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## **TRANSFORMATIVE PATHWAYS: LESSONS LEARNED FROM IPARD AGRICULTURAL MACHINERY MODERNIZATION IN MONTENEGRO**

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### **ABSTRACT**

The implementation of the IPARD (Instrument for Pre-Accession Assistance in Rural Development) initiative in Montenegro has advanced the agricultural sector by providing farmers with machinery and equipment, including tractors, trailers, balers, and irrigation systems. Through four public calls for support, a total of 333 investments were channelled, accompanied by infrastructural development to enhance farming operations and productivity. This paper assesses the impact and effectiveness of the IPARD initiative, particularly its contribution to modernizing the agricultural sector through machinery and equipment provision. The analyses involved a combination of data extraction from online sources, statistical analysis using tools like SWOT analysis and Technological Advancements Assessment, and qualitative insights from interviews with key stakeholders to evaluate the impact of IPARD on agricultural modernization in Montenegro. It evaluates how IPARD support has enhanced farming operations, productivity, and efficiency in Montenegro, identifying challenges and opportunities for improvement. Additionally, it provides insights and recommendations for future initiatives to foster sustainable agricultural modernization in the country. Notably, beneficiaries from Bijelo Polje received the highest support at €1,003,999, while Budva and Tivat did not receive any. Municipalities like Podgorica and Nikši also received significant support, reflecting their larger populations and areas. The anticipated impact is transformative, empowering farmers to modernize practices and improve efficiency. Despite challenges like eligibility criteria and communication barriers, positive collaboration and efficient information dissemination have been observed. Opportunities for improvement include expanding financing mechanisms and enhancing user engagement. These insights will guide future efforts toward

sustainable agricultural modernization in Montenegro. Moving forward, expanding financing mechanisms and enhancing user engagement are crucial steps to further empower farmers and ensure the continued success of agricultural development initiatives in Montenegro.

**Keywords:** *IPARD, Montenegro, agricultural machinery, modernization, rural development.*

## INTRODUCTION

The agricultural policy of the European Union (EU) prioritizes sustainable "green agriculture" and multifunctionality, linking financial support to environmental, health, and good agricultural practice standards (EC, 2008). This policy shift acknowledges agriculture's broader rural context, focusing on climate actions and sustainable resource management. In the Western Balkans, the EU supports rural development through various programs, such as: (a) IPARD Program provides financial assistance for agricultural investments, modernization, and competitiveness enhancement; (b) Capacity Building initiatives offer training aligned with EU standards; (c) Technical Assistance aids in aligning agricultural policies and regulations with EU standards; (d) Market Access and Trade facilitation enable export to EU member states; (e) Cross-Border Cooperation fosters economic development and infrastructure improvement; (f) Environmental Sustainability initiatives promote eco-friendly farming practices and address climate change; (g) Rural Infrastructure Development enhances rural areas' overall development; (h) Diversification and Value-Added Products encourage non-agricultural activities and value-added agricultural products; (i) Research and Innovation support farmers' access to advanced agricultural technology. These efforts aim to bolster stability, economic growth, and development in the Western Balkans, aligning them with EU standards in preparation for potential EU membership.

The Instrument for Pre-Accession Assistance in Rural Development (IPARD) is a financial instrument of the European Union (EU) aimed at supporting candidate and potential candidate countries in aligning their agriculture and rural development sectors with EU standards. IPARD offers financial aid and technical support to modernize agricultural practices, improve rural infrastructure, and enhance competitiveness. Key aspects include financial grants for investments, co-financing mechanisms, accessibility to various actors, support for a range of activities, a defined application process, technical assistance, monitoring and evaluation, and training initiatives. IPARD contributes to aligning agriculture and rural development with EU standards, fostering economic development, and preparing countries for EU membership.

The objectives of the study are to evaluate the effectiveness and impact of the IPARD initiative on modernizing the agricultural sector in Montenegro, with a focus on improvements in farming operations, productivity, and efficiency through the provision of machinery and equipment. Additionally, the study aims to identify

challenges encountered during the implementation of IPARD, such as eligibility criteria and communication barriers, while exploring opportunities for enhancing future initiatives. The study will also offer actionable recommendations for refining the IPARD program and similar agricultural modernization efforts to foster sustainable agricultural development in Montenegro. Furthermore, it will examine the regional distribution of support and investment to understand variations in impact across different municipalities and highlight areas needing additional focus. Finally, the study will use insights gained from the analysis to guide future agricultural development initiatives, ensuring more effective support and resource allocation for sustainable growth in Montenegro's agricultural sector.

## **MATERIALS AND METHODS**

### **Study area**

Montenegro, situated on the Balkan Peninsula, boasts diverse landscapes from coastal shores to towering mountains. Its climates range from Mediterranean to alpine, offering a unique environment (Pittaway, 2004). The administrative setup comprises 25 municipalities, including the capital, Podgorica. Despite its small size, Montenegro's elevations span from sea level to 2,535 meters, with a mean elevation of 1086 meters. However, agricultural neglect due to industrialization since the 1960s, coupled with rural exodus to urban areas, has impacted rural populations, reducing them to only 37.2% of the total population according to the 2011 census (Brajuskovic et al., 2018). The northern region is the most rural area, with around 60% of the population living in rural areas, the southern region with around 40% of the rural population, while the central region is with only 20% of the rural population (Mijanovic et al., 2017; Pejanovic et al., 2020). This is important to highlight in connection with the analysis of the justification of support to the agricultural machinery sector in Montenegro.

### **Methods**

Methodology was devised by merging data extraction from online sources and harnessing statistical insights from entities like Statista, MONSTAT, and the official documents of the Montenegrin Government. Approach encompassed examination of scholarly and professional literature to collect relevant data. We drew upon conventional scientific techniques and specific tools such as statistical indicators and composite data to delve into the dynamics of Agricultural Sector Modernization in Montenegro through the lens of Agricultural Mechanization under the auspices of the IPARD program. By harnessing the datasets afforded by the aforementioned sources, we gained access to current national-level data. This dataset laid the groundwork for our comparative scrutiny, dissecting divergent regions within Montenegro.

In the second phase of our research, the statistics collected from accessible sources underwent demanding scrutiny, employing conventional research tools such as SWOT analysis and Technological Advancements and Innovation Assessment.

This research was further enriched through interviews conducted with key stakeholders, including farmers (15 respondents in total) and policymakers (5 respondents); that are 20 respondents in total. These interviews were an opportunity for the interviewers to clarify any queries from the respondents. The respondents comprised individuals overseeing agricultural policy management, with both the European accession process and extension services. Employing a criterion-based sampling approach, subjects were accurately selected. The questionnaires presented close-ended queries. The feedback, provided in the Results section, can guide future improvements and strategies to ensure more efficient and successful collaboration in similar initiatives.

### RESULTS AND DISCUSSION

The IPARD measure of support to agriculture in Montenegro has provided numerous farmers with a diverse range of agricultural equipment aimed at enhancing farming operations and productivity. This equipment includes tractor units, trailers, balers, mowers, plows, sprayers, irrigation systems, hay collectors, and various other tools for cultivation and animal husbandry. Additionally, infrastructure development to support the delivered equipment has been included in the support. With 333 investments implemented through four public calls for support via the Ministry of Agriculture (Figure 1), IPARD II in Montenegro is expected to significantly improve agricultural activities and capabilities, thereby boosting overall productivity and efficiency.

Beneficiaries from all municipalities were supported, except for the municipalities of Budva and Tivat. According to the number of sub-regions, the largest number of users is from Bijelo Polje, followed by Nikšić, Pljevlja and Podgorica; and the least from the coastal municipalities: Herceg Novi and Kotor. The territory of Gornje Polimlje, which is a distinctly agricultural area, was insufficiently supported, considering the production capacities and needs for agricultural machinery. The total amount of investment (including VAT, EUR) by municipality, IPARD II in Montenegro is presented in Figure 2.

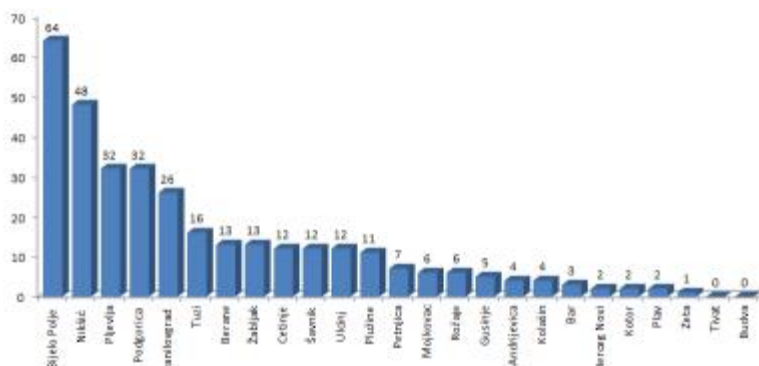


Fig. 1 Number of investments per municipality, IPARD II, Montenegro.

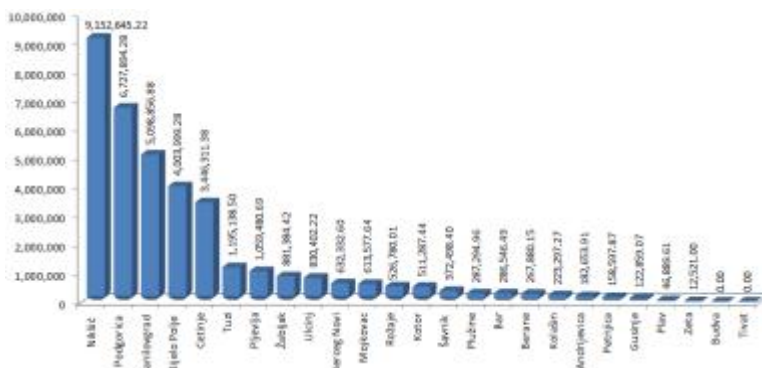


Fig. 2. Investment (including VAT, EUR) by municipality, IPARD II, Montenegro.

Table 1. Support in funding per Municipality.

Municipalities	Area in km <sup>2</sup>	Population in 2023	Population / km <sup>2</sup> 2023	Support in (EUR)
Andrijevica	340	4532	13	182,653.91
Bar	505	44057	87	286,546.49
Berane	496	26393	53	267,880.15
Bijelo Polje	924	41642	45	4,003,999.28
Budva	122	22387	184	-
Cetinje	910	15046	17	3,446,311.38
Danilovgrad	501	18287	37	5,098,856.88
Gusinje	157	3995	25	122,859.07
Herceg Novi	235	30480	130	632,332.60
Kolašin	898	7132	8	223,297.27
Kotor	335	22793	68	511,287.44
Mojkovac	367	7415	20	613,577.64
Nikšić	2065	68736	33	9,152,645.22
Petnjica	173	5245	30	158,597.87
Plav	329	8287	25	46,889.61
Pljevlja	1346	26556	20	1,059,480.69
Plužine	854	2551	3	287,294.96
Podgorica	1441	190488	132	6,727,894.28
Rožaje	415	22982	55	526,780.01
Šavnik	555	1527	3	372,498.40
Tuzi	46	15205	331	1,195,138.50
Tivat	246	12389	50	-
Ulcinj	255	20128	79	830,402.22
Žabljak	445	3053	7	881,384.42
Zeta	153	16231	106	12,521.00

The total investment (including VAT, EUR) per municipality, IPARD II calls for equipment and machinery was 38,527,685 euros. The municipality of Nikšić received the most financial support (about 9 million). The municipalities of Podgorica (6.7 million), Danilovgrad (5.1 million), and Bijelo Polje (4 million) follow. Considering the relationship between the number of inhabitants and the number of investments, the most significant support was given to the municipalities

of Bijelo Polje, Cetinje, Danilovgrad, Nikši , Šavnik and Žabljak. The most significant support was provided to the municipalities of Bijelo Polje, Cetinje, Danilovgrad, Herceg Novi, Kotor, Mojkovac, Nikši , Podgorica and Žabljak. The northern region is the most rural area, with around 60% of the population living in rural areas but the structure of municipalities from the Northeastern Montenegro proportionally did not receive the support that was to be expected regarding natural conditions, and the degree of (under)development of this region, and at the same time the potential for agricultural development. The area of Zeta is traditionally an agricultural area, and the new cycles of support should not neglect this area.

In Table 2 we presented insights from interviews with stakeholders. Challenges included meeting eligibility criteria, communication obstacles, aligning expectations, and pre-financing requirements. Positive outcomes included reduced labour dependence and increased climate resilience. Recommendations for improvement include expanding financial participation, enhancing feedback mechanisms, and providing training. Future collaboration should consider co-financing, involving users in decision-making, transparent communication, and capacity-building initiatives. Collaboration was deemed crucial for project success, shaping future agricultural modernization efforts.

Table 2. SWOT Analysis.

<p><b>STRENGTHS:</b></p> <p><b>Comprehensive Support Package:</b> The IPARD initiative offers a wide range of agricultural machinery and equipment to Montenegrin farmers, empowering them with the tools needed to enhance their farming operations.</p> <p><b>Positive Collaborative Impact:</b> The successful collaboration between administration and beneficiaries has led to notable successes, including decreased reliance on external labour, increased climate resilience, and reduced workloads.</p> <p><b>Efficient Information Dissemination:</b> The use of precise eligibility criteria and documentation checklists has streamlined information dissemination, promoting transparency and clarity in the application process.</p> <p><b>Responsiveness and Flexibility:</b> The administration's ability to adapt and respond to challenges has been praised, contributing to the effectiveness of the collaboration.</p> <p><b>Geographical Distribution:</b> The support has reached numerous municipalities, positively impacting the majority of regions and beneficiaries, promoting widespread modernization.</p>	<p><b>WEAKNESSES:</b></p> <p><b>Eligibility Criteria Challenges:</b> The stringent eligibility criteria have posed challenges, potentially excluding potential beneficiaries who do not fully meet the criteria.</p> <p><b>Communication Barriers:</b> Communication hurdles, including postal delays, have hindered effective information exchange, leading to potential delays in project realization.</p> <p><b>Expectation Alignment Issues:</b> Misalignments between user expectations and project goals have occasionally arisen, leading to misunderstandings and potential dissatisfaction among beneficiaries.</p> <p><b>Pre-Financing Requirement:</b> Requiring beneficiaries to pre-finance their investments has created hurdles during project realization, potentially limiting the participation of certain stakeholders (although this is pre-established criterion earlier).</p>
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<p><b>OPPORTUNITIES:</b></p> <p><b>Financing Mechanism Expansion:</b> By involving more financial institutions in investment financing, the project's accessibility and reach could be expanded, ensuring more stakeholders can benefit.</p> <p><b>User Engagement Enhancement:</b> Continued accessibility to engagement personnel and the incorporation of user feedback can lead to iterative improvements and foster a sense of ownership.</p> <p><b>Training and Capacity Building:</b> Offering training sessions and initiatives to empower users in effectively utilizing the provided agricultural machinery can enhance the overall impact and sustainability of the support.</p> <p><b>Innovative Financial Approaches:</b> Exploring co-financing options instead of reimbursement could broaden the scope of project accessibility and cater to a wider range of users.</p>	<p><b>THREATS:</b></p> <p><b>Inequitable Support Distribution:</b> Some areas, such as Polimlje, have been insufficiently supported, potentially leading to uneven agricultural development across the country.</p> <p><b>Lack of User Inclusion:</b> Without incorporating user suggestions and engagement in decision-making, the projects may not fully address the needs and aspirations of the beneficiaries.</p> <p><b>Limited Financial Resources:</b> The total investment amount, while significant, may still be limited in addressing the full spectrum of agricultural modernization needs in Montenegro.</p> <p><b>Technological Learning Curve:</b> Farmers might face challenges in effectively using advanced machinery without proper training and support.</p>
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The initiative demonstrates strengths in comprehensive support, positive collaboration, efficient information dissemination, and responsiveness. However, challenges persist regarding eligibility criteria, communication barriers, and expectation alignment. Opportunities for improvement include expanding financing mechanisms, enhancing user engagement, and providing training. Meanwhile, threats such as uneven distribution, limited resources, and lack of user inclusion need to be addressed to ensure sustainable agricultural modernization in Montenegro.

### CONCLUSIONS

The IPARD measure has facilitated significant transformations in Montenegro's agricultural sector, providing essential machinery and equipment to numerous farmers. This support extends beyond equipment, encompassing infrastructure development to enhance asset utilization. Anticipated outcomes include substantial improvements in farming efficiency and productivity, aligning with modern agricultural practices. Despite challenges and regional variations, IPARD II has positively impacted municipalities like Bijelo Polje, Niksic, Pljevlja, and Podgorica. Challenges such as criteria fulfillment and communication barriers underscore the importance of effective collaboration, while positive aspects highlight the potential for transformative outcomes. Recommendations for the future include exploring financial approaches, increasing user engagement, and transparent communication to foster agricultural modernization. Lessons learned

may shape future initiatives, paving the way for sustainable growth in agricultural sector.

### REFERENCES

- Brajuskovic, M., Brajuskovic, D., Mijanovic, D. and Spalevic, V. (2018). Indicators of the Regional Differences in the Ageing Population of Montenegro. *Journal of Environmental Protection and Ecology*, 19(1): 309-318.
- EC (2008). *EU Rural Development Policy 2007–2013*. European Commission—Directorate-General for Agriculture and Rural Development. Office for Official Publications of the European Communities: Luxembourg.
- Mijanovic, D., Brajuskovic, M., Vujacic, D. and Spalevic, V. (2017). Causes and Effects of Aging of Montenegrin Population. *Journal of Environmental Protection and Ecology*, 18(3): 1249-1259.
- Pejanovic, R., Przulj, N., Spalevic, V., Zejak, D., Markoska V., Tafiloska, P. (2020). *Poljoprivreda i zelena ekonomija*. Centar za razvoj agrara. Bijelo Polje, Crna Gora.
- Pittaway, M. (2004). *Eastern Europe 1939–2000*. Arnold: London, UK.
- Skataric, G., Spalevic, V., Popovic, S., Perošević, N., Novicevic, R. (2021). The Vernacular and Rural Houses of Agrarian Areas in the Zeta Region, Montenegro. *Agriculture*, 11, 717.  
<https://doi.org/10.3390/agriculture11080717>