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EU Accession and Sustainability Challenges for Ukraine's Agricultural Sector

Recently the EU opened accession negotiations for Ukraine. Apart from the trade benefits of having access to a large and wealthy EU market, Ukraine's agricultural producers in particular, will have to comply with and implement a complex and demanding EU acquis in agriculture. Together with the Common Agricultural Policy this includes regulation of markets and standards in farming practices, animal and plant health, food safety, and environmental and animal welfare. The potential additional compliance costs from EU accession may undercut Ukraine's agricultural competitiveness and supplies growth, crucial for feeding a growing population. However, in this policy brief, we show that these costs are not critical and that there is a potential for agricultural producers to simultaneously increase their output and contract harmful environmental impact, which in turn can compensate for the additional compliance costs.

Introduction

The European Council granted Ukraine candidate status in June 2022 and eventually opened accession negotiations in December 2023. For the Ukrainian agricultural sector, an EU membership would bring trade benefits from having access to a large and wealthy EU market. At the same time, Ukraine would have to comply with a complex and demanding EU Acquis in agriculture (hereafter called EU agricultural acquis). This, together with the EU Common Agricultural Policy (CAP), includes regulation of markets and standards in the areas of farming practices, animal and plant health, food safety, and environmental and animal welfare (Nivievskyi, 2024).

Complying with these regulations would entail additional costs for agricultural producers, raising concerns about the comparative advantage of Ukrainian agriculture. If these effects are strong enough, they could, in turn, hamper Ukraine's agricultural supplies growth, crucial for feeding a growing global population.

While the evidence on the expected compliance costs is very scarce (see e.g. EU Commission, 2014), it shows they would be in the range of up to an additional 10 percent of the total costs. This cost increase, however, does not seem to ruin Ukraine's comparative advantage in agriculture. Moreover, in this policy brief, we demonstrate that producers of grains and oilseeds in Ukraine have the potential to improve their efficiency by increasing their output by almost 20 percent and simultaneously contracting harmful environmental impacts by 16 percent. Such improvements can compensate for additional EU agricultural acquis compliance costs for Ukraine's agricultural producers.

Relevance

Ukraine's agricultural sector plays a key role domestically and internationally. It is noticeably dominated by crops, mainly by highly competitive grains and oilseeds. Agriculture alone accounts for about 10 percent of Ukraine's GDP, but together with upstream (e.g. agricultural machinery) and downstream (e.g. food processing) industries, the entire agri-food sector's share amounts to roughly 20 percent of GDP. The agri-food sector accounted for 60 percent of Ukraine's total exports in 2023 with Ukraine's shares in global corn and wheat trade reaching almost 20 and 10 percent, respectively.

At the same time, agriculture is among the top five sectors of the Ukrainian economy contributing to Nitruos Oxide (N2O) emissions in the country (SSSU, 2018). Since it generates not only desirable outputs but also environmentally undesirable ones (such as GHG emissions, pollution from applied chemical fertilizers and pesticides etc.), the negative outputs should be both considered in the assessment of the sector's performance.

The existing empirical literature places the main focus on the economic aspects of the agricultural sector's performance in Ukraine, more specifically on technical efficiency and total factor productivity. A recently published study (Halytsia, Vrachioli, Nivievskyi, Sauer, 2024) we undertake the first attempt to incorporate undesirable outputs of agricultural production in the analysis of Ukrainian agricultural producers' efficiency and provide empirical evidence on how they perform from a combined economic and environmental perspective. This policy brief summarizes the study's results.

Data and Methodology

To estimate the environmentally adjusted efficiency of crop producers, we use farm-level accounting data from 2017-2019, collected by the State Statistics Service of Ukraine. The analysis is conducted for cereals (including wheat, barley, maize and others) and sunflower production since they are the major crops in terms of sowing land and output shares and given their importance for Ukrainian agricultural export.

To account for both desirable and undesirable outputs of crop production (environmental bads

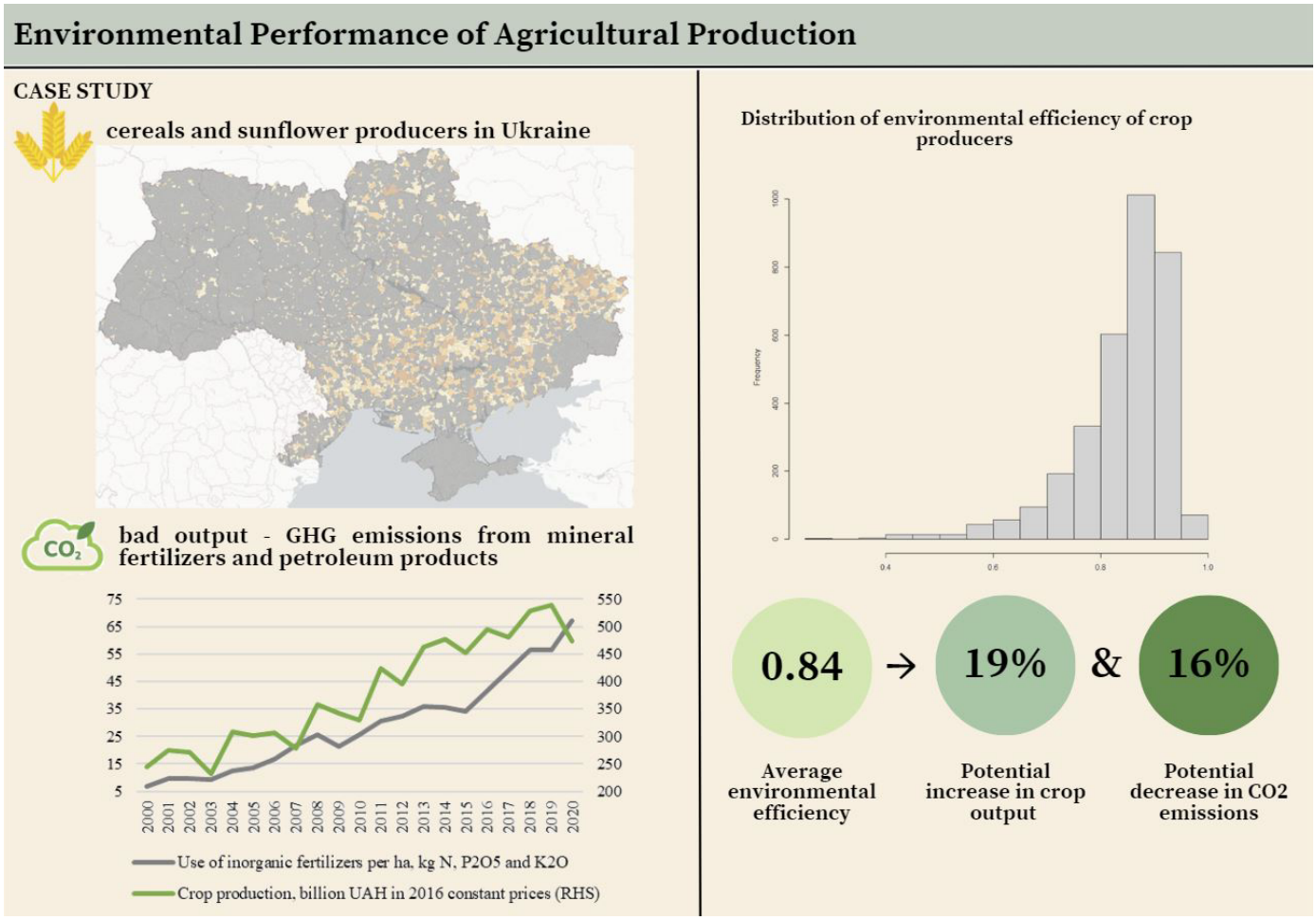
in our study are N2O emissions originating from the usage of mineral fertilizers and CO2 emissions from fuels' consumption), the production technology is formalized in the form of a hyperbolic distance function. This gives the maximum linear expansion of a desirable output vector and contraction of an undesirable output vector for a given input vector. Parametric estimation (deploying a so-called stochastic frontier model) of the distance function yielded hyperbolic efficiency estimates that reflect the producers' ability to expand good outputs and simultaneously contract environmentally undesirable ones to achieve maximum environmentally adjusted economic efficiency.

Empirical Results

The results from the econometric analysis reveal that the average environmentally adjusted economic efficiency estimate for crop producers in Ukraine is 0.84 (efficiency estimates are bounded between 0 and 1). This suggests that, on average, producers of cereals and sunflowers in Ukraine can improve their production results by increasing crop output by 19 percent (1/0.84 = 1.19) while simultaneously contracting undesirable output by 16 percent (1–0.84 = 0.16) in order to be fully efficient, i.e. have their output level on the frontier of the production technology (Figure 1).

The obtained environmentally adjusted economic efficiency level is fairly comparable to the efficiency values estimated in empirical studies for crop producers in other Eastern European countries, more specifically Poland (Gołaś et al, 2020; Stępień et al., 2021).

Figure 1. Graphic synthesis of the study's findings



Source: Authors' presentation.

Policy Implications and Recommendations

Performance Improvement

The results from the empirical analysis show that there is room for Ukrainian crop farmers to improve their environmental and economic performance. The following policy interventions can be helpful in facilitating this improvement:

- establishing clear standards for the quality of chemical fertilizers, promoting organic ones and robust agrochemicals management and monitoring systems
- promoting the adoption of climate-smart agricultural technologies, such as, for instance, fertigation (which can be especially effective in the steppe agro-climatic zone where most Ukrainian crop production is concentrated and which is noticeably affected by changing climatic conditions)
- governmental programs for energy saving in agriculture to help reduce the amount of farm CO2 emissions.

Implementation of these measures can contribute to closing the efficiency gap, bring more sustainable agricultural production growth and help farmers compensate for the anticipated costs of EU legislation compliance regarding environment, animal welfare, and food safety. The latter, in turn, entails not only costs but also a number of benefits. Potential benefits from implementing environmental regulations are, for instance, input savings (e.g. in fertilizer or pesticide costs), additional revenues (higher prices and increased consumer demand for agricultural products produced sustainably) and extension programs financed through public funds (Mettepenningen et al., 2009).

Data Collection Improvement

Key limitations of this study stem largely from issues related to data availability. More specifically, there is no data available on organic fertilizer application, specification of the types of used pesticides, or details on farm characteristics (such as farm economic size, land type, environmental subsidies, etc.). These data would enable a robust and comprehensive estimation of the environmentally adjusted economic efficiency of agricultural producers, accounting for a broader range of undesirable outputs and incorporating determinants of inefficiency into the analysis.

Currently, the State Statistics Service of Ukraine's annual statistical survey forms do not contain questions which enable the collection of the above mentioned data. Enhancing farm-level data collection will be necessary to align Ukrainian statistical databases with Eurostat, given Ukraine's candidate status for EU membership.

The importance of collecting data on farms' environmental performance is supported by the ongoing transition in the EU from a farm accountancy data network to a farm sustainability data network, which aims to collect rich microeconomic data not only on farms' income and business activities but also information on their environmental and social sustainability performance.

Conclusion

Over the two decades prior to Russia's unprovoked full-scale invasion, Ukraine developed into an increasingly important global supplier of staple food.

In this policy brief, we quantify the improvement potential for the performance of crop producers in Ukraine from both economic and environmental perspectives and highlight that potential efficiency improvement could compensate for the additional EU agricultural acquis compliance costs that Ukraine's agricultural producers are expected to face upon Ukraine becoming a full EU member.

Acknowledgement

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