Indicators for assessing the sustainable rural development in the region

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Abstract. Currently, the potential for sustainable development of the regional economy has not been realized for several reasons, among which the problems of rural development occupy a special place. Therefore, the issues of choosing an effective mechanism for sustainable rural development that can solve rural problems on a scientific basis, creating prerequisites for the growth of the regional economy, are of particular relevance. The main problems of rural territories of the Krasnoyarsk region – the outflow of population, the unfavorable ratio of incomes of rural and urban populations, the unsatisfactory state of housing conditions worsen the prospects for growth of the region's economy based on the potential of the agro-industrial complex. To eliminate these restrictions, a special mechanism of state regulation for industrial and social development of rural territories is needed. An important element of such a mechanism should be a system of indicators that allows effective monitoring of sustainable development of industrial and social subsystems in rural territories. The article attempts to offer such a system of indicators.

1. Introduction
“Today, such category as sustainable business development is more and more interesting not only for ordinary entrepreneurs, but also for economists” [1]. The solution to the problem of ensuring sustainable rural development is impossible without the development and using a special system of indicators that allow analyzing and monitoring the effectiveness of the socio-economic development in rural territories. “The problem of sustainable development is of particular interest in the modern economic literature” [2]. The modern economic literature contains a large number of works devoted to theoretical and methodological aspects of the developing a system of indicators for sustainable rural development [3-8]. Their analysis shows the heterogeneity of approaches to solving this problem. For the most part, the proposed approaches to assessing the sustainability of development do not consider the essence of such categories as "sustainability" and "sustainable development" and do not allow us to effectively solve the problem of ensuring sustainable rural development on a systematic basis. “The study of the factors that determine the enterprise sustainable development is very difficult, because it is influenced by many different conditions, most of which cannot be directly quantified by a certain indicator” [9]. Due to the debatable nature and unsolved problem of finding and justifying a system of indicators for assessing sustainable rural development, the authors offer their own view on the system of indicators for analyzing and monitoring sustainable rural development. The authors propose their systematization in the following groups:
• indicators of sustainability for the natural resource subsystem of rural territories;
• indicators of sustainability for the socio-economic subsystem of rural territories;
• indicators of sustainability for the production subsystem of rural territories;
• indicators of sustainability for the social and household subsystem of rural territories;
• indicators of sustainability for the socio-cultural subsystem of rural territories;
• indicators of sustainability for the financial and budgetary subsystem of rural territories.

“Each of these mechanisms should contribute to the ultimate goal in the management of the organization” [10]. Based on the essence of the concepts "sustainability", "development", "sustainable rural development ", the authors developed a system of indicators of sustainable development to assess the ability of rural territories to enter the regime of balance, proportionality and efficiency of production and social and household subsystems. “In order to achieve sustainable economic growth in Russia and stable economic development in the Russian regions, it is very important to solve the problem of effective interaction with the outside world” [11].

2. Indicators for sustainable rural development (indicators of production and social subsystems of rural territories)
The list of proposed indicators for production and social and household subsystems of rural territories is given in table 1.

| Subsystems of rural territories | Indicators for sustainable rural development |
|---------------------------------|---------------------------------------------|
| 1. Production subsystem         | 1.1 Coefficient of changes proportionality in the territory’s transport infrastructure |
|                                 | 1.2 Coefficient of changes proportionality in the production infrastructure of the territory |
|                                 | 1.3 Coefficient of balance, proportionality and efficiency of changes in the results of using production resources |
| 2. Social and household subsystem | 2.1 Coefficient of changes proportionality in the parameters of social and household objects |

Table 1. Indicators for sustainable rural development.

Consider the content and features of calculating the proposed indicators for sustainable rural development.

1. Indicators of sustainable development for the production subsystem of rural territories.

“The effectiveness of the wholesale and distribution center depends on the scheme of relationships formed between the project organizers” [12]. This group of indicators is used to analyze and control the balance, proportionality and efficiency of production processes in rural territories, their ability to ensure the growth of enterprises financial results and incomes of rural residents in order to eliminate the gap between the incomes of rural and urban populations [13].

Based on this conceptual approach the authors propose the following indicators.

1.1 The coefficient of changes proportionality in the transport infrastructure of the territory (KTI).

The indicator is used to analyze and monitor the sustainability of rural transport infrastructure development and its ability to help meet the needs of rural populations and businesses in the safe, cost-effective movement of passengers and cargo.

To calculate the indicator, we suggest using the following expression (1):
where $\Delta \sum_{i=1}^{N} TI_i$ — a planned improvement for the transport infrastructure of rural territories: bandwidth, security, speed and economic efficiency of moving passengers and cargo, score; $\sum_{i=1}^{N} TI_{ib}$ — the lack of bandwidth, security, speed and economic efficiency of moving passengers and cargo, score.

The indicator ($KTI$) determines the vector of improving the parameters of the transport infrastructure of the territory.

1.2 The coefficient of changes proportionality in the production infrastructure of the territory ($KPI$). The indicator is used to analyze and monitor the sustainability of rural production infrastructure development and its ability to contribute to cost-effective production processes. “Currently, there are a number of common methods for evaluating the competitiveness of products” [14].

To calculate the indicator, we suggest using the following expression (2):

$$KPI = \frac{\Delta \sum_{i=1}^{N} PI_i}{\sum_{i=1}^{N} PI_{ib}} \geq 1,$$

where $\Delta \sum_{i=1}^{N} PI_i$ — planned improvement of gas, water, heat and electricity supply parameters, score.

$\sum_{i=1}^{N} PI_{ib}$ — lack of gas, water, heat and electricity supply parameters that contribute to improving the economic efficiency of production processes, score. “In the structure of the production cost by the new technology, there is an increase in material costs and amortization deduction in connection with the acquisition and introduction of new equipment” [15].

The indicator ($KPI$) determines the vector for improving the parameters of the territory’s production infrastructure.

1.3 Coefficient of balance, proportionality and efficiency of changes in the results of production resources using ($KPRU$).

The indicator is used to assess the sustainability of rural development based on the use of reserves to increase financial results, the wage fund of employees in rural enterprises.

To calculate the indicator, we suggest using the following expression (3):

$$KPRU = \frac{\Delta \sum_{i=1}^{N} PRU_i}{\sum_{i=1}^{N} PRU_{ib}} \geq 1,$$

where $\Delta \sum_{i=1}^{N} PRU_i$ — planned increase in production and revenue with increased labor productivity, processing depth of agricultural raw materials, the range expansion of finished products, thousand
rubles; \( \sum_{n=1}^{N} PI_{ib} \) – reserve for increasing production volume with increasing labor productivity, revenue with increasing the processing depth of agricultural raw materials, the range of finished products, thousand rubles.

2. Indicators for sustainable development of the social and household subsystem of rural territories.

This group of indicators is used to analyze and control the balance, proportionality and effectiveness of social and household development of rural territories, their ability to improve the social and living conditions of the rural population to improve the ratio between the living conditions of rural and urban populations.

Based on this conceptual approach, the authors propose the following indicators.

2.1 Coefficient of changes proportionality in the parameters of social and household objects (\( KPCO \)).

To calculate the indicator, we suggest using the following expression (4):

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KPCO = \frac{\Delta \sum_{n=1}^{N} KCO_i}{\sum_{n=1}^{N} KCO_{ib}} \geq 1, \tag{4}
\]

where \( \Delta \sum_{n=1}^{N} KCO_i \) – planned quality improvement of population social and living conditions of a rural territory, score; \( \sum_{n=1}^{N} KCO_{ib} \) – deficit in the planned quality improvement of population social and living conditions of a rural territory, thousand rubles.

3. Conclusion

Thus, the proposed indicators for sustainable rural development are designed to create a methodological basis for analyzing and monitoring the balance, proportionality and efficiency of production processes, the effectiveness of social and household development of rural territories. The next stage of the research is the development of a methodology for integrated assessment of sustainable rural development based on the use of a special system of indicators.

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