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On the way Towards a Balanced Forestry Land Use: The Economy of State Forestry Enterprises in Small Polissia of Ukraine in the Context of the COVID-19 Pandemic

Abstract. *The COVID-19 pandemic, creating massive social and economic challenges, has started additional risks in ensuring balanced forest land use at the national, regional, and global levels. In this regard, the issues of preserving ecosystems and improving the well-being of citizens, avoiding the risk of deforestation and degradation of forests due to the negative impact of the pandemic on the economy of the forestry sector have become relevant. The article's purpose is a theoretical and methodological substantiation of ensuring a balanced use of forestry lands in the context of the COVID-19 pandemic, which is associated with economic regulation, investments, and the level of financial support. The object of this study is five state forestry enterprises of the Small Polissia region of Ukraine, referred to the jurisdiction of the State Forestry Agency. The main economic problems and financial needs of the studied state forestry enterprises were identified by analyzing the dynamics of their income, the level of depreciation of fixed assets, the volume of capital investments, labor productivity, and workers' wages. Based on the analysis of reporting indicators of state forestry enterprises in the Small Polissia region of Ukraine, conceptual frameworks for coordinating efforts to ensure the balanced use of forestry lands in Ukraine have been prepared. Measures were proposed to help mitigate the impact of the COVID-19 pandemic on the social and economic dimensions of forestry land use. Recommendations for financing forestry activities, accelerating transformational changes in investment support of the forestry industry, revising the tax burden on state forestry enterprises have been substantiated. Balanced forest land use can reduce the risk of future pandemics. Therefore, its financing and incentives based on economic preferences should be a public policy priority on sustainable development.*

Keywords: *balanced use of forestry lands, financing, investments, fixed-assets depreciation, labor productivity, taxation.*

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На шляху до збалансованості лісогосподарського землекористування: економіка держлісгоспів Малого Полісся України в умовах пандемії COVID-19

Анотація. *Пандемія COVID-19, породивши масштабні соціальні та економічні виклики, спричинила додаткові ризики для забезпечення збалансованого лісогосподарського землекористування на національному, регіональному та глобальному рівнях. У зв'язку з цим актуальності набуло питання збереження екосистем та підвищення добробуту громадян, уникнення ризику вирубки та деградації лісів внаслідок негативного впливу пандемії на економіку лісогосподарської галузі. Метою статті є теоретико-методичне обґрунтування забезпечення збалансованого використання земель лісогосподарського призначення в умовах пандемії COVID-19, що пов'язано з економічним регулюванням, інвестиціями та рівнем фінансового забезпечення. Об'єктом даного дослідження є 5 державних лісгоспів регіону Малого Полісся України, що віднесені до відання Держлісагентства. Ідентифіковано основні економічні проблеми та фінансові потреби досліджуваних держлісгоспів шляхом аналізу динаміки їх доходів, рівня зносу основних засобів, обсягів капітальних інвестицій, продуктивності праці та заробітної плати працівників. На основі аналізу показників звітності державних лісогосподарських підприємств регіону Малого Полісся України підготовлено концептуальні засади узгодження зусиль для забезпечення збалансованого використання земель лісогосподарського призначення в Україні. Запропоновано заходи, які допоможуть пом'якшити вплив пандемії COVID-19 на соціальну та економічну складову лісогосподарського землекористування. Обґрунтовано рекомендації щодо фінансування лісогосподарської діяльності, прискорення трансформаційних змін в інвестиційному забезпеченні лісогосподарської галузі, перегляду податкового навантаження на держлісгоспи.*

Ключові слова: *збалансоване використання земель лісогосподарського призначення, фінансування, інвестиції, знос основних фондів, продуктивність праці, оподаткування.*

PROBLEM STATEMENT

Forests are the main habitat for more than 80% of all terrestrial biodiversity; they provide a wide range of goods and services, from environmental stability to income and means of living for millions of people [1]. However, forests are also at risk due to illegal logging, fires, pollution, diseases, pests, habitat fragmentation, and the effects of climate change. The COVID-19 pandemic enhanced these problems and risks, including increased illegal forestry activities. FAO does not exclude the probability that the COVID-19 pandemic might lead to increased deforestation and associated biodiversity loss, threatening the health of terrestrial ecosystems [2]. The pandemic has also disrupted markets and supply chains, leading to job losses, deepening inequality, and vulnerability of people dependent on forest ecosystem services [3]. To overcome the impact of the pandemic, there is the need for global cooperation and interaction both in terms of immediate response and long-lasting recovery [4]. Although the COVID-19 pandemic imposes many challenges, the current crisis could help repair relationships between humans and ecosystems, including the norms and practices that must be followed to ensure balanced forestry land use. The forest sector is not immune to the adverse effects of the pandemic; however, forests have great potential to help recover from COVID-19. After all, the balanced use of forest lands can significantly mitigate many of the pandemic's social, economic, and environmental consequences, including regulation of ecosystem health, biodiversity, and climate, improving people's lives, food security, and other sectors of the economy. In turn, strengthening forest management will be crucial to restrict the pandemic and involve the forest sector's contribution in the phase of recovery [5]. Given this, the provision of balanced forestry land use is extremely important so that forests continue to play a key role in preserving ecosystems and improving the well-being of citizens to avoid the risk of deforestation and degradation due to the pandemic impact on the economy of the forest sector.

LITERATURE REVIEW

Ukrainian and foreign scientists made a significant contribution to research to ensure the balanced use of forestry lands. Tretiak et al. [6] developed theoretical and methodological approaches to forming the value chain for the development of the land-use economy, including the forestry economy. Makarenko [7] focused on increasing the efficiency of forestry management in Ukraine. Lesiuk et al. [8] studied the efficiency of the forestry management system in Ukraine in the context of institutional reforms. Budziak et al. [9], as well as Kasiukhnych [10], studied the efficiency of the use of natural resource potential of forestry lands. Financial system development's theoretical and methodological principles based on innovation and investment strategies are studied in several works [11; 12; 13; 14; 15]. Dorohan-Pysarenko et al. [16] investigated methodological approaches to assessing the efficiency of the use of enterprise assets. Zhurakovska et al. [17] studied the impact of taxes on the reproduction of natural forest resources in Ukraine. Köhl et al. [18], Paudyal and Samsudin [19] studied forest ecosystem services' assessment to implement relevant policies in the works. Konishchuk and Yehorova [20] explored the region of Small Polissia of Ukraine in terms of agro-environmental zoning. However, the UN analytical note [1] points out the need for further systematic and comprehensive research to better inform and guide the decision-making process to address the impact of the COVID-19 pandemic on the forest sector. Thus, global changes in the pandemic conditions substantiate further research on adaptive approaches to ensuring the balance of forestry land use, taking into account the opportunities, threats, strengths, and weaknesses.

The article aims to carry out theoretical and methodological substantiation of ensuring balanced forestry land use in the conditions of challenges resulting from the impact of the COVID-19 pandemic, which is related to economic regulation, investments, and the level of financial provision.

RESEARCH METHODS

To achieve the goal, the authors used the following methods: dialectical method of cognition for the analysis of scientific studies on the issue of sustainable use of forestry lands; method of analogies (transfer of patterns of development of the process in one area with certain amendments to another area); statistical (based on quantitative indicators that allow us to make conclusions on the pace of the process); comparative analysis; graphic; abstract-logical (theoretical generalizations and statement of conclusions). Data from the websites of the state forestry enterprises located in the Small Polissia region of Ukraine and reports of the State Forest Agency of Ukraine were used in the research.

RESULTS AND DISCUSSION

Almost 100% of forests in Ukraine are state-owned. 73% are used by state forestry enterprises with departmental subordination to the State Forest Resources Agency of Ukraine (State Forest Agency). On the territory of Small Polissia, state-owned forestry comprises five state forestry enterprises (forestries) subordinated to the State Forest Agency (Table 1). According to the agro-ecological zoning of Ukraine [20], the Small Polissia region of Ukraine belongs to the Western Forest-Steppe subzone of the Forest-Steppe zone.

Table 1

Characteristics of state forestry enterprises of the Small Polissia region

Forestry enterprise, location	Total area (1000 ha)	Main activities	Subdivisions
1	2	3	4
SE Brody Forestry Enterprise is located in the north-eastern part of the Lviv region on the territory of the Brody district	26.3	Reforestation, felling related to forestry, logging, wood processing	6 forestry departments include 25 logging camps, a lower warehouse, a timber plant, and a motor park. The average area of the forestry department is 4386 ha, logging camp 1052 ha
SE Busk Forestry Enterprise is located in the north-eastern part of the Lviv region in three administrative districts of Busk, Kamianka-Buzka, and Zolochiv	25.3	Reforestation, felling related to forestry, logging, wood processing	9 forestry departments include 26 logging camps; a timber industry complex (includes the lower warehouse and processing shops). The average area of the forestry department is 2809 ha, logging camp 972 ha
SE Zhovkva Forestry Enterprise is located in the north-western part of the Lviv region in two administrative districts of Lviv and Chervonohrad.	33.7	Growing high-yielding sustainable plantations to improve the operation, conservation and protection functions of forests	7 forestry departments include 40 logging camps, a logging point, wood processing plant. The average area of the forestry department is 4811 ha, logging camp 842 ha

Table 1: Continuation

1	2	3	4
SE Rava-Ruska Forestry Enterprise is located in the Lviv region in the administrative districts of Lviv, Zhovkva, Horodok, Sokal, Chervonohrad, and Yavoriv.	31.9	Afforestation and reforestation, increasing productivity and quality of forests, protection and conservation of forests, commercial activities, logging, wood processing	12 forestry departments, transportation department. The average area of the forestry department is 2658 ha
SE Radekhiv Forestry and Hunting Enterprise is located in the north-eastern part of the Lviv region within three administrative and economic districts of Sokal, Radekhiv, and Kamianka-Buzka	35.0	Afforestation and reforestation, increasing productivity and quality of forests, protection and conservation of forests, commercial activities, logging, wood processing	7 forestry departments, processing shop. The average area of forestry departments is 5003 ha

Source: composed by the authors according to [21; 22; 23; 24; 25].

Due to the pandemic, incomes of forestry companies decreased, expenditures increased, and the volume of investments decreased [4]. In particular, state forestry enterprises are currently having trouble amidst the crisis of financial flows [1]. Their incomes are negatively affected by disruptions in global supply chains and the overall dropping demand for wood products. The declining productivity of the sectors that use wood products as feedstock includes construction and automotive [1]. At the same time, the national and regional conditions of forestry activities also significantly impact the effects of the pandemic [4]. Research by Lesiuk et al. [8] shows that forest management in Ukraine is far from proper and can be described as inefficient. This, in turn, is projected on the economic condition of enterprises. In the years 2019–2020, in the state forest enterprises of Small Polissia of Ukraine, a tendency of the downturn was observed after two years of the upturn in the 2017–2018 period when economic return per 1 ha of forestry lands increased by an average of 19.6% (Fig. 1). At the same time, the aggregate inflation index in Ukraine for the period from January 2018 to December 2020 was 119.9%.

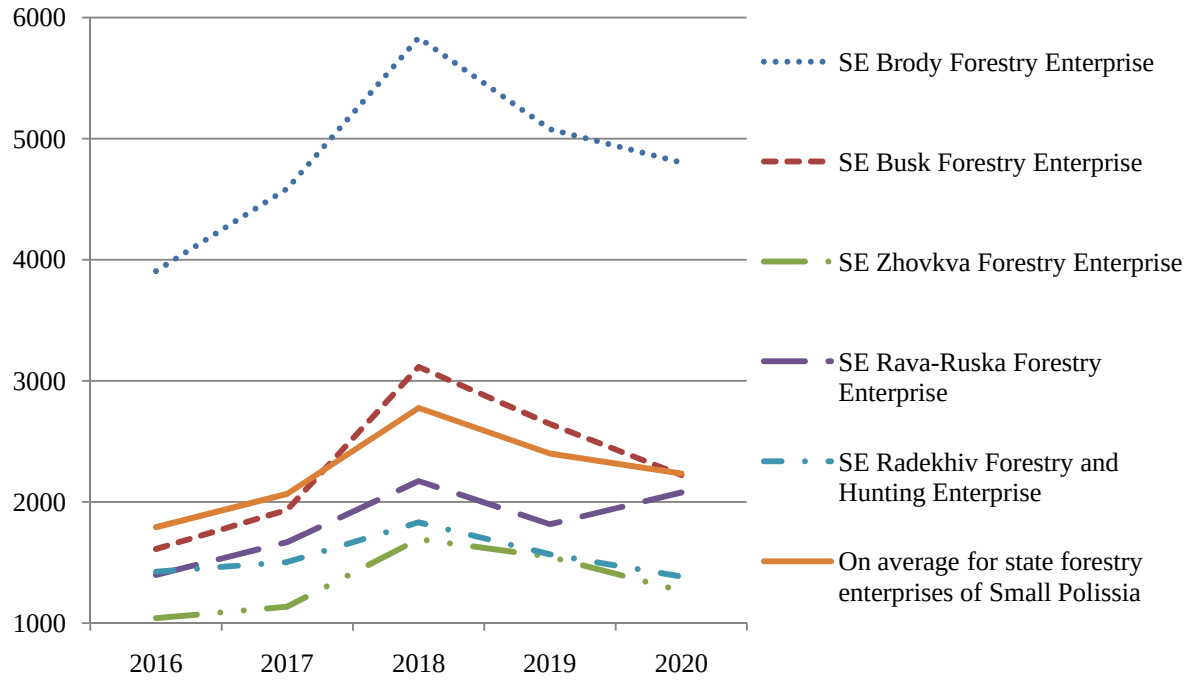

Figure 1. **Net income (1000 UAH) from sales of products, goods, works, and services per 1 ha of land**
Source: Composed by the authors according to the reports of the State Forest Agency of Ukraine.

According to the State Forest Agency, the average price of 1m^3 unit of sold wood (except for processing and own needs) excluding VAT amounted to UAH 874.7 in 2020, which is 7.6% less than in 2018 and 4.6% less than in 2019. A similar situation is in the Lviv Regional Department of Forestry and Hunting: in 2020, the price was UAH 966, which is 12.3% less than in 2018 and 3.3% less than in 2019. Obviously, in the conditions of lower prices for wood, the financial capacity of the state forestries of Small Polissia is not enough to ensure balanced forestry land use, especially in pandemic conditions. According to the FAO conclusions [26], it is necessary to increase economic incentives to mitigate the potential consequences of lower prices in the timber commodity market. One of the economic incentives in conditions of the increasing norm of deduction from the net profit of state forestries to the budget [27] should be reducing the tax burden. This is especially true in the context of an additional increase of the rental rate for special use of forest resources by 50% in 2020 compared to 2018. Noteworthy, by 2016, the norm of deduction from the net profit of state forestries to the budget was 15%; since 2016, it has increased fivefold to 75%; in 2019, it was raised again to 90%; in 2020, it only slightly decreased and amounted to 80%. Makarenko [7] studied the negative impact of increasing the tax burden on the results of activities of forestry enterprises. Thus, state forestries face severe constraints in mobilising their resources to ensure balanced forestry land use in pandemic conditions. As an immediate response, tax and budget incentives should be adopted to protect and support the state forest sector, for example lowering the rate of deduction from the net profit of state forestries at least to the level of 2018. This would increase the self-sufficiency of the sector, preserve existing jobs and support other sectors which use forest products as raw materials.

Forestry financing integrated into tax incentive packages could cover forestry management activities. According to Lesiuk et al. [8], the transformation of relations in the forest sector is possible through a wide range of measures, including ensuring forestry's financial sustainability. The transition from the COVID-19 pandemic emergency state to the recovery phase requires financial assistance. The COVID-19 pandemic, which caused large-scale social and economic consequences, also affected the financing of forestry at the national, regional, and global levels and made the issue of forestry funding even more acute than before [1]. Due to the extraordinary humanitarian needs caused by the pandemic, funding for forestry is currently under threat of reduction [1]. Therefore, financial resources are a key component of balanced forestry land use after the pandemic. At the same time, the expenditures of state forestries of Small Polissia per 1 ha of forest land, after partial growth in 2019, decreased significantly in 2020, which indicates a pervasive deficiency of the financial balance of forestry land use (Fig. 2). The outbreak of the COVID-19 pandemic has become an additional burden on a budget of state forest enterprises enhancing the pervasive deficiency of funding for the activities related to the balanced use of forestry lands. The main negative consequences of the pandemic, which are typical for many countries, include delays in implementing planned forestry measures and shortening their scale [4]. Given that the amount of financial resources is one of the most important limitations in planning the activities of an enterprise [11], it is crucial to attracting guaranteed forestry funding in the period of the pandemic.

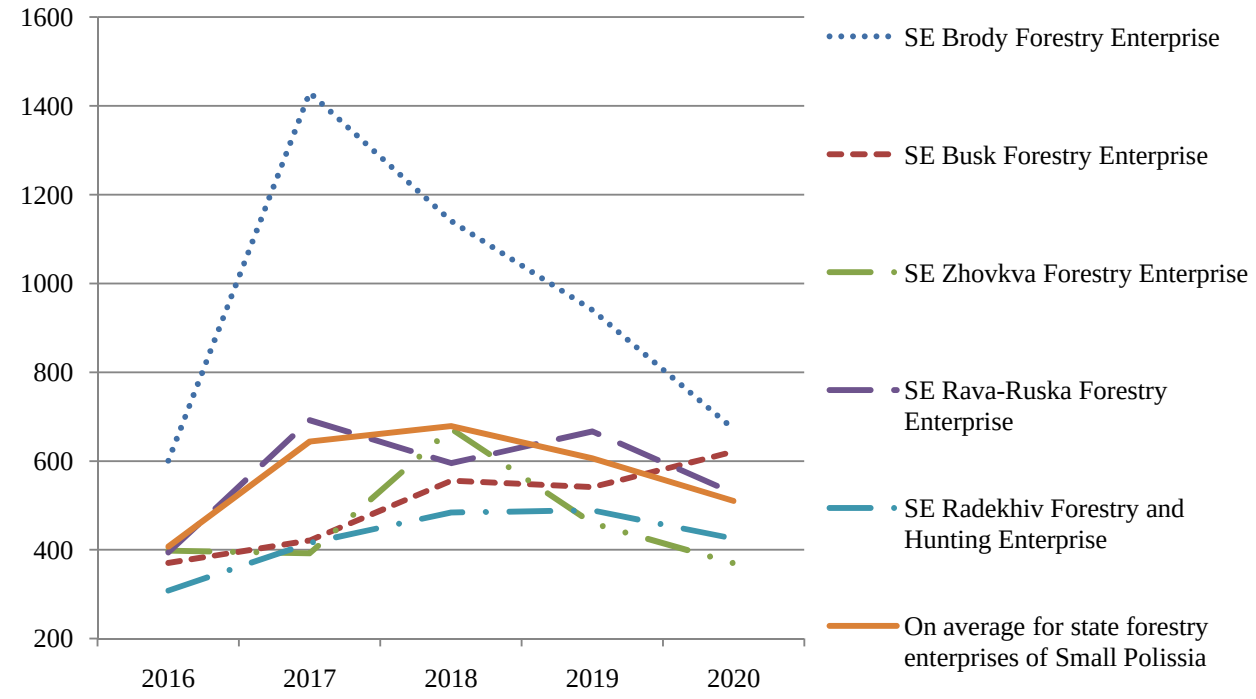

Figure 2. **Funding (UAH) per 1 ha of the total land area in permanent use**
Source: Composed by the authors according to the reports of the State Forest Agency of Ukraine.

The state forest enterprises of Small Polissia face many problems in mobilising funds, including limited access to the credit facilities because they cannot apply for a loan using their land as collateral. Therefore, it is necessary to motivate the interest of banks and private investors in increasing the amount of capital aimed at ensuring balanced forestry land use. However, national state funding is the main funding source for forestry activities in many countries [1]. In Ukraine, since 2019, state funding has been directed only to enterprises in non-resource regions of the country, depriving the state forestries of Small Polissia of opportunities to get funding from the state budget. In conditions of the negative impact of the pandemic, it is important to increase the flow of resources to ensure balanced forestry land use from all sources and at all levels. As the financing of the balanced forestry land use is a key component of restoring the forest sector after the pandemic, it is necessary to diversify the sources of funding, particularly through international funding. Thus, international funding of the forest sector is an important source of forestry funding in many countries. It plays an important role in supporting and attracting resources for sustainable forest management [1]. Over the past two decades, total financial assistance for forest sector development has been estimated at between $400 million and $1.2 billion annually [1]. Many countries have already begun to include provisions on financing forestry activities in incentive and economic recovery programs [1]. The work of the Global Network for the Financing of Forestry Activities is financed mainly from extra-budgetary funds. It has attracted almost $700,000 since January 2020 [1]. The Global Network for the Financing of Forestry Activities could also help countries mitigate the pandemic's negative effects on forests by developing national strategies for financing forestry activities. Given in Table 2 are the examples of financial support of countries and organisations by the Global Network for the Financing of Forestry Activities.

Table 2

Information on the activities of the Global Network for the Financing of Forestry Activities for financial support of countries and organisations

Country / organisation	Direction of financial support	Results as of the end of 2020
1	2	3
Botswana	The activity is focused on the development of the national strategy for financing forestry activities and the priorities of the national forest plan for the period 2019–2039	The development of a funding strategy has been completed, and a project on integrated ecosystem management and biodiversity use is currently being developed
Cote d'Ivoire	Activities focus on the development of a national strategy for financing forestry activities and a project proposal focused on agroforestry systems	It is proposed to reduce the burden on forests and diversify the income of small landowners through the production, processing, and sale of various agroforestry products
Ethiopia	National forestry financing strategy under the project aimed at strengthening the capacity of the least developed countries in developing scientifically sound, coherent, and well-funded strategies for implementing the 2030 Sustainable Development Agenda	A detailed analysis of the situation in the forest sector and the field of forest use of the country has been prepared. A national strategy for financing forestry activities is being developed in order to mobilise resources from all possible sources for inexhaustible forest use
Guinea-Bissau	Development of a national strategy for financing forestry activities	A detailed analysis of the state of affairs in the field of forest use and financing of forestry activities in the country was prepared, a concept note on the project to strengthen sustainable forest use was prepared
Northern Macedonia	Development of a national strategy for financing forestry activities	The national strategy for financing forestry activities has been approved
South Africa	Strengthening the country’s capacity to adapt to climate change and mitigate its effects through the inexhaustible forest use	A project proposal for the mobilisation of funds for inexhaustible forest use has been developed
Tanzania	Development of a national strategy for financing forestry activities	A detailed analysis of the situation in the field of forest use and financing forestry activities was conducted

Table 2: Continuation

1	2	3
Central African Forestry Commission	Development of a regional strategy for financing forestry activities and a draft concept note aimed at strengthening the capacity of the region in the development and implementation of SWOT-plus projects and the transition to payments based on the results achieved	The United Nations Development Program (UNDP) has mobilised resources to develop a full project proposal for submission to the Green Climate Fund
Economic Community of West African States	Develop a project proposal for climate-resilient forests and communities based on the restoration of forest landscapes	The Secretariat (as the governing body of the Network), in partnership with FAO, the selected accredited body, has developed a concept note for submission to the Green Climate Fund

Source: Composed by the authors according to [1].

Financial problems force governments to borrow a significant amount of money for sustainable development. However, excessive debt-based financing makes a negative contribution to the high concentration of global debt, jeopardising the economic and social development of countries [15]. UN points out that, to help countries cope with the financing of forestry activities, especially during the current pandemic, international financial institutions and organisations such as the Global Environment Facility and the Green Climate Fund should strengthen their cooperation in financing forestry activities [1]. Thus, in 2020, the Secretariat of the Green Climate Fund developed a more structured framework for cooperation in the form of communities of practitioners who support the Fund is expanding its activities through a wider group of organisations and institutions related to the forest sector [1]. The list of problems of access to resources of the Global Network for the Promotion of Forestry Financing includes complex processes, procedures, and requirements for project development; long periods of project development (from two to three years for the development of proposals in full); high cost of project preparation; insufficient funding for the development of project proposals and insufficient funding for project preparation. High cost of full proposal development (approximately $0.5–0.6 million per project), as well as limited funding for project preparation, affect how many accredited bodies support countries, as these bodies are forced to limit the number of countries or projects to support, taking into account the budget available during a particular period. This situation has led to an increase in the duration of project development and the overall time of project preparation for countries [1]. According to the UN, the procedures for obtaining funding should be simplified, and the financing of activities for the inexhaustible use of forests should be integrated into operational programs [1].

At the global level, however, there are concerns that the global recession, especially in donor countries, may reduce international funding of forestry activities, including through official assistance for development [4]. However, in the long run, international financial organisations may play a positive role in supporting Ukraine's balanced forestry land use for post-pandemic recovery. For example, The Global Partnership for Sustainability and Landscape Sustainability (PROGREEN) program is aimed at enabling countries to achieve their national development goals and meet their global commitments, in particular on forest-related issues, climate change and biodiversity, to preserve and improve ecosystem services in the context of sustainable production and landscape protection. The PROGREEN program provides support for analytical work and capacity building, and co-financing forestry activities [1].

Ukraine should take advantage of the declared priorities of international financial institutions on increasing funding for natural assets such as forests, which will increase access to resources to ensure the balanced use of forestry lands in the face of the negative impact of the pandemic. It should be noted that although the current system of forestry legislation in Ukraine is quite developed, there is no separate law that would cover the long-term vision and goals of Ukrainian forest policy [8]. Also, there is no adopted program of forest development and management, even though, as already mentioned, almost 100% of Ukraine's forests are state-owned. Integrating forest policy actions into Ukraine's national program for the sustainable use of forestry land could restore the forest sector and contribute to an environmental strategy to ensure balanced forestry use. In this regard, mobilising financial resources to ensure balanced forestry land use should be an integral part of recovery from the COVID-19 pandemic. This could be done through measures such as the inclusion of forestry funding in post-COVID-19 recovery action plans and economic incentive plans for the sustainable use of forestry lands. An additional source of financial income to the forest sector of Ukraine may be the introduction of the proposed by Köhl et al. [18] cost-efficient way to measure changes in carbon stocks and its analytical accounting for the development of the carbon market.

"The development and implementation of national strategies for financing forestry activities have proven to be effective as a means of enhancing the mobilisation of national resources and improving coordination and interaction between sectors, stakeholders, and partners in the development process at the national and regional levels. National forest funding strategies help strengthen the links between forestry and related sectors, such as agriculture, water supply, power production, environment protection, industry mitigation of climate change, and

diminishing risks. In addition, funding strategies have proven their effectiveness in the accounting of the aspects of forestry and forestry financing into national sustainable development framework mechanisms and potentially integrating such aspects into integrated national funding mechanisms." [1]. Thus, in Ukraine, there is a need to develop a program of transformation to ensure balanced forestry land use, which will reduce the impact of the pandemic. It is necessary to prepare a national strategy for financing forestry activities and move forward in implementing the voluntary national contributions of Ukraine to ensure the balance. Financial support from the state should be aimed at helping state forest enterprises to survive the pandemic. It should include direct subsidies and preferential interest rates, reducing the tax burden, and changes in the regulatory framework (Table 3).

Table 3

Proposals for financial support measures and economic incentives for sustainable forest management in Ukraine

Source	Suggested measures
Increasing international financial support	Development and implementation of a national strategy for financing balanced forestry land use
Expand access of state forestries to financial services, including low-cost loans	Development and implementation of the state program of preferential crediting. Legislative regulation of the possibility of the use forestry land as collateral for loans
Investments in forestry land use	Establishment of an Investment Fund in Ukraine aimed at significantly expanding the scope of reforestation during the United Nations Decade for Ecosystem Restoration (2021-2030)
Funding from the Green Climate Fund	Development of projects aimed at ensuring balanced forestry land use and increasing carbon storage in forests
World Bank funds	Participation in the program Global Partnership for Sustainability and Sustainability of Landscapes (PROGREEN)
Strengthening the financial potential of state forestries	Reduction of the norm of deduction from the net profit of state forestries to the level of 2018. Revision of tax incentives in favour of ensuring balanced land use
Environmental insurance	Adoption of the Law of Ukraine "On Environmental Insurance" following the Decision of the National Security and Defense Council of Ukraine dated 23.03.2021 "On challenges and threats to the national security of Ukraine in the environmental sphere and priority measures to their neutralisation"
Accounting of carbon units at the local and regional levels	Changes in the legislation on the registration of property rights to carbon, accounting of the accumulation of carbon in forests by forest enterprises for, the development of the national carbon market, which would allow additional financial income

Source: Composed by the authors.

The pandemic has raised awareness among the world community that forest health is a prerequisite for ensuring the health of the planet and humanity [1]. In this regard, it is very important that the financing of forestry activities be an integral part of the financing to ensure balanced forestry land use. To attract funding for these purposes from all sources, National Forest Financing Program should be adopted and integrated as an integral part of the national recovery plan after the pandemic, which would help identify opportunities and challenges at the forest sector level and align sectoral actions with national goals of development. The issues related to the use of forest lands should be addressed in an integrated, consistent, coherent, and complementary manner at the national, regional, and local levels to promote sustainable forestry land use in its economic, social, and environmental aspects. Therefore, to address the challenges of financing balanced forest management in the context of the COVID-19 pandemic joint, long-term and consistent efforts of management structures at all levels are required.

In many countries, little attention is paid to forests, and less investment is directed to forest use than expected, despite the intensification of information activities and recognition of the contribution of forests to addressing such issues as low-carbon development and sustainable society [1]. According to Tretiak et al. [6], the investment approach to the efficient use of forestry lands includes equipment upgrades and innovations. Research of the degree of depreciation of fixed assets of state forestries of Small Polissia (Fig. 3) indicates a steady trend of increasing wear. During the period under study, the growth rates of fixed asset provision of the state forestries of Small Polissia stand behind the growth rates of depreciation of the fixed assets. Scientists [7] explain the negative situation of increasing depreciation by the lack of the necessary working capital for the modernisation of forestry production. The own sources for the renewal of fixed assets of the forest sector include profits. However, as we have already mentioned, 90% of the net profits of the state forestries is directed to the state budget. In turn, the high level of depreciation of fixed assets of enterprises may be the cause of other internal economic and environmental threats [16]. To a large extent, this occurs due to the lack of a national strategy for forestry development, which might help attract investment in the forest sector, and consequently in the renewal of fixed assets, technologies of forestry, and afforestation [10].

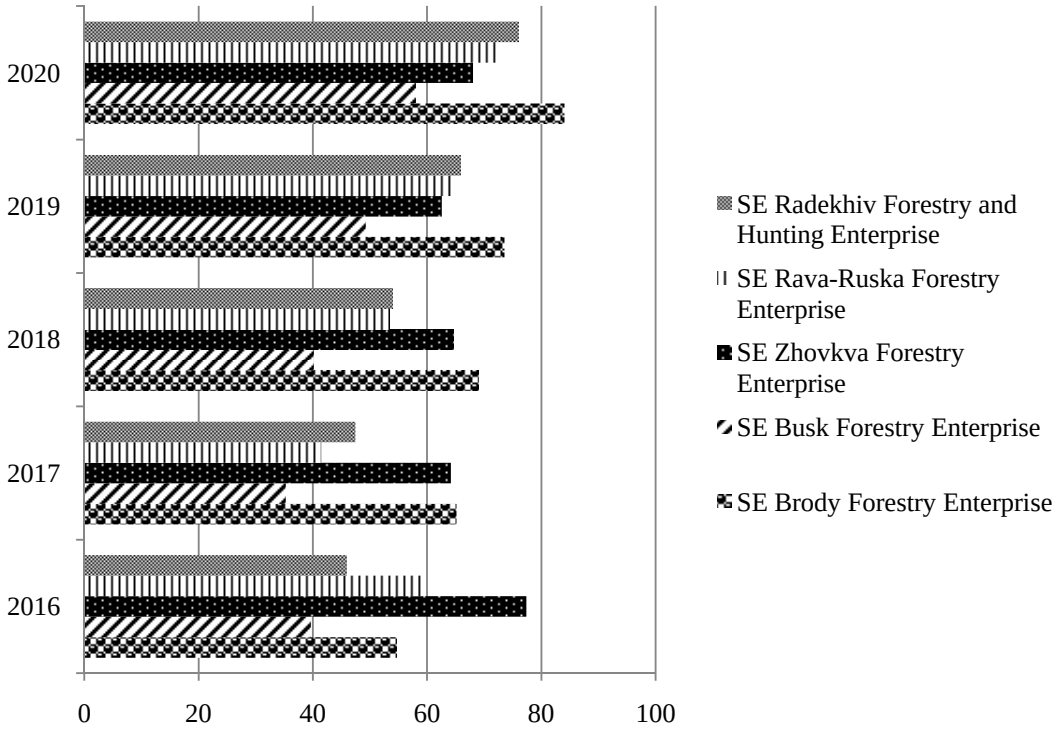

Figure 3. **Degree of depreciation of fixed assets (%)**
Source: Composed by the authors according to the reports of the State Forest Agency of Ukraine.

Investing in forestry activities through pre-crisis commitments and opening up new investment opportunities means investing in a sustainable future for people and the planet [1]. Thus, after the pandemic, investing in balanced forest management is a key strategic recovery tool. However, the characteristic feature of the Ukrainian forest sector is the investment deficit, which does not contribute to ensuring an acceptable level of capitalisation and increasing the share of high value-added products in forest processing units of state forestries [12]. We studied capital investments in the renewal of the facilities and equipment of state forestries of Small Polissia for the period 2018–2020 (Table 4).

Table 4

Capital investments (UAH) of state forestries of Small Polissia of Ukraine per 1 ha of land

State forestry enterprises	2018	2019	2020	Deviation of 2020 to the average for 2018–2019 (%)
SE Brody Forestry Enterprise	297	169	87	37.6
SE Busk Forestry Enterprise	146	18	13	16.1
SE Zhovkva Forestry Enterprise	65	57	9	15.3
SE Rava-Ruska Forestry Enterprise	63	30	62	133.9
SE Radekhiv Forestry and Hunting Enterprise	127	24	40	53.7
On average for state forest enterprises of Small Polissia of Ukraine	132	57	42	44.1
On average, according to the State Forest Agency of Ukraine	107	58	46	55.8

Source: Composed by the authors according to the reports of the State Forest Agency of Ukraine.

The existing imbalance in the financing of the forestry sector does not attract investment flow, creating a shortage of resources for forestry [17]. Onehina et al. [13] studied the role of investments in economic development. She considers them a key factor in ensuring sustainable development. In 2020, state forestries of Small Polissia spent almost 56% fewer capital investments than the average for 2018–2019. In general, for the State Forestry Agency of Ukraine, the decrease for the study period made up about 44%. According to Kasiukhnych [10], most investments in forestry during the pre-crisis period were directed to the repair of dated equipment, while new environmental and resource-saving technologies remained without adequate funding. In the state forestries of Small Polissia, the situation with capital investments is

more critical than the state forestries of other regions, as forestry management in this region is self-sustaining.

Moreover, due to the pandemic, forestries bear additional expenses for the health and safety protection of their employees and local communities. In addition, the uncertainty caused by the pandemic is delaying capital investment flow in the sector. Reduced access to state and private investment due to the economic crisis resulting from the COVID-19 pandemic can reduce efforts to re-equip the forestry sector and jeopardize sustainable forest management.

According to Plastun et al. [14], the formation of a new state investment policy based on investment mechanisms is the basis for reformatting financial systems, and the main role of catalyst for these processes belongs directly to the state as an 'initiator,' 'mediator' and 'accumulator' in the field of investment. Therefore, in the short-term perspective, it is necessary to include investments in forestry in recovery plans, particularly in the national strategy for ensuring the balanced use of forestry lands in Ukraine, considering regional conditions and priorities. Investing in sustainable forest management, including mobilising sufficient funding, is a key component of effective and sustainable recovery from the COVID-19 pandemic, which calls for creating an Investment Fund in Ukraine aimed at significantly expanding reforestation during the United Nations Decade on Ecosystem Restoration (2021–2030). For example, Canada has launched a nearly $83 million investment program to bridge the gap between new product development and commercialisation to make the forest sector more competitive and sustainable. The Canadian government has also allocated $13 million to support indigenous communities in forestry activities, entrepreneurship, careers, and management opportunities. Forests in Germany have received €700 million from the government to promote sustainable forest use, including investment in up-to-date equipment. Spain has allocated €40 billion to encourage investments, especially to the environmental sustainability of forests [1]. Cooperation with the private sector to promote capital investment is a long-term strategy for integrating sustainable forestry into national investment policy. A statement from the Collaborative Partnership on Forests [29] noted the urgent need to open up investment opportunities that strengthen means of living without deforestation and diminish the risk of future zoonotic diseases.

Forests are the livelihood of millions of people around the world. They are the basis for employment, health, and diminishing risks of disaster and, in this way, help to maintain livelihoods and economic protection systems. Worldwide, the pandemic aggravates the burden of forest-dependent populations in various ways, including job losses, declining incomes, etc. Therefore, it is important to emphasize the need to ensure balanced forestry land use to ensure that forests continue to operate as a social protection network. A recent analysis [1] shows that the loss of jobs and income associated with the pandemic will likely lead to the extreme poverty of 34.3 million people. In the worst case, by 2030, another 160 million people may face extreme poverty. About 2.4 billion people – a third of the world's population – still rely on wood fuels to meet their basic energy needs (cooking, boiling water, and heating their houses). Wood fuels, which include firewood and charcoal, remain one of the most affordable energy sources for people affected by natural disasters and humanitarian crises [1]. Dependence on forest biomass energy is likely to increase during the COVID-19 crisis, as supply chains for other energy sources might be disturbed and income opportunities lessen. In turn, the sharp increase in economic vulnerability will increase the pressure on forests, as more and more people among the rural poor turn to forest products for their basic needs [1]. We studied the social component of the use of forestry lands through the prism of labour productivity and the average monthly salary of full-time employees of state forestries of Small Polissia for the period 2018–2020 (Table 5).

Table 5

Labour productivity and income of employees of state forest enterprises of Small Polissia

State forestry enterprise	Sold products per 1 full-time employee (1000 UAH)				Average monthly salary of full-time employees (1000 UAH)			
	2018	2019	2020	2020,% to 2019	2018	2019	2020	2020,% to 2019
SE Brody Forestry Enterprise	321.7	289.8	298.7	103.1	14380	12762	11695	91,6
SE Busk Forestry Enterprise	492.5	437.3	404.5	92.5	10641	9973	9308	93.3
SE Zhovkva Forestry Enterprise	286.7	263.5	246.6	93.6	10165	10776	8112	75.3
SE Rava-Ruska Forestry Enterprise	451.4	382.4	478.6	125.2	10669	10446	9589	91.8
SE Radekhiv Forestry and Hunting Enterprise	229.8	203.1	205.4	101.1	9224	9730	9019	92.7

Source: Composed by the authors according to the reports of the State Forest Agency of Ukraine.

Although labour productivity in Brody Forestry Enterprise, Rava-Ruska Forestry Enterprise, Radekhiv Forestry and Hunting Enterprise in 2020 increased compared to 2019, the average salary of full-time employees decreased in all state forestries of Small Polissia. The number of full-time employees has also decreased: in 2018, the number of employees in the state forestries of Small Polissia was 1,269; in 2019 it decreased by 35 people; and in 2020 it decreased by another 124 people (by 10%). Lesiuk et al. [8] point out the compliance of the qualifications of forestry workers with the real needs of forestry development. After an increase in the share of labour costs in the cost structure of state forestries of Small Polissia in 2019 compared to 2018, there is a decrease in this indicator in 2020, which indicates lessening attention to the efficiency of labour costs. However, the pandemic should not be used as an excuse to weaken social norms in an attempt to overcome its economic impact and promote growth. Due to the decrease in the average monthly salary, there is a risk of losing highly qualified personnel. According to a global survey carried out in 2020 [5], redundancies and temporary salary cuts have been reported as the worst consequences of the COVID-19 pandemic in all segments of the timber chain. At the same time, as we have already pointed out, the aggregate inflation index for the period from January 2018 to December 2020 was 119.9%. As an example, according to the State Statistics Service [29], the price of gas in the second half of 2020 increased by 32.8% compared to the second half of 2019. Under such conditions, the direct focus of the response to COVID-19 is likely to lead to an increase in deforestation [26]. According to Budziak et al. [9], loss of forests and forested areas means the loss of 'clean' land. That is, increasing the vulnerability of the population will affect natural resources, such as forests, which are often the most accessible source of livelihood and income [4]. Forest products and ecosystem services have been identified as critical in many countries during the COVID-19 pandemic [29]. Worldwide, about 1 billion people depend to some extent on forest products such as wild meat, edible insects, edible plants and fruits, mushrooms, and fish as part of their balanced diet. About 2.4 billion people, both in urban and rural areas, use wood-based energy for cooking. As the average monthly salary of workers during the pandemic has decreased compared to previous years, and prices have risen, people will use forests and forest products for heating, which can lead to overuse of natural resources. In addition, there will be even more pressure on forest resources due to illegal logging. This will harm the economic and social well-being of forest enterprises and forest-dependent communities and will have long-term consequences for future livelihoods. In some countries, the pandemic has led to illegal use of forest resources, including illegal logging, illegal gathering of other than wood forest products, as well as changes in land use [1; 4].

Balanced forestry land use could be an integral part of job creation efforts. It offers certain unique benefits in achieving many economic, social, and environmental goals. Forestry is well known for its job creation potential due to its time-consuming nature, and labour and land are key factors in the production of wood and non-wood forest products and ecosystem services. Therefore, state forestry enterprises managers should be more effective in expanding social security schemes for forestry workers in conditions of the pandemic. Areas of forestry activities with the potential to create new jobs include afforestation, reforestation, improved natural forest management, conservation, protection of watersheds, agroforestry, forest protection from fires, road construction, and creation of recreation areas. According to the research by Paudyal et al. [19], the transformation of degraded forest lands into forest plantations could improve ecosystem services. It is also necessary to increase the share of high value-added products in forest processing units of state forestries, which will allow them to invest sufficient funds in the reproduction of forest resource potential. In turn, investment in forestry has the potential of creating more jobs compared to other sectors.

According to the results of the SWOT analysis, we identified strengths and weaknesses, opportunities and threats to ensure the balanced use of forestry lands of the Small Polissia region in the conditions of the pandemic (Table 6).

Although the full scale and depth of the pandemic are still being revealed, a SWOT analysis shows that there is still a long way to recovery. Results of SWOT-analysis will enable the state forest enterprises of Small Polissia of Ukraine to determine measures to ensure balanced forestry land use in the conditions of the pandemic, improve management efficiency to ensure the availability of the best scientifically sound data and technological solutions in response to the crisis and for further recovery. Balanced forestry land use can reduce the risk of future pandemics and should be prioritised through increased funding and economic incentives. Balanced forestry land use is crucial for addressing many of the issues imposed by the pandemic, including fostering efforts to stop deforestation and forest degradation, increasing the value of ecosystem services, creating new jobs in afforestation and reforestation plans, revitalisation of sustainable supply chains and providing a variety of means of living.

Table 6

Matrix of SWOT analysis of provision of balanced forestry land use in Small Polissia region of Ukraine in the conditions of impact of the pandemic

Strengths	Weaknesses
1. Territorial location; 2. Advantages of the state form of ownership; 3. Access to renewable natural resources, which are the basis of forestry; 4. Potential to increase revenues from extending the list of ecosystem services; 6. Reliable taxpayers; 7. Potential to ensure balanced forestry land use.	1. Negative dynamics of net income; 2. Negative dynamics of forestry land financing; 3. Lack of funding from the state budget; 4. Negative dynamics of investments; 5. Depreciation of fixed assets; 6. Reduction of the average monthly salary of full-time employees; 7. Imperfect personnel policy; 8. Reducing the share of salary costs in the cost structure; 9. Significant tax burden on profits; 10. Weakly diversified economy of state forestries.
Opportunities	**Threats**
1. Prospects of extending the list of ecosystem services; 3. Attracting state funding to ensure the balanced use of forest lands; 4. Attraction of private investments; 6. Wide access to low-cost loans and soft loans; 7. Financing from the Green Climate Fund; 8. Environmental insurance; 9. Legislative regulation of the possibility of using forest land as a collateral. 10. Upgrading and modernisation of production facilities; 11. Accounting of the accumulation of carbon in forests; 12. Capitalisation of forestry lands; 13. Diversification of production; 14. Expanding the scope of reforestation; 15. Participation in the Global Partnership for Sustainability and Sustainability of Landscapes; 17. Reduction of the norm of deduction of a part of net profit of state forestries; 18. Strengthening the positioning of forestry as a sector that can effectively fight poverty, generate stable incomes and create jobs in the condition of the pandemic.	1. Further increase of the tax burden; 2. Loss of qualified personnel; 3. Limiting the ability to renew fixed assets, which potentially provokes the loss of market position; 4. Further reduction of capital investments; 5. Lack of budget funding; 6. Lack of a national forest financing program as an integral part of the national recovery plan after the COVID-19 pandemic; 7. Reduction of costs on forest lands creates a conflict of priorities between economic, environmental, and social goals of the balanced use of forest lands.

Source: The authors' own research.

CONCLUSIONS

This study made a step towards identifying the immediate and most obvious consequences of the pandemic to ensure balanced forestry land use. Identified are the main economic problems, financial needs, and social imbalances of forestry land use in the Small Polissia region of Ukraine for more efficient recovery after the pandemic. They include the negative dynamics of reducing financial provision; reduction of capital investments; significant level of fixed assets depreciation; increased tax burden; reduction of social guarantees; imperfect personnel policy. Financial provision of forestry land use and investment mobilisation can be important components of management measures for the environmental, economic, and social balance of forestry land use in response to the COVID-19 pandemic and building immunity to future pandemics. The study may accelerate transformations in the forest sector's investment provision and help turn the COVID-19 pandemic from a global threat to an opportunity for lasting changes ensuring balanced forestry land use.

The conducted SWOT analysis substantiates the possibility of using the potential of the state forest enterprises of Small Polissia to coordinate the efforts for recovery after the pandemic with the efforts to ensure the balanced use of forestry lands. To develop a transformation action plan in favour of the financial provision of balanced forestry land use, the following measures are proposed: development and implementation of a national strategy for financing forestry activities; include provisions on financing forestry activities in incentive packages and recovery plans after the COVID-19 pandemic; increase the volume of international financial support; provide conditions to increase investment; reduce the tax burden.

As the pandemic is still going on, further studies are expected to provide additional evaluation and research to better understand the short-, medium- and long-term consequences of the pandemic for balanced forestry land use.

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