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ANALYZING THE IMPACT OF TAX MECHANISMS FOR STIMULATING INNOVATION IN THE AGRICULTURAL SECTOR ON ATTRACTING INVESTORS

АНАЛІЗ ВПЛИВУ ПОДАТКОВИХ МЕХАНІЗМІВ СТИМУЛЮВАННЯ ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ В АГРАРНІЙ СФЕРІ НА ЗАЛУЧЕННЯ ІНВЕТОРІВ

This article examines the role of tax mechanisms in stimulating innovation within the agricultural sector and their impact on attracting investors. Tax incentives, such as reduced rates for research and development (R&D) and depreciation allowances, are critical for encouraging investment in innovative practices. Results indicate that favorable tax policies enhance the financial viability of innovative projects and significantly increase investor confidence. By aligning tax incentives with innovation initiatives, agricultural enterprises can create a more appealing investment climate, promoting the adoption of advanced technologies and sustainable practices while strengthening competitiveness in a dynamic market. Leveraging tax mechanisms effectively enables agricultural businesses to attract domestic and foreign investors, ensuring long-term viability and resilience amid evolving challenges.

Keywords: innovation, agricultural businesses, tax mechanism, investors attraction, tax incentives, tax policy, depreciation allowance.

У статті розглядається важливість податкових механізмів у стимулюванні інноваційної діяльності в аграрному секторі та їхній вплив на залучення інвесторів. Аграрний сектор, як один з ключових елементів економіки України, стикається з численними викликами, зокрема, недостатнім фінансуванням, низьким рівнем інвестицій та необхідністю впровадження нових технологій. Податкові стимули можуть стати ефективним інструментом для підвищення інвестиційної привабливості аграрних підприємств. Стаття аналізує різні типи податкових механізмів, що використовуються в Україні та деяких світових країнах (із акцентом на країнах ЄС), такі як податкові кредити на дослідження і розробки (R&D), пільгові ставки

податку на прибуток, відшкодування та зменшені ставки ПДВ для окремих товарів, звільнення від податку на приріст капіталу, податкові пільги для зеленого сільського господарства, прискорена амортизація. Зокрема, акцентується увага на тому, як ці механізми можуть сприяти підвищенню конкурентоспроможності аграрних підприємств, їх екологічної орієнтованості і стимулювати впровадження інновацій. Дослідження базується на аналізі існуючих доробок та звітів, а також на даних про ефективність податкових режимів в аграрному секторі. Результати свідчать про те, що країни з розвиненими системами податкових стимулів демонструють вищий рівень інвестицій у сільське господарство та інновації. Однак в Україні існують певні недоліки в реалізації податкових механізмів, які потребують вдосконалення. Крім того, стаття пропонує рекомендації для державних органів щодо оптимізації податкової політики з метою створення сприятливого інвестиційного клімату в аграрному секторі. Основна мета статті полягає у формуванні цілісного уявлення про роль податкових механізмів у стимулюванні інновацій та залученні інвесторів, а також у визначенні напрямків для подальших досліджень у цій сфері. Таким чином, результати дослідження можуть бути корисними для науковців, аграрних підприємств і державних службовців, які займаються питаннями аграрної політики та економічного розвитку України.

Ключові слова: інновації, аграрний бізнес, податковий механізм, залучення інвесторів, податкові пільги, податкова політика, амортизаційні відрахування.

Problem statement. The agricultural sector faces numerous challenges in adopting innovative practices due to limited financial resources and insufficient investment. Understanding how tax mechanisms can stimulate innovation and attract investors is crucial for enhancing competitiveness and sustainability. We need to consider the best practices in tax concessions and tax mechanisms functioning to implement the most efficient and relevant policies in the Ukrainian context.

Analysis of recent research and publications. The theoretical and practical aspects of taxation in agriculture have been extensively explored by numerous experts. Notable contributions include the works of M. Boehlje (1982), who examined the implications of tax policy on agricultural productivity [1]; R. Durst (2001), who focused on the relationship between tax incentives and investment decisions [2]; and L. Ebrill (2011), who analyzed the efficiency of tax systems in promoting innovation within the sector [3]. Additionally, R. Halvorsen (1991) provided insights into the structural changes induced by taxation in agriculture [4], while C. Heady (2002) discussed the broader economic impacts of agricultural taxation [5]. B. Hill (2007) contributed to the understanding of tax mechanisms and their influence on farm income variability [6], and I. Rajaraman (2005) explored the implications of tax policy on agricultural development in emerging economies [7]. Lastly, J. Savickiene (2013) highlighted the importance of aligning tax policies with agricultural sustainability goals [8]. The OECD report emphasizes that tax mechanisms can incentivize innovation by reducing taxable income through provisions for depreciation and offering preferential treatment for investments in research and development (R&D). The report also discusses how tax systems influence the behavior of farms and food companies, ultimately impacting their investment decisions. A review by CPB Netherlands Bureau for Economic Policy Analysis suggests that while R&D tax credits encourage investment, they may not always lead to significant advancements in technology development [9]. CLA emphasizes the broad definition of R&D in agriculture, which includes activities such as developing climate-resilient crops and improving farming techniques [10]. EY guide provides an overview of R&D tax incentives across various jurisdictions, detailing how these incentives encourage investment in innovation. It highlights specific benefits available to agricultural firms, including tax reductions and accelerated depreciation [11].

However, further research should be done to deepen the most effective tax mechanisms and leverages to attract investors in the agricultural sector.

Formulation of the research task. The primary goals for this article are: 1) Highlight specific tax incentives and mechanisms that have proven effective in promoting innovation in agriculture 2) Assess how different tax regimes influence investment decisions among agricultural enterprises and their capacity to adopt innovative practices. 3) Offer evidence-based recommendations for policymakers to design and implement tax policies that effectively support agricultural innovation and enhance competitiveness.

Summary of the main research material. In recent years, the agricultural sector has emerged as a vital component of economic stability and growth in both Ukraine and the European Union. As these regions face increasing challenges such as climate change, food security concerns, and the need for sustainable practices, the role of tax mechanisms in stimulating innovation within agriculture has become critically important. Tax incentives, including research and development (R&D) credits, special tax regimes, and exemptions, are designed to encourage investment in innovative technologies and practices that enhance productivity and sustainability.

In Ukraine, the current tax framework for agriculture is characterized by a mix of direct and indirect incentives aimed at fostering innovation. However, the effectiveness of these mechanisms is often hindered by bureaucratic complexities and a lack of awareness among agricultural producers. Recent studies highlight the necessity for legislative reforms to optimize the taxation system and better support innovation in the agricultural sector.

Conversely, the European Union has implemented a comprehensive Common Agricultural Policy (CAP) that provides substantial financial support to farmers through direct payments and various subsidies. CAP not only aims to stabilize farmers' incomes but also incentivizes environmentally sustainable practices through "green" payments. The EU's approach reflects a robust commitment to integrating tax mechanisms as tools for fostering innovation while addressing broader societal goals. The Common Agricultural Policy (CAP) of the European Union can be considered a tax mechanism in the broader sense, as it involves direct payments and financial support to farmers that are funded through the EU budget, which

is primarily financed by member states' contributions and customs duties (Figure 1).

In 2023, 33 of the 38 OECD countries provided tax relief for R&D expenditures, a notable increase from just 19 in 2000. Within the European Union, 23 member states offered R&D tax support in 2023, which is double the number available in 2000. According to OECD estimates regarding tax subsidy rates for R&D (Figure 2), both the average and median tax subsidies for firms investing in R&D continued to decline in 2023, following a slight decrease observed in 2022. This downward trend is also evident in the EU27 region and is consistent across all

modeled scenarios, irrespective of the size or profitability of the business. Profitable small and medium-sized enterprises (SMEs) within the OECD could anticipate an average subsidy of 18% on their R&D expenditures in 2023, which is higher than the nearly 15% subsidy expected by larger firms [16].

The most recent OECD estimates of implied marginal R&D tax subsidy rates (Figure 3) illustrate the theoretical levels of tax support (before tax) that firms with specific characteristics are entitled to in 2023 for each additional unit of R&D investment. In this year, Iceland, Portugal, and France provided the most generous R&D tax incentives for

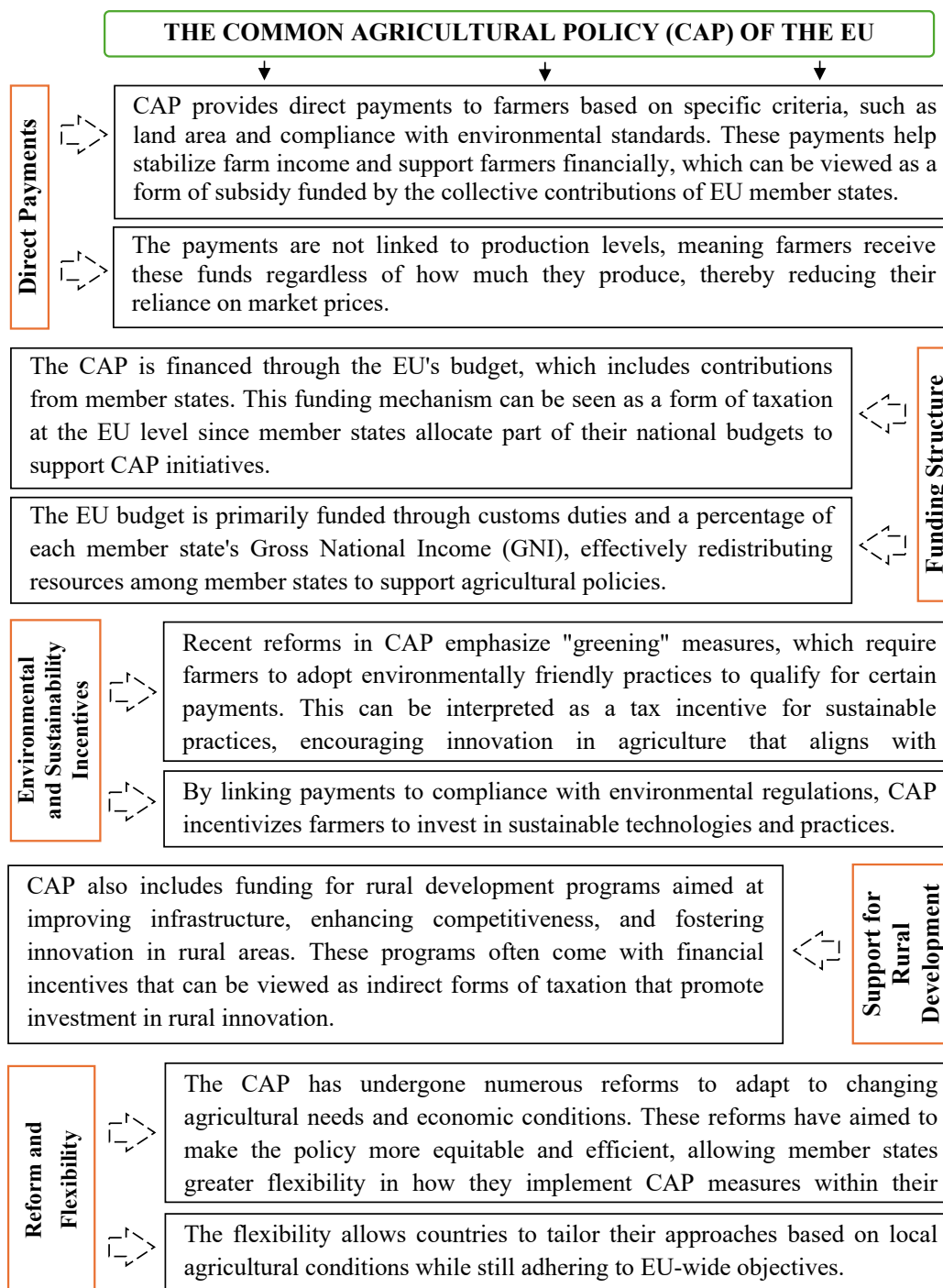


Figure 1. Overview of The Common Agricultural Policy (CAP) of the European Union

Source: compiled by the authors based on [12]

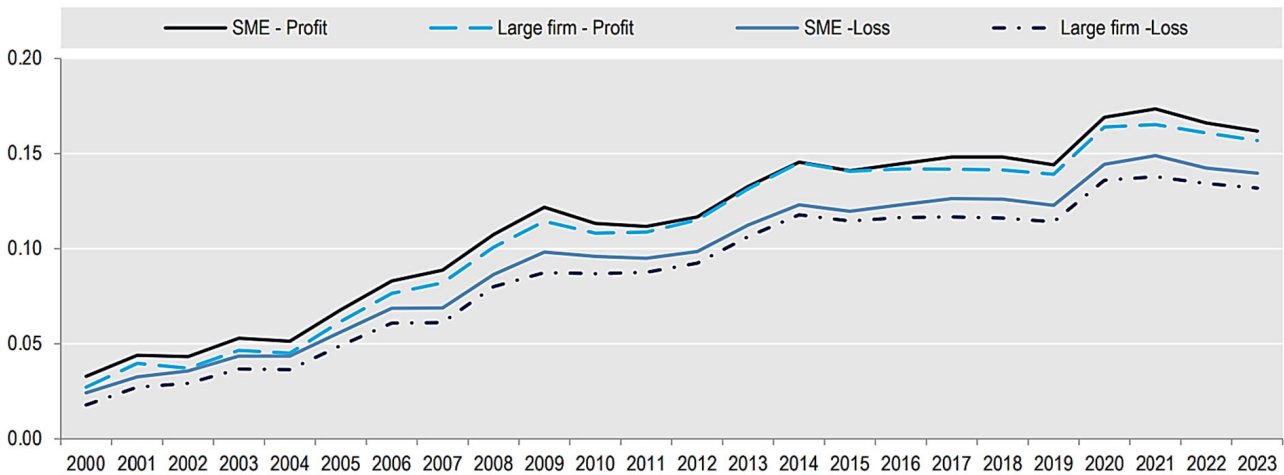


Figure 2. Trends in tax subsidy rates on R&D expenditures in the EU-27 in 2000-2023, 1 minus B-Index (unweighted averages)

Source: [16]

small and medium-sized enterprises (SMEs), regardless of their profitability. For large firms, whether profitable or operating at a loss, the highest R&D tax subsidy rates were found in Portugal, France, and Poland. This indicates a strong commitment from these countries to R&D through favorable tax policies aimed at enhancing innovation across various business sizes [16].

The trends regarding tax support for R&D in the EU27 closely mirror those observed in the OECD area (Figure 4). The recovery of business R&D spending in 2021 led to renewed growth in tax expenditures related to R&D relief, while direct funding continued to increase, albeit at a slower rate than in 2020, and did not decline in real terms as it did within the OECD. From a long-term perspective, total government support for business R&D in the OECD area rose by 50%, increasing from 0.14% of GDP in 2000 to 0.21% in 2021. This growth was primarily driven by a consistent rise in tax support for R&D, which surpassed direct funding starting in 2016. In the EU27, total support for business R&D nearly doubled during this

period, climbing from 0.10% of GDP to 0.19% in 2021, with R&D tax incentives overtaking direct funding as early as 2015 [16].

Business Enterprise Expenditure on Research and Development (BERD) is a critical metric used to assess the level of research and development (R&D) activities conducted by businesses within a specific timeframe. This measure is particularly significant for understanding the contributions of the business sector to overall innovation and economic growth. BERD represents the intramural R&D expenditures incurred by businesses, regardless of the funding sources. It is a component of Gross Domestic Expenditure on R&D (GERD) and focuses solely on the R&D performed within the business sector. This includes all R&D activities, whether funded internally by the business or externally by other entities such as government or higher education institutions [17].

Tax incentives for research and development (R&D) are increasingly recognized as a vital component of business support policies in OECD and EU countries (Figure 5).

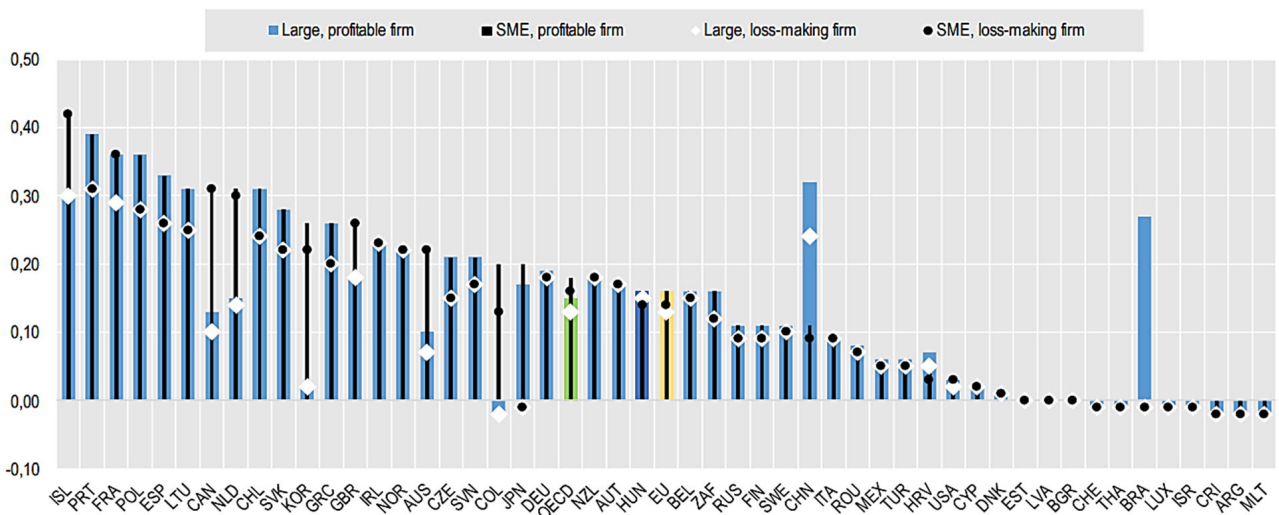


Figure 3. Tax subsidy rates on R&D expenditures in 2023, 1 minus B-Index, by firm size and profit scenario

Source: [16]

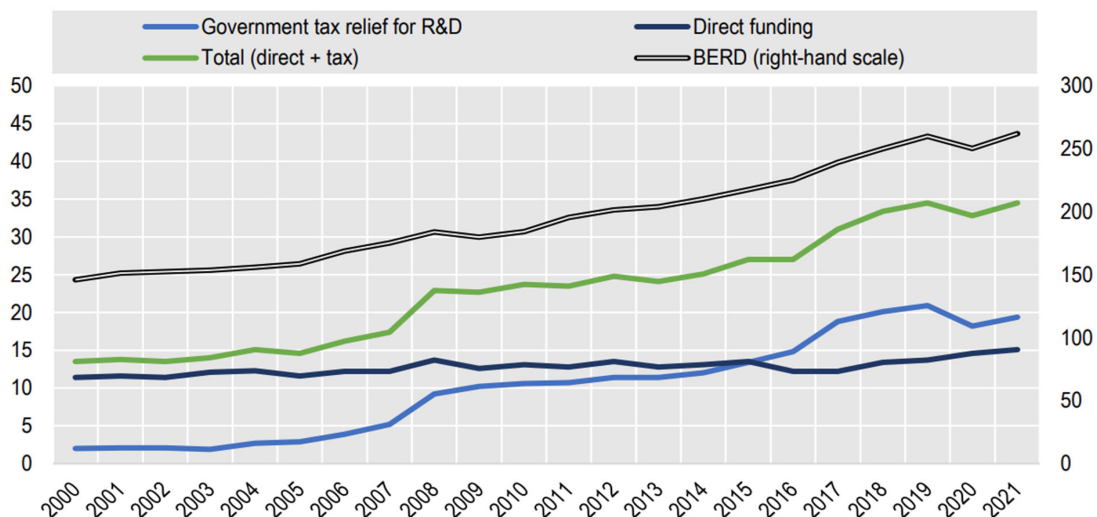


Figure 4. Trends in government financial support for business R&D in the EU, 2000-2021, constant-price (2015) USD PPP billion

Source: [16]

In 2021, these incentives accounted for approximately 55% of total government support for business R&D, reflecting their dominant role in the policy landscape. Notably, over half of the public support for R&D in three out of five OECD nations was delivered through tax relief mechanisms. The countries with the highest R&D tax relief as a percentage of GDP included Iceland, the United Kingdom, and France, followed closely by Portugal and Belgium. When combining direct and tax support, the UK, Iceland, and France provided the most substantial financial backing for business R&D relative to GDP in 2021, indicating a strong commitment to fostering innovation through fiscal measures [16].

Based on the comprehensive analysis of the OECD Reports regarding tax mechanisms applied for R&D (Table 1), we may conclude the following [13-14]:

Prevalence of Tax Incentives. As of 2021, 33 out of 38 OECD countries offered preferential tax treatment for business R&D expenditures, with tax incentives accounting for about 55% of total government support across the OECD area.

Impact on Small Firms. Research indicates that small firms are more responsive to R&D tax incentives compared to larger companies, making these measures particularly effective in stimulating innovation among SMEs.

Trends Over Time. The aggregate level of government tax relief for R&D expenditure has increased significantly over the past two decades, indicating a growing reliance on these incentives to foster innovation.

Design Features Influence Effectiveness. The effectiveness of tax incentives varies based on their design

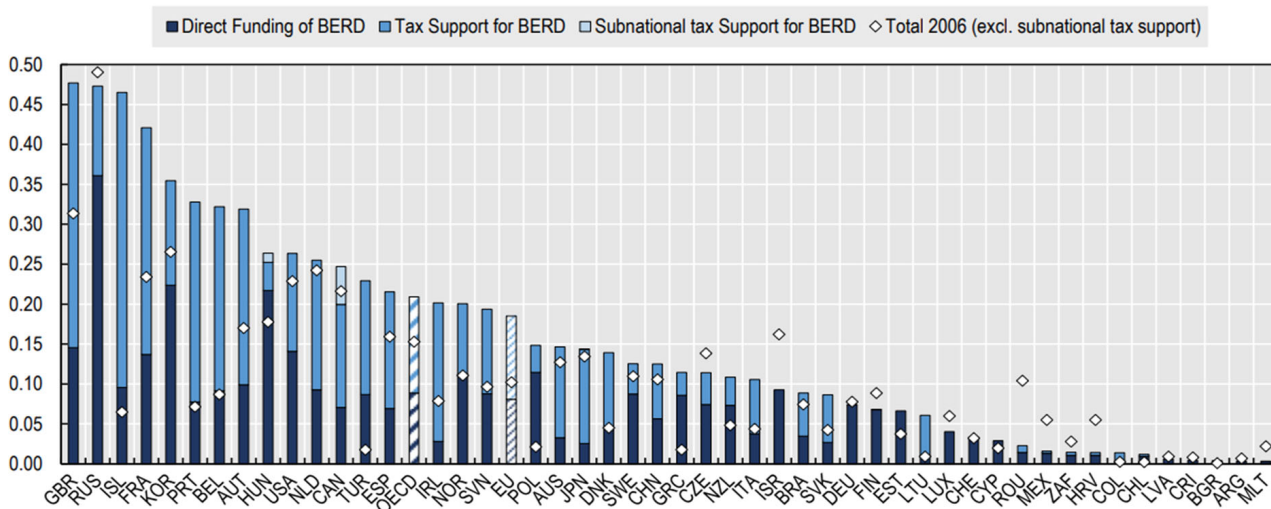


Figure 5. Direct government funding and government tax support for business R&D, 2021 and 2006, percentage of GDP

Source: [16]

Table 1

Tax Mechanisms for Stimulating Innovation in the Agricultural Sector, 2023

Country / Incentive		Description
Ukraine	R&D Tax Credit	Agricultural companies can benefit from tax credits for R&D activities aimed at improving productivity and sustainability.
	Single Agricultural Tax (SAT)	A simplified tax regime that allows farmers to pay a fixed tax based on land value instead of income tax. This reduces the overall tax burden and encourages investment in innovation.
	VAT Exemption	Certain agricultural products are exempt from VAT, which lowers costs and encourages farmers to invest in new technologies.
	Investment Incentives	The Law on State Support for Investment Projects provides incentives for large-scale projects that create jobs and engage in R&D.
EU	Common Agricultural Policy Payments	Direct payments to farmers that provide financial support to enhance productivity and sustainability across member states.
	Green Direct Payments	Additional payments linked to environmentally friendly farming practices within EU member states.
USA	R&D Tax Credit	Federal tax credits available for expenses related to agricultural research and development.
	Section 179 Expensing:	Allows farmers to deduct the full purchase price of qualifying equipment in the year it is bought, incentivizing investment.
	Grants and Subsidies	Various federal programs provide grants for innovative agricultural practices and technologies.
China	Agricultural Subsidies	Government subsidies that include tax reductions for environmentally friendly farming practices.
	VAT Refunds	Refunds on VAT paid for agricultural inputs and equipment help reduce costs for farmers.
	Tax Incentives for High-Tech Agriculture	Special incentives are provided for companies engaged in high-tech agricultural production.
Australia	R&D Tax Incentive	A refundable tax offset available for eligible R&D activities undertaken by agricultural businesses.
	Landcare Management Grants	Grants aimed at promoting sustainable land management practices among farmers.
UK	R&D Tax Relief	Provides significant tax relief for companies investing in R&D activities within agriculture, encouraging innovation.
	Small Business Rate Relief	Reduces business rates for small agricultural enterprises, allowing them to reinvest savings into innovation.
	Capital Allowances	Farmers can claim capital allowances on certain investments, providing immediate tax relief.

Source: compiled by the authors based on [13-14]

features, such as eligibility criteria, types of expenditures covered, and provisions for loss-making firms.

Complementarity with Direct Funding. Tax incentives are particularly effective in encouraging experimental development, whereas direct funding is more impactful for basic research

On the other hand, OECD publication on taxation in agriculture [15] mentions Income Tax Concessions, VAT Exemptions and Capital Gains Tax Relief as key the tools of tax mechanisms designed to stimulate innovation. Many countries offer income tax relief to farmers and agricultural businesses, allowing them to retain more earnings for reinvestment in innovative technologies and sustainable practices. Exemptions from VAT on agricultural products reduce the costs for producers, making it easier for them to invest in new methods or technologies that enhance productivity. Some countries provide relief on capital gains taxes for the sale of agricultural assets, incentivizing reinvestment into modern farming practices or innovative technologies.

Conclusions. Effective tax policies can drive investment in new technologies, boost productivity, and encourage sustainability in agriculture. Nonetheless, challenges persist regarding the fair distribution of benefits from these policies, especially for smallholder farmers. Recent trends show a growing alignment between tax incentives and sustainability goals. By incentivizing environmentally friendly practices through fiscal measures, governments can attract investors focused on sustainable agriculture. To maintain their effectiveness, regular evaluations of tax policies are crucial. Policymakers need to assess the impact of these incentives on investment levels and make necessary adjustments to adapt to evolving economic conditions and agricultural challenges. Additionally, combining tax incentives with other support mechanisms, such as grants and technical assistance, can amplify their effectiveness in attracting investment and fostering innovation within the agricultural sector. Future research should aim to refine tax mechanisms to ensure they not only promote innovation but also address equity concerns effectively.

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