Assessment of the impact of the forest industry on the sustainable development of the region

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Abstract. Effective interaction of society, government and business in a market economy is one of the main factors affecting the sustainable development of all sectors of the economy, including the forest industry. The aim of this work is to develop a concept and tools for assessing the impact of management decisions of individual economic entities of the forest industry on the sustainable development of the region as a whole. All economic management decisions are essentially divided into three groups: operational and production decisions, decisions on wages and decisions on profit distribution. The authors propose a tool to assess the impact of management decisions of forest industry enterprises on the sustainable development of the region using an integral indicator calculated as a result of summation of indicators characterizing the impact of management decisions of enterprises operating in the municipalities of the region.

1. Introduction

The concept of "sustainable development" has received international recognition in the "Declaration on environment and development", adopted at the UN Conference in Rio de Janeiro in 1992. Currently, sustainable development is understood as a set of socio-economic processes in which the use of natural resources, investment in research and development and production, changes in legislation and management decisions lead to increased production efficiency and meet the human needs of both the living generation and the future.

In 2009, in a report to the International Commission on basic indicators of economic activity and social progress, led by Nobel laureates J. Stiglitz and A. Sen there was substantiated the use of the indicator "standard of life" as the main criteria of the economic development of the society instead of gross domestic product (GDP). Generally recognized indicators of the standard of life of the population are the quality of food, comfort of housing, quality of clothing, level of health care, access to education, the state of the environment, the quality of rest and services and personal safety [1].

Leading international organizations have created methodologies for assessing the sustainable development and the standard of life.

Thus, the UN Commission on the sustainable development (UNCSD) has created a model "Driving force - state - response" (DSR), the Organization for the economic cooperation and development (OCED) has proposed a model "Pressure - State - Response cooperation and development" (PSR), in
the environmental program Global Reporting Initiative there was given the model "Society - Economy - environment". World Bank has established indicators for the model of the ecologically sustainable development.

The existing methods of assessing the sustainable development of the regions are based on the calculation of indicators, the initial data for which are statistical data characterizing the economic processes in the whole region [2-4]. Scientists of Rostov State University of Economics (RSUE) also conduct research in this area [5-7]. I.S. Ferova (2019) [8] notes that the index systems of international organizations are the basis of the sustainable development, at the same time she accepts the environmental aspect as a dominant one in her conceptions. There is also a significant number of national studies.

Countries-members of the European Union consider the following aspects of the sustainability: the socio-economic development (real GDP per capita), sustainable consumption and production, social integration (poverty and social exclusion), demographic changes (employment rate of older people, health service (life expectancy), climate change and energy consumption (greenhouse gas emissions, primary energy consumption), sustainable transport (global energy consumption), natural resources, global partnership and good governance. Paula Bolcárková et al. (2015) [9], Yin et al. (2014) [10] investigate the conception of sustainability in terms of the environmental safety and protection, Ding et al. (2015) [11], Mariola Grzebyk et al. (2015) [12], Walter Musakwa (2015) [13], Shen et al. (2015) [14], Xu et al. (2016) [15] focus their research on the assessment of the sustainable development of cities and other territories.

In Russia, rating agencies also use various indicators and composite indices based on their own methods of assessing the sustainable development of the region. Every year since 2013, the Rating Agency SGM develops and publishes ratings of cities and regions of Russia based on various sustainability criteria (figure 1), the Rating Agency RIA since 2012 publishes the rating of regions according to the standard of life and the rating of socio-economic status of subjects of the Russian Federation on the basis of 72 indicators taken into account. The rating of the socio-economic status of subjects of the Russian Federation is based on the aggregation of key indicators of the regional development for the year. Its results allow to assess the level of the economic development of a region, its positions on the economic map of Russia, as well as to determine the development dynamics. The average value of the integrated rating of all the regions increased from 39.4 at the end of 2017 to 41.6 points at the end of 2018, and the median value increased from 39.6 to 40.0 (the range of values from 1 to 100 points). The number of regions with an integral rating of more than 50 points increased from 20 at the end of 2017 to 22 at the end of 2018, while the number of regions with an integral rating below 25 points decreased from 17 to 12.

![Figure 1. Priority of the UN sustainable development goals for Russian business according to the Rating Agency SGM.](image-url)
The rating Agency SGM notes that the sustainability of the development of Russian cities does not depend directly on the number of their population and territorial location, but the balance of the economic, social and environmental development of a city contributes to the stability of its development in different periods of the economic development and it is not necessarily determined by the high level of the development of all the spheres simultaneously. During the year, no more than 10-15% of 185 cities change their position in the Rating by more than 30 positions. The main contribution to a significant change in the position of cities is made by no more than 3-5 indicators from 42.

It should be noted that this approach to assessing the sustainable development of the region is only an assessment of the actual state of the economy of the region as a whole and it is not possible to analyze the contribution of each economic entity to this result. The absence of this analysis makes it impossible to determine which economic entities have made a positive contribution to the sustainable development of the region and the quality of life of its population, and which have not. The absence of such analysis also does not allow to evaluate the effectiveness of management decisions of enterprises and their owners and, accordingly, to build a targeted reasoned dialogue between government and business in the interests of society.

The article proposes a conceptual approach and tools to assess the impact of management decisions taken by the management and owners of forest industry enterprises on the sustainable development of the region and the quality of life of its population. At the same time in the company's contribution to sustainable development of the region is mostly influenced by the decision of the owners of the enterprises on the distribution of profits, and the quality of life affected by management decisions of enterprises on wages of its employees.

2. Materials and methods

Now in General and regions of the Russian Federation the activity is carried out by the enterprises of the forest industry of large, medium and small business. In a market economy, the purpose of the creation and operation of enterprises (firms, firms), regardless of their size is to make a profit. The profit received by the enterprise directly depends on cost of its production as is a basis for determination of the prices of its realization.

In general, the cost of production includes the following main costs:
1. Raw materials, purchased products, semi-finished products, fuel, energy.
2. Salary costs.
3. Mandatory contributions to social insurance funds.
4. Equipment maintenance costs.
5. General production costs.
6. General costs.
7. Commercial costs.

It is clearly seen from the consideration of the essence of costs that some of them are fundamentally slightly dependent on management decisions of the enterprise management.

First of all, this applies to the cost of raw materials, components, fuel, energy and other tangible assets. Management decisions of the enterprise management related to the purchase of raw materials, components, fuel, energy and other material values do not significantly affect their cost, which is determined by the market situation. In addition, this is due to the fact that raw materials, materials and other tangible assets must be purchased at a certain level of quality in accordance with the design and technological documentation in the amount necessary for the production of the planned volume of products. Therefore, management decisions of management in this case consist in ensuring timeliness of deliveries of raw materials of necessary quality in necessary volumes.

Management decisions in the course of production ensure compliance with technological processes and terms of production and also practically do not affect the change in production costs.

The set of these management decisions, slightly affecting the cost of production, will be attributed to the group of operational and production.
The second group of management decisions should include decisions related to labour costs. These management decisions by their nature and impact on the cost price differ significantly from the first group.

Firstly, these management decisions are within the full competence of the company's management in compliance with the requirements of the legislation on the minimum salary.

Secondly, these management decisions should maintain the level of wages at the enterprise, which will ensure the stability of the workforce.

Thirdly, these decisions should largely be personalized, providing the necessary qualifications of the members of the workforce, which should ensure the production of competitive products.

Fourthly, these decisions should provide a certain level of profit, which is determined by business owners.

Thus, management decisions on remuneration are always a kind of compromise of the interests of production, the workforce and business owners. At the same time, it is obvious that the more decisions on wages will be made in favour of the workforce, the less profit that business owners will receive for distribution.

In the third group of management decisions it is necessary to include decisions of owners on distribution of the profit which remained at the disposal of the enterprise after payment of all payments provided by the legislation.

In principle, the profit can be directed in three main areas related to the sustainable development of the region:

- investment in production;
- investing in the solution of environmental problems;
- investing in the social sphere,
and also be directed to the payment of dividends.

Naturally, the decision of the owners to invest in production, in the solution of environmental problems and the social sphere, will be a contribution of this business to the sustainable development of the municipality, in which the company carries out its production activities, and, accordingly, the region as a whole.

Dividends received by the owners of the enterprise can be spent on personal consumption, personal investment in other enterprises and for charitable purposes.

Thus, the decisions of the forest industry management on wages and the decision of the owners on the distribution of profits are the most complex and most affecting the presence or absence of a specific contribution of the forest industry to the sustainable development of the region and the standard of living of its population.

3. Result and discussion

3.1. Tools for assessing the impact of management decisions of forest industry enterprises on the sustainable development of the region and the standard of living of its population

To assess the impact of management decisions of enterprises of the forest industry on the sustainable development of the region and the standard of living of its population, it is proposed to use tools in the form of an information system that reflects the main indicators of enterprises on wages and profit distribution. The information system should be built in accordance with the following basic principles.

First of all, Forest industry enterprises from all municipalities of the region should be represented in the information system.

Secondly. In the information system, data on enterprises should be presented on certain consecutive dates in such a way that it is possible to make calculations for different consecutive periods of time.

Thirdly. The information system should be able to include data on new enterprises at any time. This will increase the credibility of the assessments that will be made on its basis.

Compliance with the above principles will create an information system that will reflect the dynamics of the main indicators of wages and profit distribution, which will assess the impact of management
decisions of forest industry enterprises on the sustainable development of the region and the standard of living of its population.

The information system should include two main blocks.

Box 1. Reference books with conditionally-constant data, which provide the possibility of correct entering into the digital model of the information collected by the system of state statistics.

1.1. The Directory "Regions (Subjects of the Russian Federation)" contains details:
- the code of the region according to "The all-Russian classifier of objects of administrative and territorial division (ACATD)"
- the name of the region in accordance with the ACATD
- year of the census of the region
- month of census of the population of the region
- the population of the region according to the results of the census

1.2. The Directory "Municipalities of the region" contains details:
- code of the municipality in accordance with "The all-Russian classifier of municipal unit territories (ACMU)"
- the name of the municipality in accordance with the ACMU
- year of the census of the population of the municipality
- month of the census of the population of the municipality
- the population of the municipality as a result of the census

1.3. Directory "Forest industry enterprises" contains the following details:
- enterprise code in accordance with "The all-Russian classification of enterprises and organizations (ACEO)"
- code of the municipality, on territory of which the enterprise is located, in accordance with the ACMU.

1.4. The Directory "The Calendar" contains details:
- month
- month name
- quarter to which the month belongs
- the half-year to which the month belongs

Box 2. Databases in which information on wages and profit distribution of forest industry enterprises is accumulated.

2.1. The database "Wages and number of employees of the forest industry" contains the following details:
- code of enterprise in accordance with ACEO
- year
- month
- average number of employees
- monthly salary Fund

2.2. Database "Inflation" contains details:
- year
- month
- inflation rate from the beginning of the year as of this month
- inflation percentage in a given month (determined by the introduction of the inflation percentage of the month from the beginning of the year as a result of subtracting from it the inflation percentage from the beginning of the year as of the previous month)
- adjusted inflation percentage for this year at the beginning of next year.
If the annual percentage of inflation is officially adjusted at the beginning of the next year, the inflation database adjusts the percentage of inflation in each month by an amount equal to 1/12 changes in the higher or lower direction.

2.3. The database "Profit distribution of forest industry enterprises" contains the following details:
- code of enterprise in accordance with ACEO;
- year;
- month;
- profit remaining at the disposal of the enterprise;
- investment in production development;
- investments to solve environmental problems;
- investments in the social sphere;
- dividends.

With the accumulation in databases of information on wages, number of employees and distribution of profits for all enterprises of the forest industry of all municipalities of the region for a sufficient period of time, it is possible to assess the impact of management decisions of these enterprises on the sustainable development of the region and the standard of living of its population.

3.2. Assessment of the impact of business decisions in the forest industry on the sustainable development of the region

Assessment of the impact of management decisions of owners of forest industry enterprises on the distribution of profits on the sustainable development of the region can be carried out according to the following rules:

First, you must select the start date of the assessment period d1 and the end date of the assessment period d2.

An important condition for the possibility of evaluation is the availability of information in the database "distribution of profits of the forest industry" on the start date d1 and the end date of the evaluation period d2. For this purpose it is necessary to check completeness of information on the corresponding dates. It is necessary at the start date of the evaluation period d1 and the end date d2 to enter into the database for each municipality information on the distribution of profits in the forest industry.

After successful implementation of the above checks, the sustainable development of the region is assessed by the following indicators.

1. Dynamics of investments in production development.

First, the rate of change in the volume of investments in the production of forest industry enterprises of each municipality at the end of the evaluation period d2 is determined in comparison with the volume of investments in production at the beginning of the evaluation period d1 according to the formula (1).

\[
Is(d1-d2)_n = \left( \frac{\sum_{i=1}^{p} Isd2_i - \sum_{i=1}^{p} Isd1_i}{\sum_{i=1}^{p} Isd1_i} \right)
\]

where \(Is(d1-d2)_n\) – indicator of changes in investments in the production of forest industry enterprises of the municipality in the period d1-d2; \(Isd1_i\) – is the volume of investment in the production of the i-th enterprise, which is part of the forest industry enterprises of the n-th municipality, at the start date of the assessment d1; \(Isd2_i\) – is the volume of investment in the production of the i-th enterprise, which is part of the forest industry enterprises of the n-th municipality, at the end of the evaluation d2; \(p\) – is the number of enterprises included in the forest industry enterprises of the n-th municipality on the start date of the assessment d1.
Then there is determined the indicator of changes in the volume of investment in the production of the entire region for the period $d_1-d_2$ on the basis of indicators of municipalities according to the formula (2)

$$I_s(d_1-d_2) = \sum^n_{i=1} \left( I_s(d_1-d_2)_i \ast \frac{N_{m_i}}{N_r} \right)$$

(2)

where $I_s(d_1-d_2)$ – is an indicator of the dynamics of changes in the volume of investment in the production of the entire region for the period from $d_1$ to $d_2$; $I_s(d_1-d_2)_i$ – is an indicator of changes in investments in the production of forest industry enterprises of the $i$-th municipality for the period $d_1-d_2$; $n$ – is the number of municipalities in the region; $N_{m_i}$ – is the population of the $i$-th municipality on the date of the sustainable development assessment; $N_r$ – is the number of the population of the region on the date of sustainable development assessment.

2. Dynamics of investments in solving environmental problems.

First, the indicator of change in the volume of investments in solving environmental problems in the forest industry enterprises of each municipality at the end of the evaluation period $d_2$ compared to the volume of investments at the beginning of the evaluation period $d_1$ according to the formula (3)

$$I_e(d_1-d_2)_n = \frac{\sum^p_{i=1} I_{e(d_1-d_2)i} - \sum^p_{i=1} I_{e(d_1)_i}}{\sum^p_{i=1} I_{e(d_1)_i}}$$

(3)

where $I_e(d_1-d_2)_n$ – is an indicator of change of investments in the solution of ecological problems of set of the enterprises of the forest industry of $n$-th municipality in the period $d_1-d_2$; $I_{e(d_1-d_2)i}$ – is the amount of investment in the solution of environmental problems of the $i$-th enterprises of the forest industry of the $n$-th municipality, at the start date of the assessment $d_1$; $I_{e(d_1)_i}$ – is the amount of investment in the solution of environmental problems of the $i$-th enterprise of the forest industry of the $n$-th municipality, on the date of completion of the assessment $d_2$; $p$ – is the number of forest industry enterprises of the $n$-th municipality at the start date of the assessment $d_1$.

Then there is determined the indicator of the dynamics of changes in the volume of investments to solve environmental problems of the entire region for the period $d_1-d_2$ is determined on the basis of indicators of municipalities according to the formula (4).

$$I_e(d_1-d_2) = \sum^n_{i=1} \left( I_e(d_1-d_2)_i \ast \frac{N_{m_i}}{N_r} \right)$$

(4)

where $I_e(d_1-d_2)$ – is an indicator of the dynamics of changes in the volume of investments to solve environmental problems of the entire region in the period from the date $d_1$ to the date $d_2$; $I_e(d_1-d_2)_i$ – is an indicator of changes in investments in solving environmental problems of forest industry enterprises of the $i$-th municipality in the period $d_1-d_2$; $n$ – is the number of municipalities in the region; $N_{m_i}$ – is the population of $i$-th municipality on the date of sustainable development assessment; $N_r$ – is the number of the population of the region on the date of sustainable development assessment.

3. Dynamics of investments in the social sphere.

First, determine the rate of change of the volume of investments into social sphere at enterprises of the forest industry each municipality at the end of the grading period $d_2$ in comparison with the volume of investment at the beginning of the evaluation period $d_1$ by the formula (5)

$$I_{cf}(d_1-d_2)_n = \frac{\sum^p_{i=1} I_{cf(d_1-d_2)i} - \sum^p_{i=1} I_{cf(d_1)_i}}{\sum^p_{i=1} I_{cf(d_1)_i}}$$

(5)

where $I_{cf(d_1-d_2)_n}$ – is an indicator of changes in investments in the social sphere of the set city-forming enterprises of the $n$-th municipality in the period $d_1-d_2$; $I_{cf(d_1)_i}$ – is the volume of investment in the social sphere of the $i$-th enterprise of the forest industry of the $n$-th municipality, on the date of assessment $d_1$;
Icf\(d1-d2)\) is the volume of investment in the social sphere of the \(i\)-th forest industry enterprises of the \(n\)-th municipality, on the date of assessment \(d2\); \(p\) – the number of enterprises included in the set of forest industry enterprises of the \(n\)-th municipality as of the start date of the assessment \(d1\).

Then there is determined the indicator of the dynamics of changes in the volume of investments in the social sphere of the whole region in the period \(d1-d2\) on the basis of indicators of municipalities according to the formula (6).

\[
Icf\left(d1-d2\right) = \sum_{i}^{n}\left(Icf\left(d1-d2\right)_{i} \ast \frac{Nm_{i}}{Nr}\right)
\]

where \(Icf(d1-d2)\) – is an indicator of the dynamics of changes in the volume of investments in the social sphere of the entire region from the date \(d1\) to the date \(d2\); \(Icf(d1-d2)_{i}\) – is an indicator of changes in investments in the social sphere of forest industry enterprises of the \(i\)-th municipality in the period \(d1-d2\); \(n\) – is the number of municipalities in the region; \(Nm_{i}\) – is the population of \(i\)-th municipality on the date of sustainable development assessment; \(Nr\) – is the number of the region's population at the date of assessment of sustainable development.

### 4. Dynamics of dividend payments

First, we define the rate of change of the amount of dividends received by owners of forest enterprises each municipality on the date of the end of the grading period \(d2\), compared to the amount of the dividend on the date of commencement of the assessment period \(d1\) by the formula (7).

\[
D\left(d1-d2\right)_{i} = \sum_{i}^{p} Dd_{i2} - \sum_{i}^{p} Dd_{i1}
\]

where \(D(d1-d2)_{i}\) – is the indicator of changes in the amount of dividends received by the owners of the \(i\)-th enterprise of the forest industry of the \(n\)-th municipality in the period \(d1-d2\); \(Dd_{i1}\) – is the amount of dividends received by the owners of the \(i\)-th enterprise of the forest industry of the \(n\)-th municipality, on the start date of the evaluation period \(d1\); \(Dd_{i2}\) – is the amount of dividends received by the owners of the \(i\)-th forest industry enterprise of the \(n\)-th municipality at the end of the evaluation period \(d2\); \(p\) – is the number of forest industry enterprises of the \(n\)-th municipality on the start date of the evaluation period \(d1\).

Then the indicator of change of the amount of the dividends received by owners of all enterprises of the forest industry of the region in the period \(d1-d2\) is defined on the basis of indicators of municipalities according to the formula (8).

\[
D\left(d1-d2\right) = \sum_{i}^{n} D\left(d1-d2\right)_{i} \ast \frac{Nm_{i}}{Nr}
\]

where \(D(d1-d2)\) – is an indicator of changes in the amount of dividends received by owners of forest industry enterprises in the region in the period from date \(d1\) to date \(d2\); \(D(d1-d2)i\) – is an indicator of changes in the amount of dividends received by the owners of forest industry enterprises of the \(i\)-th municipality in the period \(d1-d2\); \(n\) – is the number of municipalities in the region; \(Nm_{i}\) – is the population of the \(i\)-th municipality on the date of the sustainable development assessment; \(Nr\) – is the number of the population of the region on the date of the sustainable development assessment.

In General, visualization of the results of the assessment of the impact of decisions of forest industry owners on the sustainable development of the region for the period \(d1\)÷\(d2\) can be performed in graphical form. All municipalities that make up the region are marked vertically. Horizontally, the values of the indicators of changes in the volume of investments in production, investments in solving environmental problems, investments in the social sphere and changes in the volume of dividends are displayed in different colors. If the value of one or another indicator of changes in investments in the municipality has a positive value, it indicates that the owners of the forest industry enterprises of the municipality have made decisions that have increased investments. If the value of one or another indicator of changes
in investments in the municipality is negative, it means that the owners of the forest industry enterprises of the municipality made decisions that led to a decrease in investment. If the dividend change is positive, it means that the owners have decided to reduce the investment by increasing their dividends. If the rate of change of dividends also has a negative value, it means that the profit of enterprises decreased and a signal of the need for serious analysis of the Economics of forest enterprises in this municipality. At the end of the chart, the results for each indicator of investment changes in the whole region are summed up.

5. Assessment of the impact of management decisions at the enterprises of the forest industry on the standard of living of the population of the region

Assessment of the impact of management decisions in the forest industry on the quality of life of the population of the region can be made according to the following rules.

First, there are selected the date of the beginning of the assessment period \( d_1 \) and the date of the end of the assessment period \( d_2 \).

An important condition for the possibility of the assessment is the availability in the database "Wages and number of enterprises of the forest industry" information on the start date \( d_1 \) and the end date of the evaluation period \( d_2 \). For this purpose completeness of information on the corresponding dates is checked there. After the above checks have been successfully carried out, the average wage in the forest industry of each municipality as at the start date of the evaluation period \( d_1 \) shall be calculated using the formula (9).

\[
Szd_{1n} = \frac{\sum_{i=1}^{p} Fzd_{1i}}{\sum_{i=1}^{p} Chd_{1i}}
\]  

(9)

where \( Szd_{1n} \) – is the average salary of employees of forest industry enterprises of the \( n \)-th municipality as of the start date of the evaluation period \( d_1 \); \( Fzd_{1i} \) – is the wage Fund for employees of the \( i \)-th enterprise of the forest industry of the \( n \)-th municipality, on the start date of the evaluation period \( d_1 \); \( Chd_{1i} \) – is the number of employees of the \( i \)-th enterprise of the forest industry of the \( n \)-th municipality, on the start date of the evaluation period \( d_1 \); \( p \) – is the number of enterprises included in the set of forest industry enterprises of the \( n \)-th municipality on the start date of the evaluation period \( d_1 \).

Then the average salary at the enterprises of the forest industry of each municipality on the date of the termination of charge of \( d_2 \) is calculated according to the formula (10).

\[
Szd_{2n} = \frac{\sum_{i=1}^{p} Fzd_{2i}}{\sum_{i=1}^{p} Chd_{2i}}
\]  

(10)

where \( Szd_{2n} \) – is the average salary at the enterprises of the forest industry of the \( t \)-th municipality at the end of the evaluation period \( d_2 \); \( Fzd_{2i} \) – is the wage Fund of employees of the \( i \)-th enterprise of the forest industry at the end of the evaluation period \( d_2 \); \( Chd_{2n} \) – is the number of employees of the \( i \)-th enterprise of the forest industry of the \( n \)-th municipality, on the end date of the evaluation period \( d_2 \); \( p \) – is the number of enterprises included in the set of forest industry enterprises of the \( n \)-th municipality at the end of the evaluation period \( d_2 \).

After that the indicator characterizing a standard of living of employees of the forest industry of municipality in the period \( d_1-d_2 \) according to the formula (11).

\[
Pkm(d_1-d_2) = \frac{Szd_{2n} - Szd_{1n}}{1 + Kinf} \times 100
\]  

(11)
where \( Pkm(d_1-d_2)_n \) – is an indicator of living standards of forest industry workers of the \( n \)-th municipality in the period from \( d_1 \) to \( d_2 \); \( Szd_{d_2} \) – is the average wages in the forest industry of the \( n \)-th municipality at the end of the evaluation period \( d_2 \); \( Kinf \) – is the inflation rate (the sum of the inflation percentages for the months included in the assessment period \( d_1 \div d_2 \) divided by 100); \( Szd_{d_1} \) – is the average salary at the enterprises of the forest industry of the \( n \)-th municipality at the beginning of the evaluation period \( d_1 \); \( d_1-d_2 \) – assessment period.

At the final stage, the standard of living of forest industry workers in the region is estimated on the basis of indicators of their standard of living in municipalities in the period \( d_1-d_2 \) according to (12).

\[
Purr_{d_1-d_2} = \sum_{i=1}^{n} \left( Pkm(d_1-d_2)_i \times \frac{Nm_i}{Nr} \right)
\]

where \( Purr_{d_1-d_2} \) – is an indicator of the standard of living of forest industry workers in the region for the period from date \( d_1 \) to date \( d_2 \); \( n \) – is the number of municipalities in the region; \( Pkm(d_1-d_2)_i \) – is an indicator of the standard of life of the \( i \)-th municipality for the period from date \( d_1 \) to date \( d_2 \); \( Nm_i \) – is the population of the \( i \)-th municipality on the date of standard of life assessment; \( Nr \) – the number of the region's population at the date of assessment of the standard of life.

Visualization of the result of assessing the quality of life of forest industry workers in the region for the period \( d_1-d_2 \) is made in graphical form. All municipalities that make up the region are marked vertically. Horizontally displays the value of the indicator of living standards of forest industry workers of the municipality, multiplied by its weight coefficient \( \frac{Nm_i}{Nr} \). The indicator value is displayed in green, provided that the indicator has a positive value in the municipality. The value of the indicator is displayed in red, provided that in the municipality the indicator has a negative value. At the end of the graph is summed up, which is the result of assessing the living standards of forest industry workers in the region for the selected period.

As a result of assessing the living standards of forest industry workers in the region, one of two situations may arise.

1. Standard of living indicator \( Purr_{d_1-d_2} \) for the period from the date \( d_1 \) to the date \( d_2 \) has a positive value. This value of the indicator can be achieved in two cases.

   In the first case, when the management of all enterprises of the forest industry took management decisions on wages, which not only compensated for inflation processes, but also exceeded them.

   In the second case, the positive management decisions on wages at the enterprises of some municipalities, taking into account their weight, were higher than the negative decisions at the enterprises of municipalities with less weight.

2. Standard of living indicator \( Purr_{d_1-d_2} \) for the period from the date \( d_1 \) to the date \( d_2 \) is negative. This value of the indicator can also be achieved in two cases.

   In the first case, management decisions on wages at all enterprises of the forest industry of all municipalities do not compensate for inflationary processes.

   In the second case, negative management decisions on wages affected the economic processes of municipalities, which have a large weight in the economy of the region, and municipalities in enterprises which have taken management decisions to increase wages, but have low weight do not overlap these negative phenomena.

6. Conclusion

The practical application of the proposed approach and tools will allow the leadership of the region and specialists of relevant ministries and agencies to quickly and timely assess the impact of management decisions of forest industry enterprises on the sustainable development of the region and the quality of life of its population. The results of the assessment will first of all allow to identify enterprises where inefficient and unbalanced management decisions are made. First of all, attention should be paid to the following enterprises.
The first group. Employees of the company are paid the minimum wage. At the same time, mandatory social contributions are also made in a minimum amount. The profit is obtained as much as possible, provided that the products have been sold. However, the owners of the company (participants or shareholders) decide on the distribution of all profits as dividends. That is, investment in production, ecology and social sphere is not made at all. In this case, the decisions taken by these businessmen have led to the fact that this company does not make a positive contribution to the sustainable development of the region or to improving the quality of life of its population.

The second group. Employees of the company are paid the maximum possible salary. At the same time, mandatory social contributions are also made in the maximum amount of profit remaining at the disposal of the enterprise, there is no or extremely small. Accordingly, dividends are not paid and investment in production, ecology and social sphere is not made. In this case, management decisions taken by the management of the enterprise, led to the fact that the company does not make any positive contribution to the sustainable development of the region, but if the level of wages compensates for inflationary processes, the company makes a positive contribution to improving the standard of life of the population of the region.

In the future, the analysis should be made for enterprises that have made a negative contribution to the sustainable development of the region, and a negative contribution to the standard of life of its population.

Obtaining this information and their analysis will allow the region’s leadership to quickly establish a dialogue with business about the need to make informed management decisions by the management of forest industry enterprises and their owners, which will allow enterprises to make a positive contribution to the sustainable development of the region and to improving the living standards of its population. The effectiveness of this dialogue is tested in the next assessment of the impact of business management decisions on the sustainable development of the region and the standard of life of its population.

If the positive dynamics of the contribution of these enterprises to the sustainable development of the region and the standard of living of its population is revealed, it will indicate that the dialogue between the government and business has taken place. If there is no positive dynamics, and even worse-negative dynamics, then in this case there is a need for a deeper analysis of the state of the economy of these enterprises of the forest industry in the region.

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