

Schwartz, A. (1973). Interpreting the Effect of Distance on Migration. *Journal of Political Economy 81*, 1153–69.

Sharboom Bana consulting engineers. (2023). *Revision of the rural plan of the village of Barazin & Ruzi & Mehtarloo.* East Azarbaijan: Rural Development Deputy(Housing Foundation).

Shipley, R., Feick, R., & Earley, R. (2004). Evaluating municipal visioning. *Planning Practice and Research 19(2)*, 195-210.

Throgmorton, J. (1992). Planning as persuasive storytelling about the future: Negotiating an electric power rate settlement in Illinois.

Journal of Planning Education and Research 12(1), 17-31.

Westhoek, H., Berg, M., & Bakkes, J. (2006). Scenario development to explore the future of Europe's rural areas. *ELSEVIER(Agriculture, Ecosystems and Environment)*, 7-20.

World Bank. (2000). *Beyond Economic Growth. Meeting the Challenges of Global Urbanization.* Washington,DC.: The World Bank Development Education Program.