

Alternative Forms of Employment for Population in Rural Areas as Part of Sustainable Development Problem: Cognitive Model

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Abstract: The urgency of the problem of rural dwellers' employment in the context of the task of sustainable development of rural areas is a crucial issue affecting numerous aspects of public life and the economy. Lack of permanent employment with decent pay makes rural residents look for new sources of income outside villages. This article aims at considering alternative employment for the population as the foundation for sustainable development of rural areas, which involves application of various means for data analysis. To achieve the goal, we have conducted a sociological poll among public and government officials at different levels. The results of the polls have been used to make graphic models of certain aspects of the problem. Within the theme of the research, we have performed cognitive modelling, which, among other things, includes the process of finding facts influencing the subject of the study, as well as building and analyzing the cognitive model. The results of the cognitive modelling have shown that factors like "instability" of life conditions, "insufficient qualification of workers", "loan benefits", "attracting employers", and "entrepreneurial activity" are the most functionally important factors for the development of alternative forms of employment in rural areas. We recommend administrative authorities using those factors for strategic planning and supporting managerial decision-making for sustainable development of rural areas.


1 INTRODUCTION


Today, in administering rural areas, officials face numerous problems that include negative trends of the urbanization process. Rural dwellers' migration to cities and towns often stems from their aspiration for better quality of life, which includes access to better education and health services, as well as effective employment opportunities. International experts find that, as cities and towns offer broad opportunities for employment, education, and access to highly qualified health services, such conditions of life attract people from rural areas. On the other hand, rural dwellers' migration to cities and towns might promote urbanization and modernization of rural

areas, as dwellers who stay might use resources available to develop small and medium non-agricultural businesses. Such solution of the issue might help reduce the level of poverty in the remaining population, improve the quality of life in rural areas and, consequently, enhance sustainable development of rural areas (Islam, Rashid, Howlader, Ahmed, 2011; Bjerke, Mellander, 2022). Applying data received from public polls and using MATLAB software, we have built a model for sustainable development of rural areas using "rural tourism" as an example form of employment. The results have shown that the "financial support" component of the model is the cornerstone of sustainable rural tourism (Asadi, Jabbari, 2022).

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Russian specialists also write that rural territories, remote from centers of economic activity, and unequal conditions of life between rural dwellers and urban residents result in mass out migrations from rural areas (Lebedeva, Sabinov, Shatalova, 2021). Russian researchers also see low quality or total lack of social infrastructure, jobs, insufficient transport accessibility, limited access to end markets, technological, financial, and informational resources as causes for rural dwellers' out migration (Chudinova, Mitrofanova, 2021). Low social protection and level of life of the rural population, as well of lack of alternative employment opportunities are the reality of village life (Petrikov, 2021). Declining rural population is fraught with the risk of social desolation of Russian territories. That is why sustainable development of rural settlements is one of the currently urgent areas of the socioeconomic policy of the Russian administration (Kopylova, Kozlova, 2024).

One of prioritized areas of sustainable development of rural territories is creating conditions for growth of non-agricultural businesses, or alternative employment. The form of employment can be implemented through different types of small and medium entrepreneurship. In practice, that can be collecting, storage, and processing of wild fruit and berries; retail; agricultural product storage, processing, and selling; transportation services and many other businesses. Moreover, today, amid the active growth of Internet resources, that might include any kind of online, remote job. Creating additional jobs with decent pay will help constrain urbanization processes that have been witnessed so far.

The purpose of writing this article is to analyze the results of the problem under study, which is actualization of the rural dwellers' need in alternative employment and, consequently, sustainable development of rural territories. To achieve the purpose, we have conducted a poll to get primary data, have built graphic models as diagrams, and have performed cognitive modelling of the problem being studied.

2 BUILDING GRAPHIC MODELS

We have conducted a poll in the Ural Federal District (UrFD). Our respondents were government officials at different levels (421 people), who had outlined the main causes for rural population migration as follows (See fig. 1):

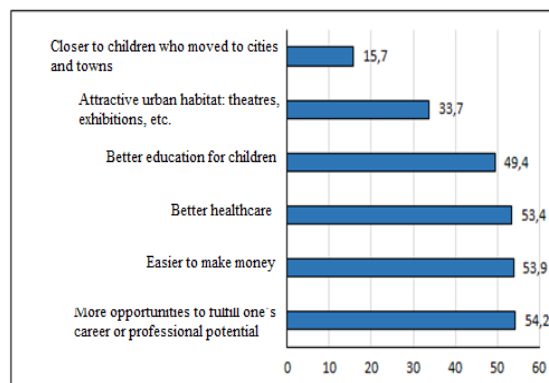


Figure 1: Causes for rural population migration in UrFD.

On Figure 1 and onwards, the sum of votes exceeds 100% as every respondent might have chosen several answers at a time. Figure 1 shows that most votes came for the answer showing that people were willing to fulfill their potential in careers not associated with agriculture; however, villages offer insufficient opportunities for that. Municipal officials in the UrFD believe that following causes might help stop the out migration from rural areas:

- high pay;
- social guarantees;
- providing free accommodation/ house/ apartment;
- interesting jobs available;
- opportunities for fulfilling personal potential;
- remote job opportunities (See fig. 2).

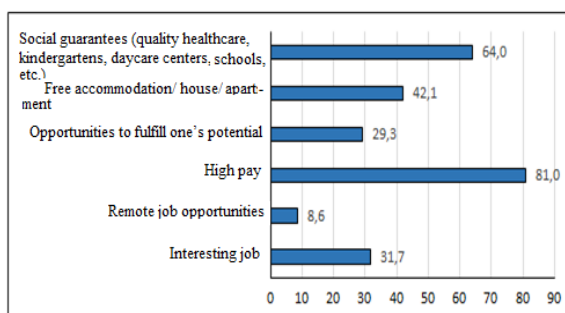


Figure 2: Possible causes for residents' return to rural areas.

Therefore, the main reason that can bring rural dwellers back to villages from cities and towns is high pay, according to UrFD officials. That level of wages cannot be provided for through traditional employment. The problem can be solved through alternative businesses only.

Alternative forms of employment in rural areas play an important part in diversifying the income of

rural dwellers and improving their welfare. Figure 3 represents the results of the poll among UrFD municipal officials concerning alternative employment of the population.

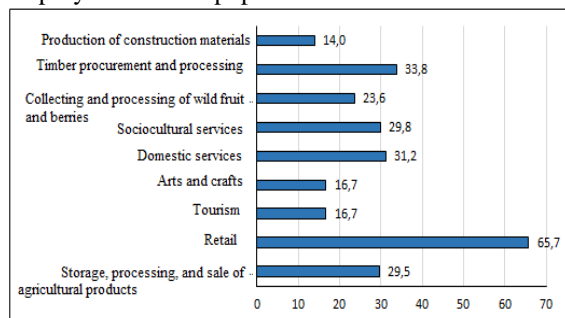


Figure 3: Types of alternative employment in rural territories.

Figure 3 shows that retail, timber procurement, and domestic services are the main types of employment for rural dwellers. Self-employment is a form of labor that has been gaining weight because of the simplified procedure of getting the status, low tax rates, and the lack of strict reporting requirements it offers.

Modern science pays specific attention to dynamic characteristics of phenomena studied. T.A. Nestik suggested interpreting social time as direct adaptation of human perception of information in close connection with the change of environment (Polunin, Alakoz, Cherkashin, 2020). That is why we conducted polls to score the level of unemployment among rural dwellers from 1 to 5 in 2022 and 2023 to compare (See fig. 4).

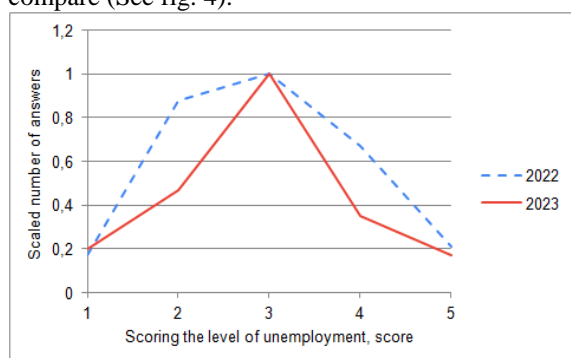


Figure 4: Scoring the level of unemployment among rural dwellers.

Figure 4 shows the scaled number of answers illustrating the immediacy of the problem of unemployment. Figure 4 demonstrates that in 2023, the criticality of the problem under consideration declined substantially, as the solid line is below the dashed one.

3 BUILDING THE COGNITIVE MODEL

Scientific literature surveying has proved that the development of alternative forms of employment for rural populations represents a diverse spectrum of activities, which includes both standard and unconventional forms of labor, whose advantages and disadvantages are mostly studied using statistic researches. We suggest using cognitive modelling that allows structuring and analyzing the problems by singling out the key factors that affect the development of strategies to improve the activity of the subject under research. Cognitive modelling not just allows analyzing the problems, it also suggests options for their management strategies.

The cognitive model of the problem studied is represented as a mathematical structure, a weighted directed graph $G=(V, E)$, where $V=\{v_i, v_j\}$ is a vertex set of the cognitive model, $E=\{e_{ij}\}$ is an arc set; $i, j=1, 2, \dots, n$ (Nestik, 2011). The rule where each $v_i \in V$ element of the cognitive model is linked with other $v_j \in V$ elements is represented by the n-ratio $r(v_i, v_j)$. The research by cognitive modelling is performed using the scheme as follows. A survey of scientific literature is performed to find out reference factors that are concepts of the topical area, positively or negatively affecting the subject of research. In our research, such factors are “population employment”, “loan benefits”, “income diversification”, “creating new opportunities”, etc. Then, cause and effect relationships are found between the factors using expert reasoning under the “if A, then B” scheme, where A is cause and B is effect. For example, “if touristic attraction of a rural territory is high, then employment of the population is high”, “if attracting employers is high, then employment of the population is high”, etc. Direct and reverse causalities between the factors are supported by expert-approved scoring within the $[-1; 1]$ interval and are found using expert methods (Fig. 5).

4 CONCLUSION

The problem of employment for rural dwellers and their respective migration to cities and towns is an unavoidable process that requires large focus and thorough analysis from public authorities' part. It is crucial to secure the balance between the development of cities and towns and maintaining rural areas to support sustainable development of territories. Solving the problems faced by rural population requires comprehensive measures, including active cooperation between the state and businesses, as well as creating new jobs outside the agricultural sector. Developing alternative forms of employment will contribute to maintaining the population number in rural territories, along with improving the level and quality of life in villages.

Overall, the development of alternative employment in rural areas is an important course to reduce unemployment, diversify sources of income, and maintain rural settlements. The results of cognitive modelling have shown that "instability" of life conditions, "insufficient qualification of workers", "loan benefits", "attracting employers", and "entrepreneurial activity" are the key factors of the problem of developing alternative forms of employment in rural areas. It is recommended that public authorities use the factors for strategic planning and supporting managerial decision-making.

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