



Food and Agriculture
Organization of the
United Nations

UKRAINE

Impact of the war on agricultural enterprises

Findings of a nationwide survey of agricultural enterprises
with land up to 250 hectares, January–February 2023



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Executive summary

Background

The war in Ukraine, which escalated on 24 February 2022, has put in danger sowing and harvesting campaigns in most regions of the country.¹ Armed conflict, high prices and lack of access to key agricultural inputs, rising production costs, and economic disruption have a significant impact on farmers' production and incomes as well as the availability and affordability of food for consumers. Combined with the loss of consumers' incomes, these disruptions in the agrifood value chain significantly impact domestic food security.

Agricultural enterprises play a leading role in the agrifood value chain, producing more than 70 percent of the crop output in 2021.² They are officially registered independent business entities with legal status (including physical person entrepreneurs) which carry out productive agricultural activities. For the purposes of this assessment, agricultural enterprises include those cultivating up to 250 hectares of land, representing approximately 65 percent of the total number of agricultural enterprises in Ukraine, while they own and use only 7 percent of the total agricultural land.³

Objectives of assessment

Against this background, the Food and Agriculture Organization of the United Nations (FAO) has conducted a nationwide survey, targeting 1 927 agricultural enterprises (involved in crop and livestock production) in 23 oblasts, including selected rayons in Donetska, Kharkivska, Khersonska and Zaporizka oblasts that are under the control of the Government of Ukraine. Luhanska oblast (temporarily occupied) was exempted from the survey as well as the Autonomous Republic of Crimea and the city of Sevastopol (temporarily occupied).

The assessment has the following objectives:

- assess the impact of the war on crop and livestock producers, and estimate damages and losses in terms of production, assets, tools, machineries and other types of infrastructure;
- assess the impact of the war on agrifood value chains, including producers' pre-and post-production activities, as well as disruptions of producers' input and output markets; and
- estimate the needs of crop and livestock producers for the upcoming spring season, and provide recommendations for supporting their recovery and rehabilitation.

The analysis is part of a series of complementary assessments that aim at providing a comprehensive understanding of the impact of the war on Ukraine's agriculture sector (crop and livestock production and agrifood value chains). In addition, the use of this data will allow the identification of key pillars of

¹ The conflict in Ukraine, which started in 2014, escalated into a war in February 2022.

² Statistical Yearbook "Agriculture of Ukraine" for 2021.

³ The State Agrarian Register (SAR) is an automated electronic system created by the Ministry of Agrarian Policy and Food to attract and distribute all types of support to Ukrainian farmers, effectively and transparently. Over 70 percent of the agricultural enterprises included in our sample are also registered in the SAR. Eligible farmers will be able to apply for state subsidies, targeted, subsidized credit programmes as well as loans and technical assistance from international donors.

resilience that require immediate investment to enable farmers and livestock keepers to absorb and recover from shocks; and inform programming decisions and advocacy efforts.

Key highlights

- At the national level, agricultural enterprises reported a 9 percent **decrease in the size of grain and oil crops cultivated area** compared with the same period of the previous year. Agricultural enterprises along areas in the front-line are the most affected, recording nearly 20 percent decrease in the size of grains and oil crops cultivated area.
- Almost all agricultural enterprises involved in crop production (93 percent) reported an **increase in production costs**, with over two-thirds of them (81 percent) recording significant or drastic increase (more than 25 percent) since the start of the war. Similarly, around two-thirds (76 percent) of agricultural enterprises involved in livestock production reported increases in production costs, with over half of them (60 percent) recording significant or drastic increases.
- Almost 90 percent of agricultural enterprises involved in crop production reported a **decrease in revenues**, with over 70 percent of them recording a significant or drastic decrease. Agricultural enterprises involved in livestock production appeared to be less affected, however over 60 percent of them reported a decrease in revenues, including 46 percent recording a significant or drastic decrease.
- Approximately 12 percent of agricultural enterprises reported that **part of their land is potentially contaminated by unexploded ordnances**. Oblasts along the front-line appeared to be the most affected, with 32 percent of respondents reporting so.
- Almost 40 percent of all the agricultural enterprises reported to have **changed their farm operational decisions** due to the war. This percentage is higher in the areas along the front-line oblasts, with around 45 percent of them reporting so. The main adopted changes are limited use of agricultural inputs (seeds, pesticides or fertilizers); business diversification (e.g. pursued or started a new business); and change in the output markets (e.g. new buyers).
- The overall value of the **damages and losses** for agricultural enterprises is estimated at USD 3.85 billion in the crop and livestock sectors. The crop sector account for USD 2.71 billion, while the livestock sector account for approximately USD 1.13 billion. On average, these damages and losses amount to approximately USD 147 000 per agricultural enterprise, not considering the temporarily occupied territories.
- The majority of agricultural enterprises involved in **crop production** reported to have experienced **difficulties related to production and sales**. The main reported difficulties are high prices of fuel or electricity; difficulties in accessing agricultural production inputs (e.g. seeds, fertilizers and pesticides); and difficulties in accessing markets. Most of the producers experience problems with accessing agricultural inputs due to high prices, but farmers operating close to the front-line also experience the unavailability of these inputs. **In terms of greatest needs** to continue production, the provision of fertilizers, fuel and seeds, ability to access markets were the most frequently reported needs.

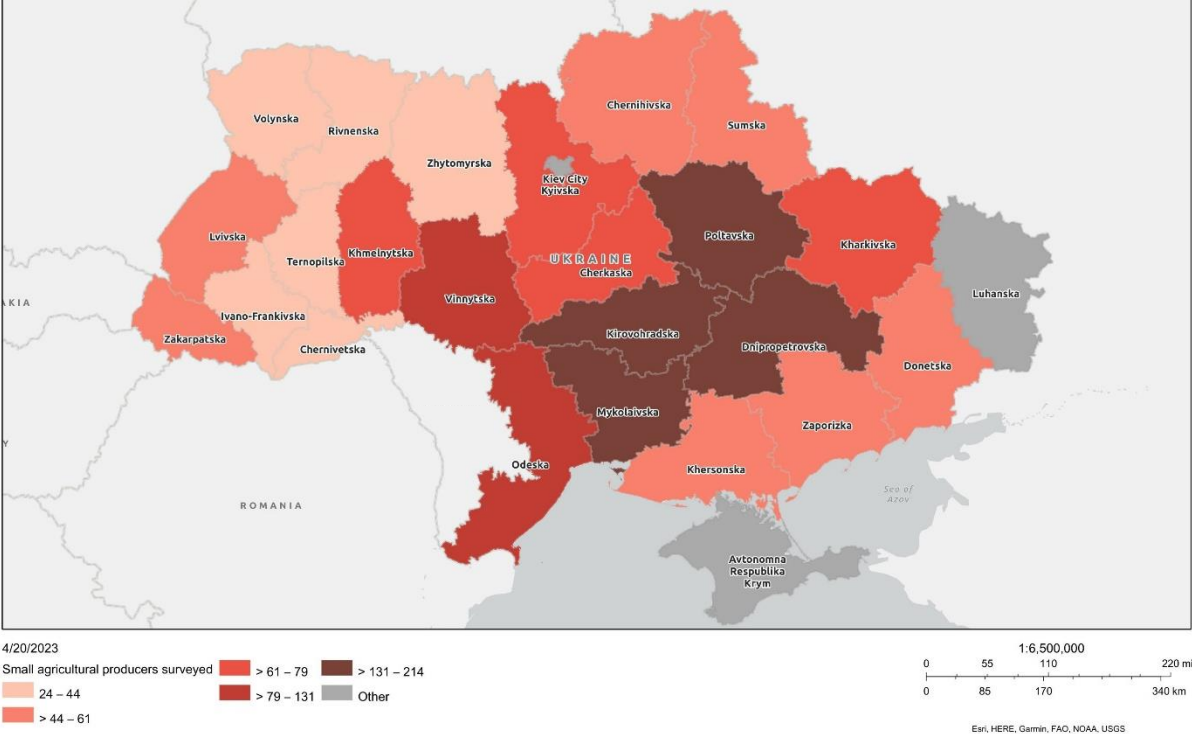
- Nearly half of the enterprises involved in **livestock production** reported to have experienced **difficulties related to production and commercialization**. The main difficulties are access to markets and buyers, access to agricultural inputs (e.g. feed, vaccines, drugs and equipment) and labour, and high prices of fuel or electricity to power agricultural equipment or even no access to electricity. In terms of **greatest needs** to continue production, the most frequently reported needs were access to fuel or electricity (reported by almost 60 percent of livestock producers), access to feed or fodder, ability to access markets (e.g. low buying prices and inability to find buyers) and restocking of animals.
- **Disruptions of the agrifood value chain** have also affected agricultural enterprises: on average, 9 percent reported an output buyer stopping operations or not being able to purchase more quantities. The buyers most affected were other farms, traders or cooperatives. In addition, the **collapse of agricultural inputs markets** (e.g. fertilizers and seeds) has been observed particularly in the oblasts along the front-line.
- Agricultural enterprises appeared to incur **additional debts** compared to the same period before the war, increasing from 6 percent in 2021 to 9 percent in 2022. It is worth noting that over 80 percent of the agricultural enterprises that incurred additional debts in 2022 did not incur additional debts in 2021.

Sociodemographic information of producers

Geographical coverage

This analysis is the result of a national assessment that comprises a target sample of 1 927 agricultural enterprises in 23 oblasts (with the exception of the occupied oblast of Luhanska). The oblasts have been grouped into clusters as follows:

- **Western oblasts:** Chernivetska, Ivano-Frankivska, Khmelnytska, Lvivska, Rivnenska, Ternopilka, Volynska and Zakarpatska.
- **Central oblasts:** Cherkaska, Kirovohradska, Kyivska, Odeska, Poltavska, Vinnytska and Zhytomyrska.
- **Front-line oblasts:** Chernihivska, Dnipropetrovska, Donetsk (only the parts controlled by the Government of Ukraine), Kharkivska (only the parts controlled by the Government of Ukraine), Khersonska (only the parts controlled by the Government of Ukraine), Mykolaivska, Sumska and Zaporizka (only the parts controlled by the Government of Ukraine).



Source: FAO. 2023. Ukraine: Impact of the war on agricultural enterprises (January–February 2023). In: *FAO Data in Emergencies Hub*. Rome. Cited 20 April 2023. <https://data-in-emergencies.fao.org>

Legal status and gender of farm managers or owners

The legal status of the surveyed farms is predominantly private farms (82 percent).⁴ Followed by private person entrepreneurs owned and operated by individuals (11 percent).⁵ According to the analysis results, most of small farms are owned or managed by males (82 percent at the national level). Kyivska, Odeska, and Zaporizka oblasts have the highest percentage of female owners (37 percent, 24 percent and 23 percent, respectively). At the national level most farmers are registered through the State Agrarian Registry service (73 percent). However, there are oblasts with low registration rates (50 percent and below) such as Kyivska, Lvivska, Zhytomyrska and Sumska oblasts. The lack of registration limits the ability of more than half of farmers in these regions from receiving support from the Government of Ukraine and/or international organizations. Among the possible reasons for the lack of registration is the low level of awareness about the State Agrarian Registry. At the national level, one in every five farmers (11 percent) interviewed does not know about the service, compared with more than 20 percent in Chernihivska, Donetsk, Lvivska, Sumska, Zaporizka and Zhytomyrska oblasts.

Specialization

The majority of producers interviewed are specialized in crops (81 percent at the national level), followed by producers engaged in crop and livestock production (mixed type producers, 10 percent), and producers specialized in livestock production (9 percent). Crop production largely consists of grains and oil crop production (e.g. maize, sunflower and wheat) and pulses (e.g. beans, chickpeas, peas and soybeans), accounting for 86 percent and 9 percent of income from crop production, respectively. Livestock producers are mainly engaged in dairy production (34 percent of income), pig farming (29 percent) and beef cattle production (19 percent).

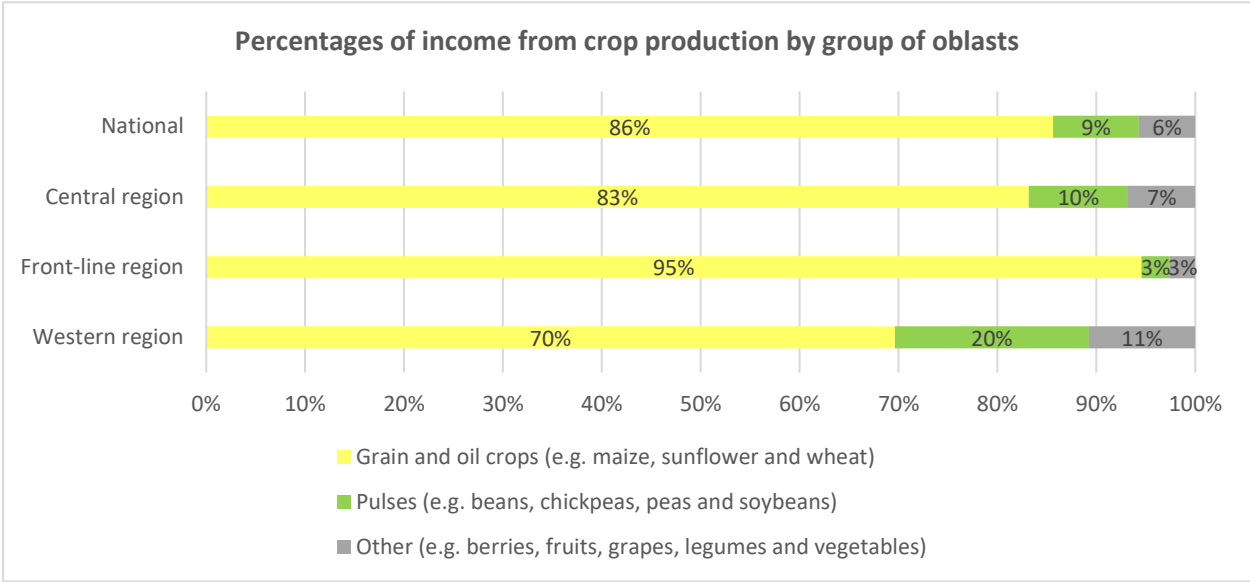
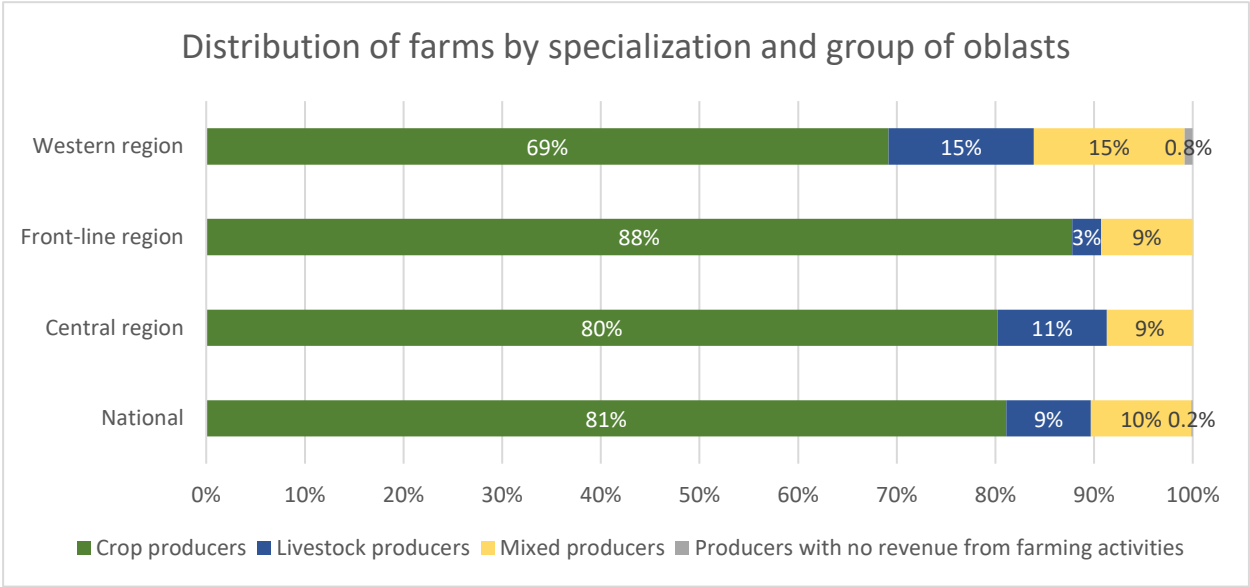
Around 88 percent of the agricultural producers in oblasts along the front-line are involved in crop production only, representing the group of oblasts with the highest specialization in the sector. Dnipropetrovska (88 percent), Donetsk (90 percent), Mykolaivska (93 percent) and Sumska (90 percent) oblasts exhibit the highest percentages of engagement in crop production. Only about 3 percent of farmers in this region are engaged in livestock production only, with a focus on dairy cattle and pig farming.

In western oblasts, 69 percent of the farmers are crop producers, and the main specialization is the production of grain and oil crops (e.g. wheat, maize and sunflower). Khmelnytska and Volynska have higher percentages of involvement in crop production compared with the average of the region (81 percent and 76 percent, respectively); whereas Chernivetska and Zakarpatska oblasts have higher percentages of involvement in livestock production (24 percent and 28 percent, respectively). In the western region, dairy cattle and pig farming remain the primary forms of livestock production.

⁴ Private enterprises are represented by farms and private agricultural enterprises. Farms can be created exclusively by citizens of Ukraine, while private agricultural enterprises are legal entities operating on the basis of private property and can be established by citizens of Ukraine, as well as foreigners, stateless persons, and legal entities.

⁵ In Ukraine, there is a subset of individual farmers known as individual private entrepreneurs. A distinct feature of private person entrepreneurs is that they could be established by individuals and members of a family and having land in cultivation of up to 20 ha.

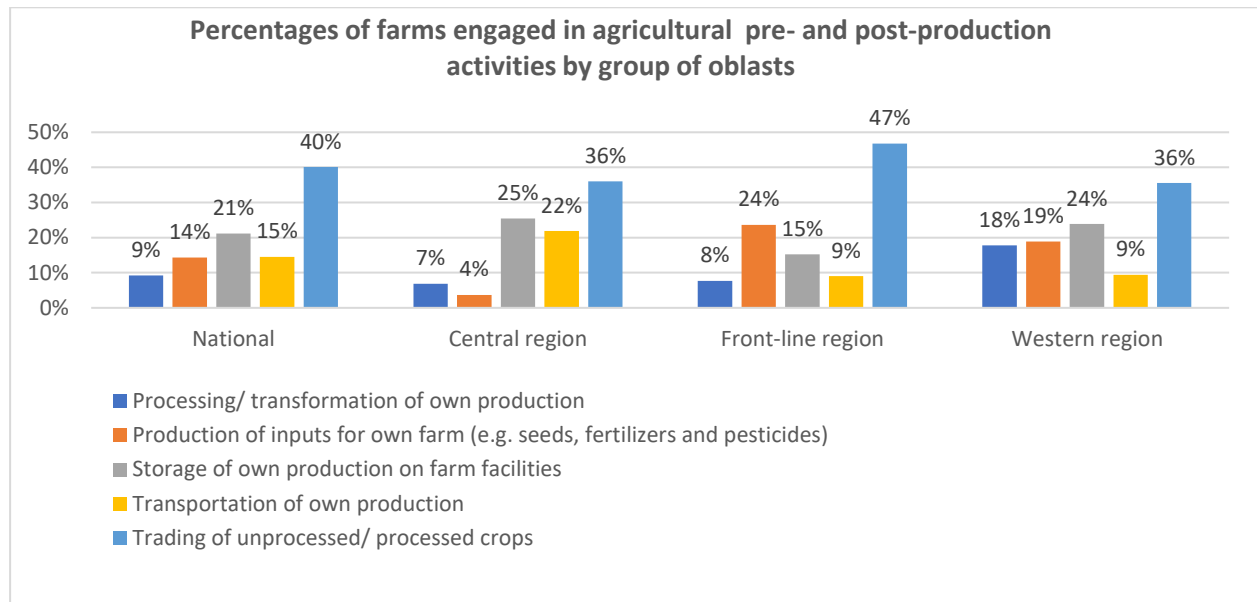
The majority of agricultural producers in central oblasts (80 percent) are involved in crop production only. Odeska and Kirovohradska have the highest share of agricultural producers specialized in crops (93 percent and 91 percent, respectively).



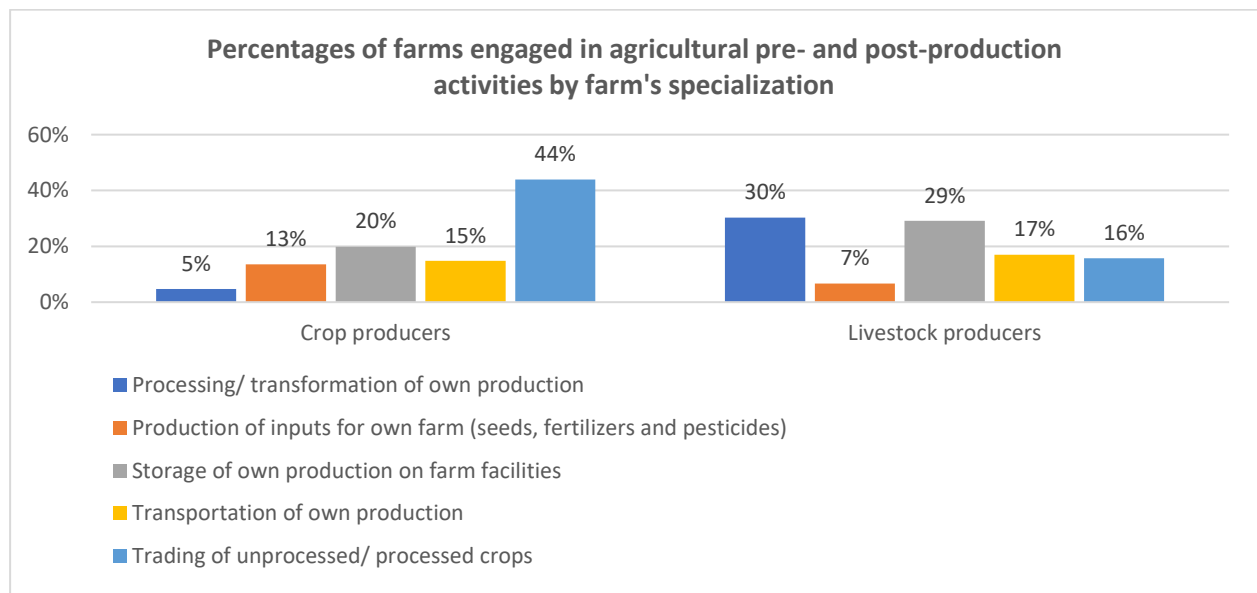
Vertical integration and service delivery

At the national level, in addition to production, small-scale agricultural producers are engaged primarily in the trading of unprocessed or processed crops (40 percent), the storage of their own production in farm facilities (21 percent), transportation of their own production (15 percent), production of inputs (e.g. fertilizers, pesticides and seeds) for their own farm (14 percent), processing or transformation of their own production (9 percent).

When disaggregating at the regions level, the pre- and post-production activities can be characterized as follows: farmers operating in central oblasts tend to specialize in the trading of unprocessed and processed crops, as well as in the transportation of agricultural products from other farms. Conversely, producers in western oblasts and along the front-line exhibit a higher proportion of activities related to the processing and transformation of their own agricultural output as well as production of seeds, fertilizers and pesticides to meet their own needs.



At the national level, small-scale livestock producers are involved more in processing or transformation of their own production as well as storage of their own production on farm facilities, while crop producers are engaged more in trading of other farms' agricultural products and less in storage of their own production on farm facilities.

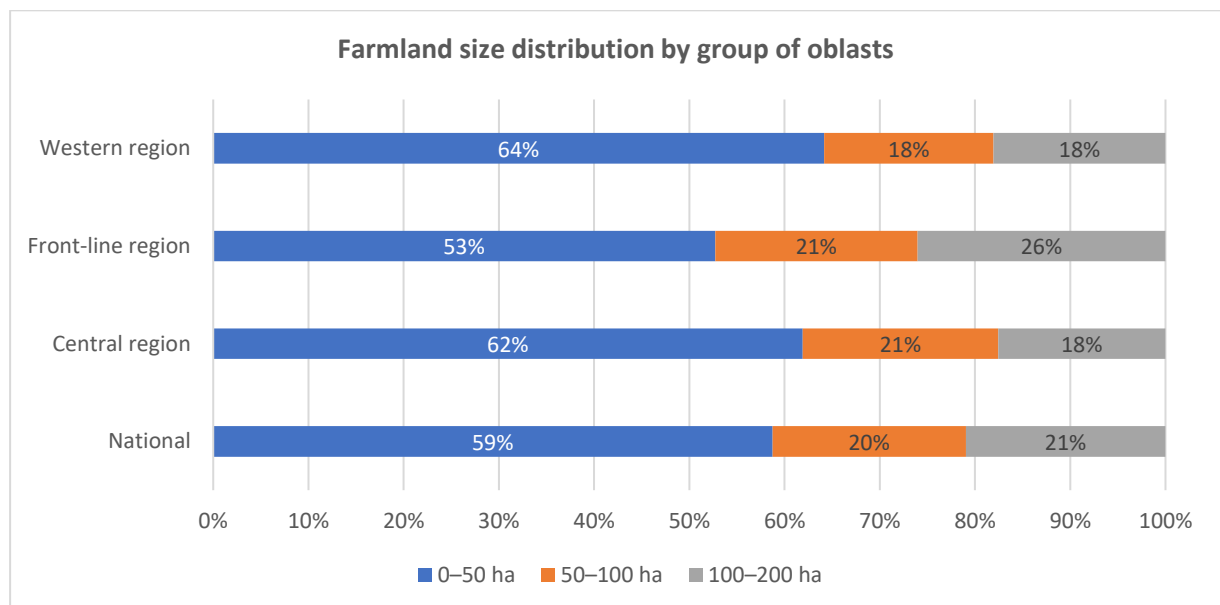


Farm size and land status

The average farmland size across the country stands at 64 ha. At the oblasts level, Dnipropetrovska, Kharkivska and Sumska display the highest average farmland sizes (86 hectares, 90 hectares and 90 hectares, respectively). In terms of distribution, the average farmland size of up to 50 hectares is the most frequent (59 percent of agricultural producers nationally).

At the national level, 45 percent of farmland is rented. Chernihivska, Chernivetska and Lvivska oblasts exhibit the highest proportion of rented farmland, with rates of 82 percent, 74 percent, and 72 percent, respectively, implying higher rental costs in these areas. Crop producers tend to use more rented land (40 percent at the national level) compared with livestock producers (32 percent).

Around 76 percent of small farms on average employ up to five workers during the main season, whereas only 6 percent have more than 20 workers. The trend is even more evident for the producers operating along the front-line, where over 86 percent of farms do not employ more than five workers during the main season. This is partially explained by the higher share of farms engaged in crop production in the region. Nationally, 82 percent of crop producers have up to 5 workers while livestock production is more labour-intensive (55 percent of respondents have more than 6 workers in the main production season). However, other possible reasons could be the labour migration associated with ongoing military operations which limits both the labour supply and farms' ability to employ more workers.



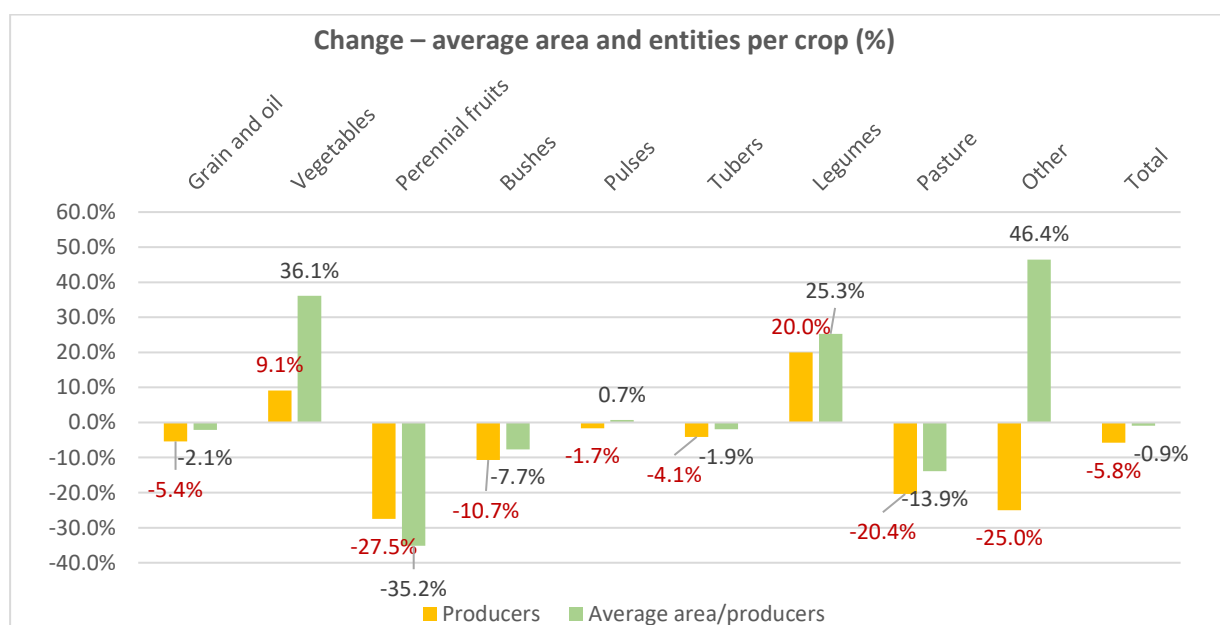
Impact of the war on agricultural production

This section provides an overview of the impact of the war on the production of agricultural enterprises in Ukraine, including national overview and regional granularity by group of oblasts (western, central, and front-line). It provides analyses of the main agricultural activities, both in terms of crops and livestock production and related sale of products, whether the production has been interrupted or reduced due to war, the increases in production costs and decreases in sale revenues, as well as the estimated damages and losses faced by the respondents.

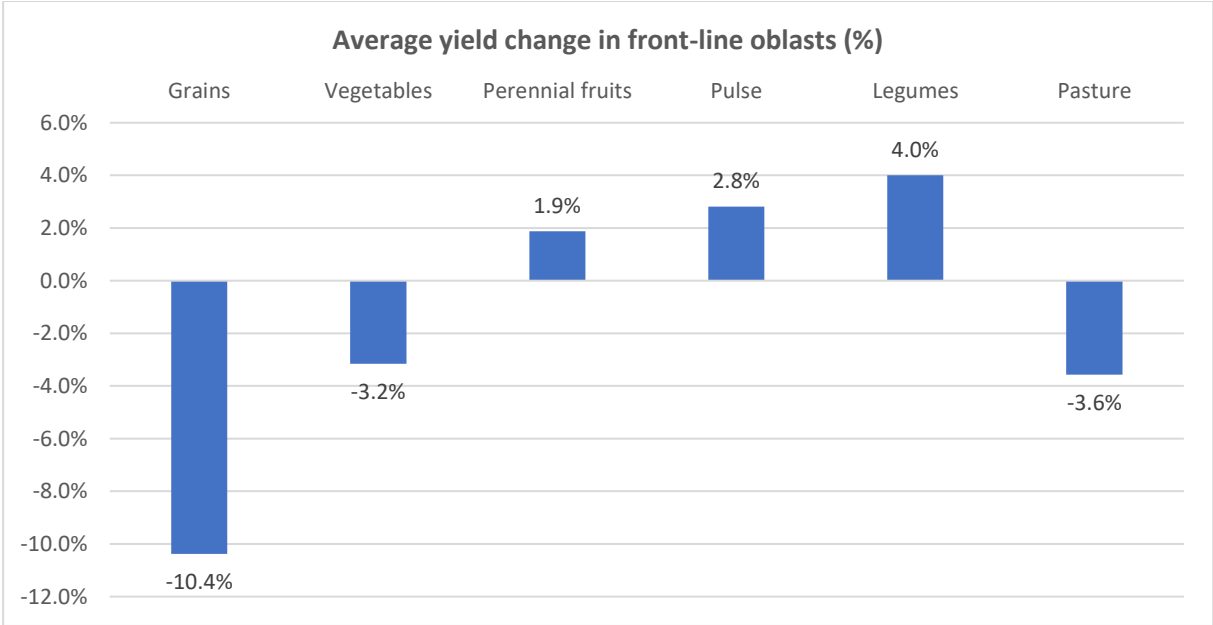
Interruption and/or reduction of agricultural production

The study showed a decrease of 7.7 percent in the total number of enterprises engaged in crop production, of which 1 percent are livestock producers ceasing their limited crop production, and 6.7 percent are agricultural enterprises completely stopping production. The majority (87 percent) of the enterprises that ceased production are in the front-line oblasts. Based on their responses, a number of factors contributed to the interruption and/or reduction of agricultural production, including farms being temporarily closed, losing control of the farmland as a result of the war, engagement of the owners in the war, death of the owners as a result of the war, and the sale of the land after the start of the war.

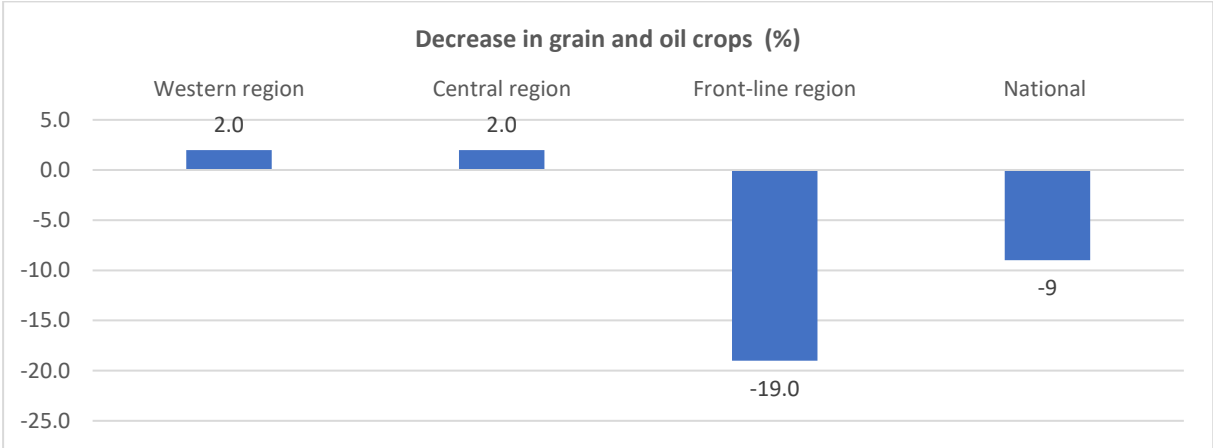
Changes in the cropping patterns are also evident along with the overall decrease in the number of producers (almost 6 percent decrease between 2021 and 2022). The increase in the number of enterprises planting vegetables and legumes can be understood as an effort to diversify production, a coping mechanism due to export and income limitations. The changes in the production of perennial crops are due to the significant shortages in labour availability and consequent abandonment of production.



Agricultural enterprises operating in areas along the front-line oblasts recorded the highest decreases in the area planted for grains and oil (over 10 percent decrease), vegetables (3.2 percent) and pasture (3.6 percent).

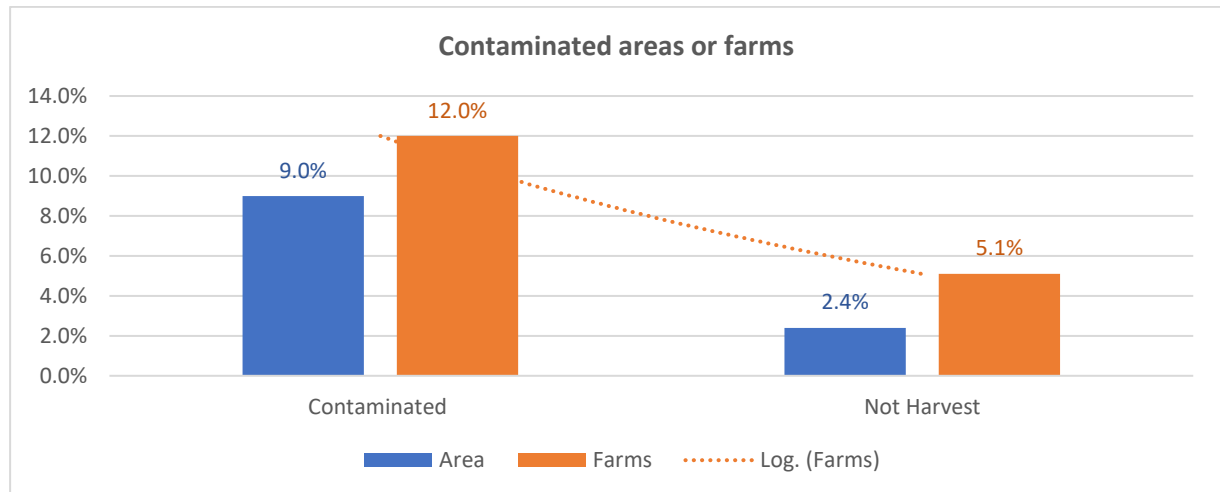


In addition, when analysing the changes in the cultivated areas between 2021 and 2022, a decrease of approximately 9 percent in grain and oil crops (e.g. wheat, maize and sunflower) at the national level was observed. The decrease is entirely attributable to agricultural enterprises in areas along the front-line oblasts, with western and central ones recording a slight increase (around 2 percent each).

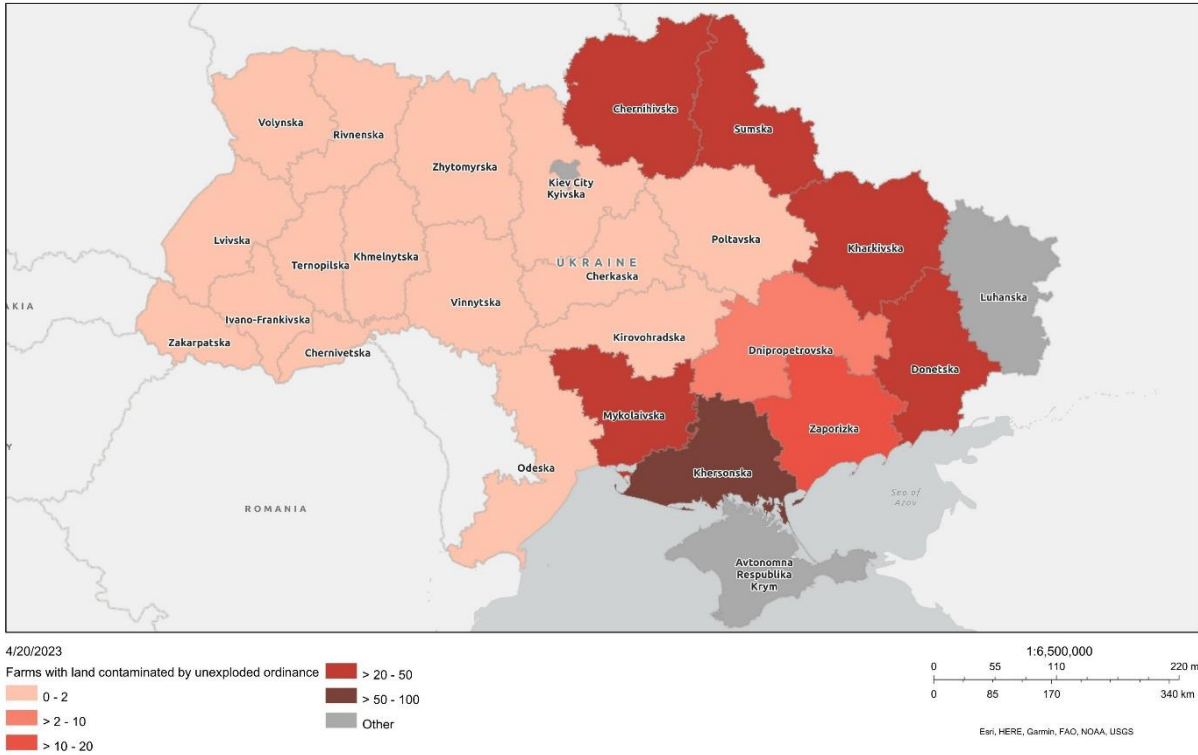


Contamination of land by unexploded ordnances

A total of 12 percent of enterprises have reported contamination of at least part of their land by unexploded ordinance, mines, bombshells, and debris accounting for approximately 9 percent of the total area cultivated, which averages at 48 hectares per farm (among those reporting contamination). Approximately 5.1 percent of farmers reported that they were not able to harvest part of the contaminated area, amounting to a total of 2.4 percent of the total cultivated land (an average of 29 hectares per affected enterprise). Moreover, approximately two-thirds of the farmers reporting inability to harvest also reported contamination of at least part of their land.



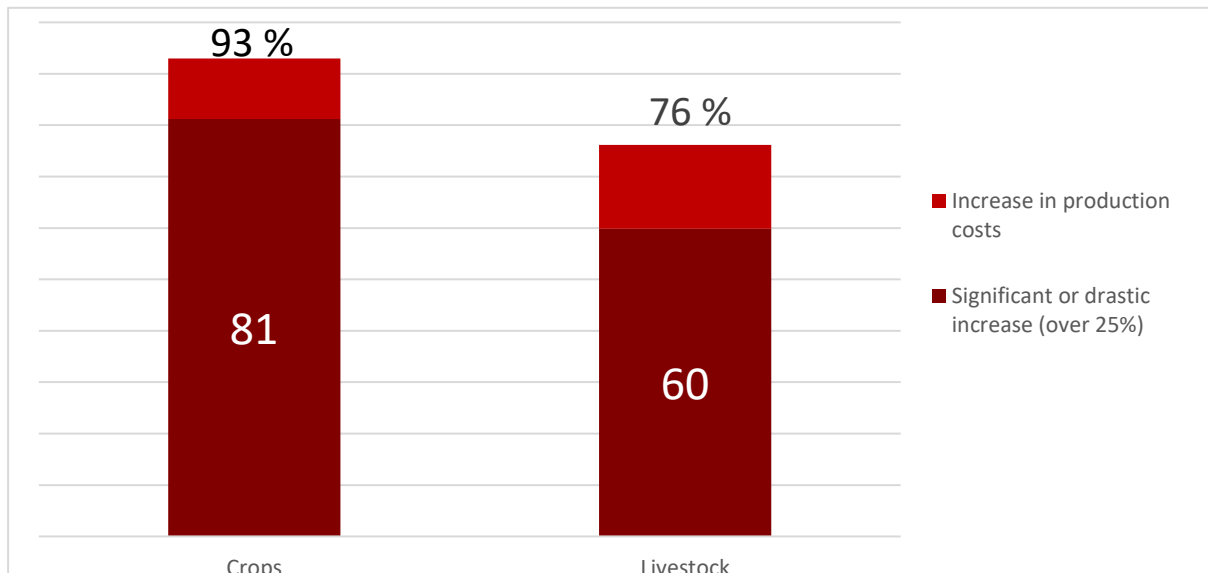
In terms of distribution of the contamination of land, 98 percent of the contaminated area has been reported in the front-line oblasts, including 80 percent of the unharvested area. Around 14 percent of the reported unharvested area is in the central oblasts and the rest is in the western oblasts. In the front-line oblasts, almost one-third (32 percent) of enterprises have reported at least some contamination with unexploded ordinance, mines and debris, accounting for approximately 22 percent of the total area cultivated. Of these affected enterprises, around 11 percent reported inability to harvest at least part of the contaminated area, amounting to 4.5 percent of the total cultivated land. Grains and oil crops account for 96.7 percent of the contaminated and unharvested area, while the remaining areas are pastures and areas cultivated with pulses. Producers affected by land contamination experienced an increase in production costs by up to 62 percent, compared with 2021. The enterprises that were not able to harvest part of the contaminated land experienced an increase of their production costs by 51.4 percent, compared with 2021.



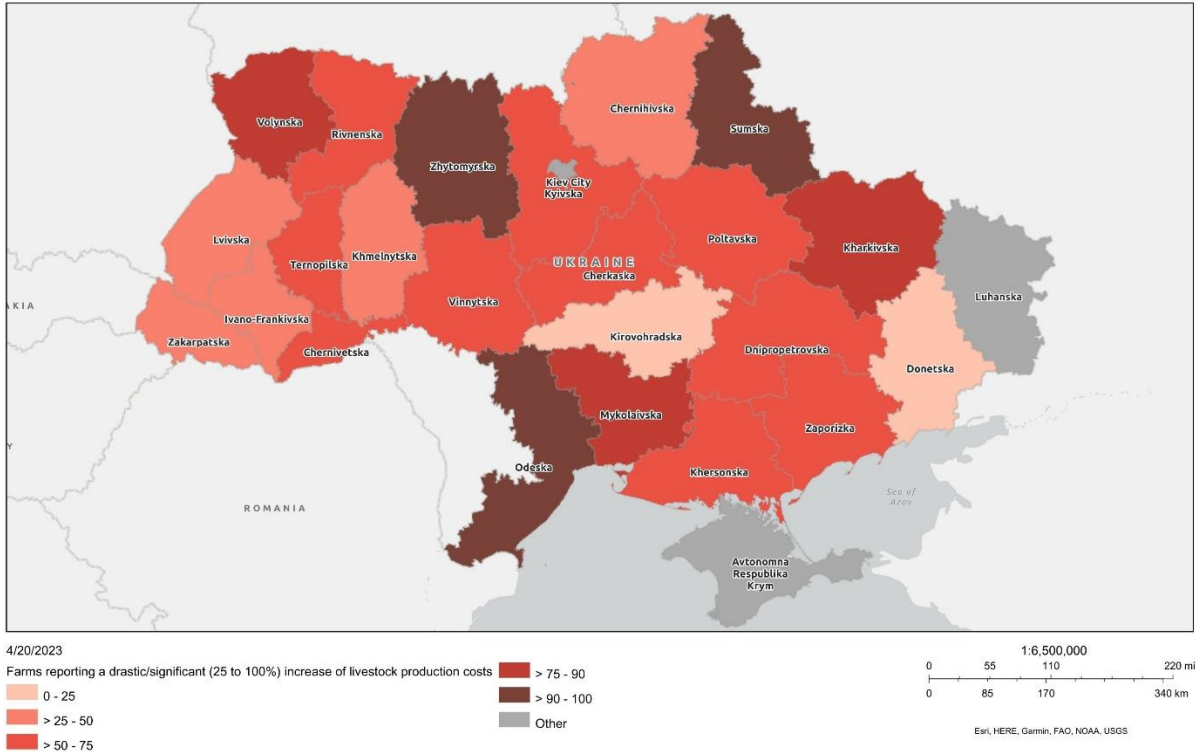
Source: FAO. 2023. Ukraine: Impact of the war on agricultural enterprises (January–February 2023). In: *FAO Data in Emergencies Hub*. Rome. Cited 20 April 2023. <https://data-in-emergencies.fao.org>

Increase in production costs

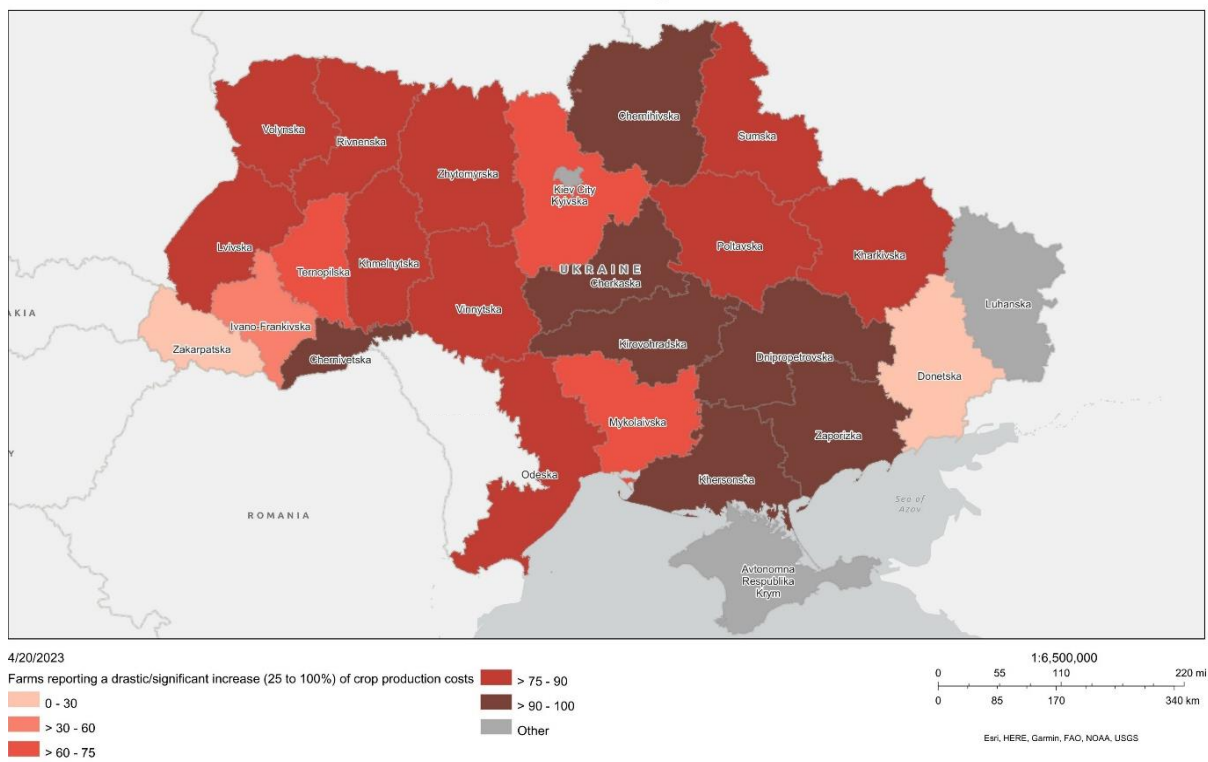
Almost all (93 percent) of the agricultural enterprises involved in crop production reported an increase in production costs, with over two-thirds of them (81 percent) recording significant or drastic increase (more than 25 percent) since the start of the war. Cherkaska, Chernihivska, Chernivetska, Dnipropetrovska, Khersonska, Kirovohradska and Zaporizka were the oblasts most affected, with over 90 percent of the agricultural enterprises reporting significant or drastic increases.



Similarly, around two-thirds (76 percent) of agricultural enterprises involved in livestock production reported increases in production costs, with over half of them (60 percent) recording significant or drastic increases. Odeska, Sumska, and Zhytomyrska were the oblasts most affected, with over 90 percent of the enterprises involved in the livestock sector reporting significant or drastic increases in production costs.



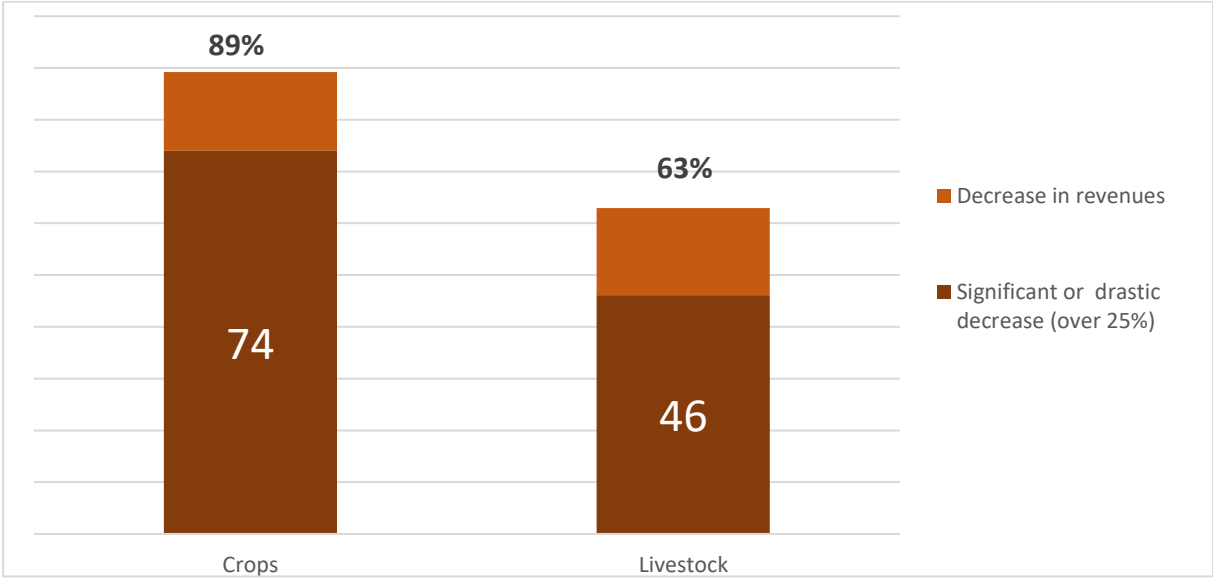
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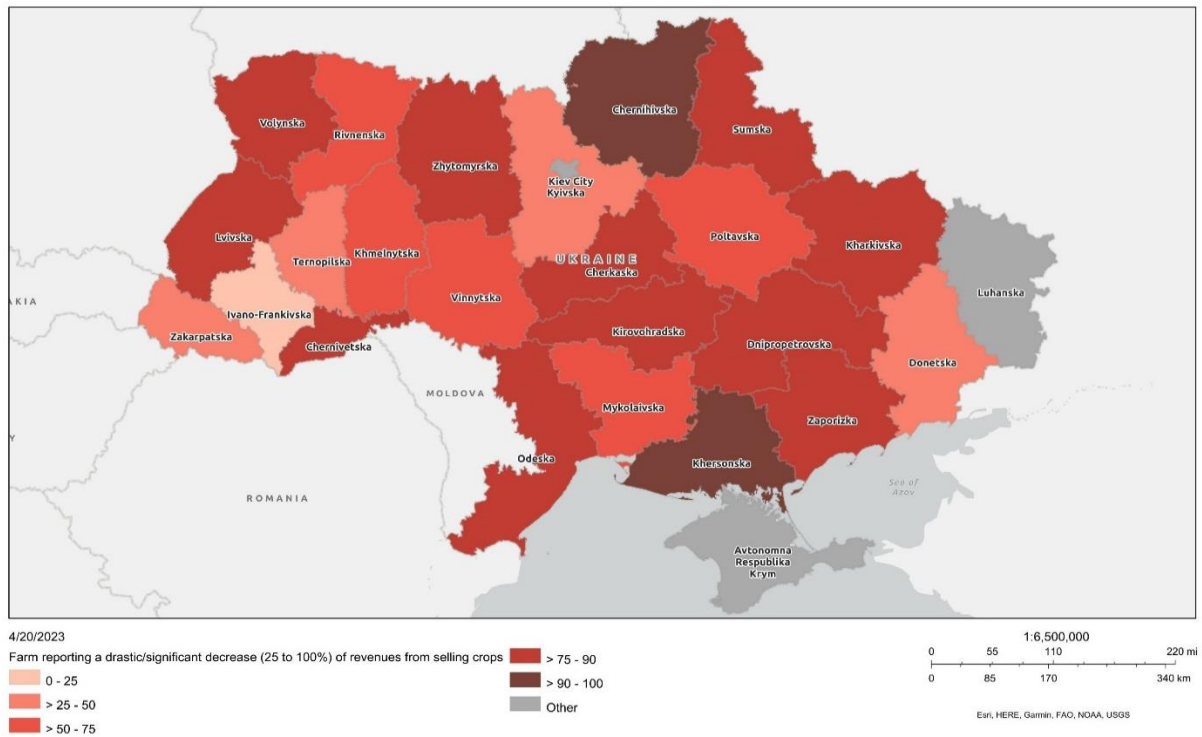
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Decrease in revenues

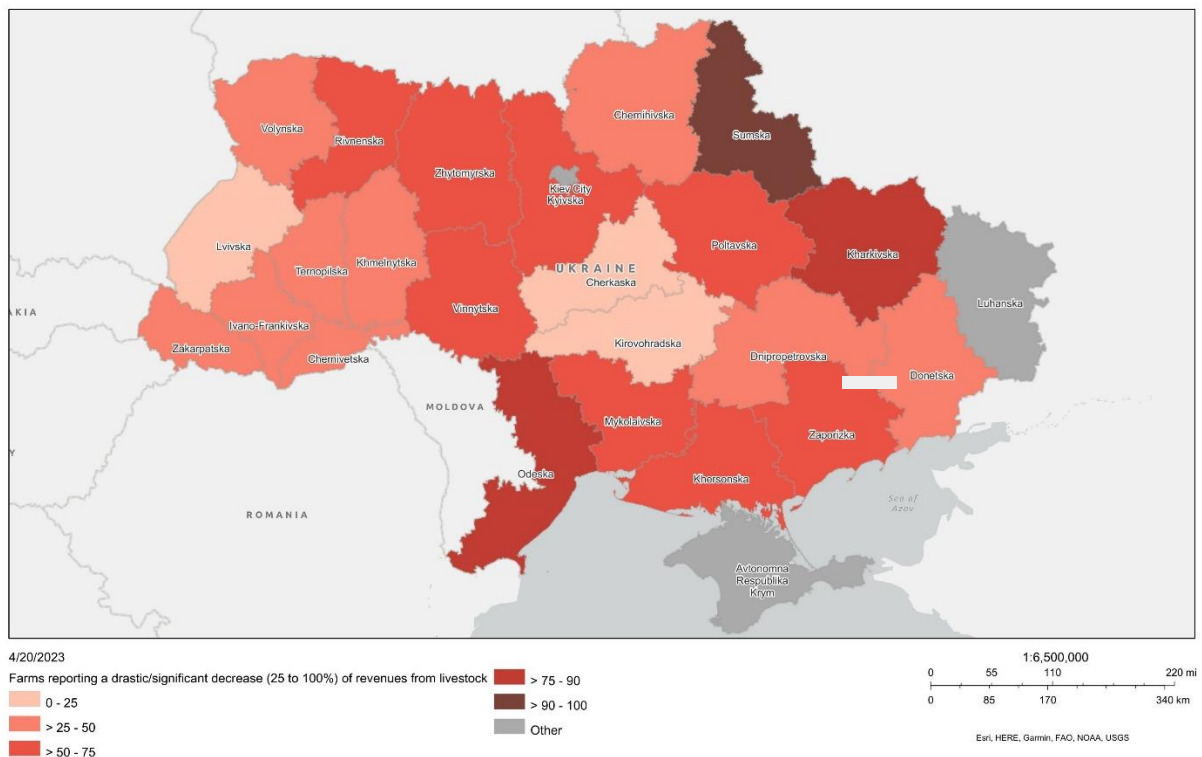
Almost 90 percent of agricultural enterprises involved in crop production reported a **decrease in revenues**, with over 70 percent of them recording a significant or drastic decrease. Agricultural enterprises involved in livestock production appeared to be less affected, however over 60 percent of them reported a decrease in revenues, including almost half (46 percent) recording a significant or drastic decrease. Agricultural enterprises that are specialized in crop production and operating in areas along the front-line oblasts appeared to be most affected, increasing the likelihood of a decline in revenues by 30 percent compared to enterprises that operate in the western and central oblasts.



In addition, the likelihood of a decline in revenues increases by 10 percent when agricultural enterprises involved in crop production have difficulties in accessing agricultural inputs (e.g. fertilizers, pesticides and seeds).



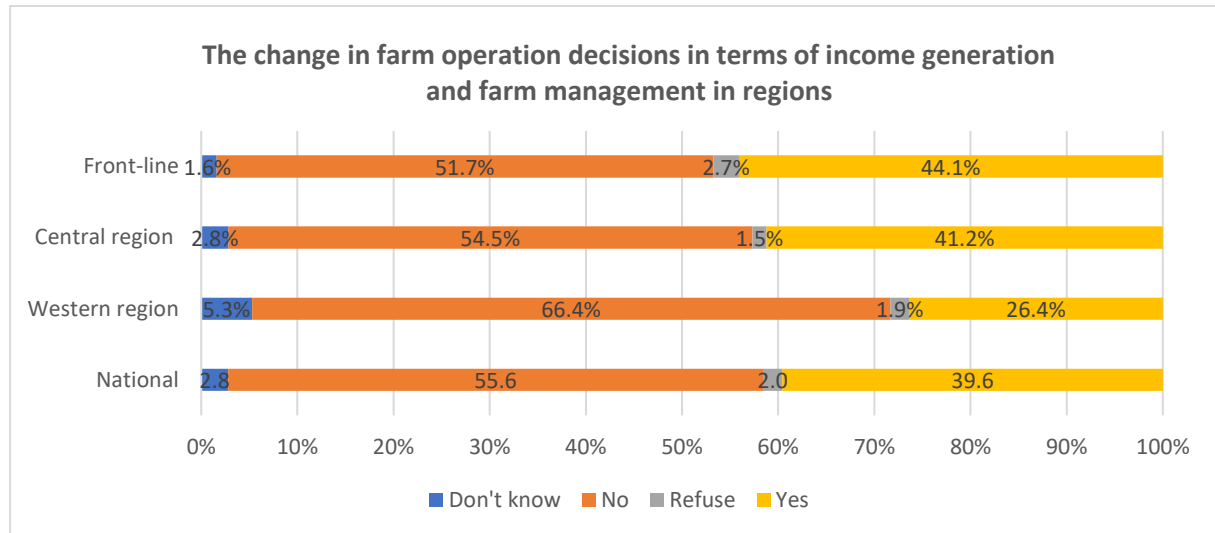
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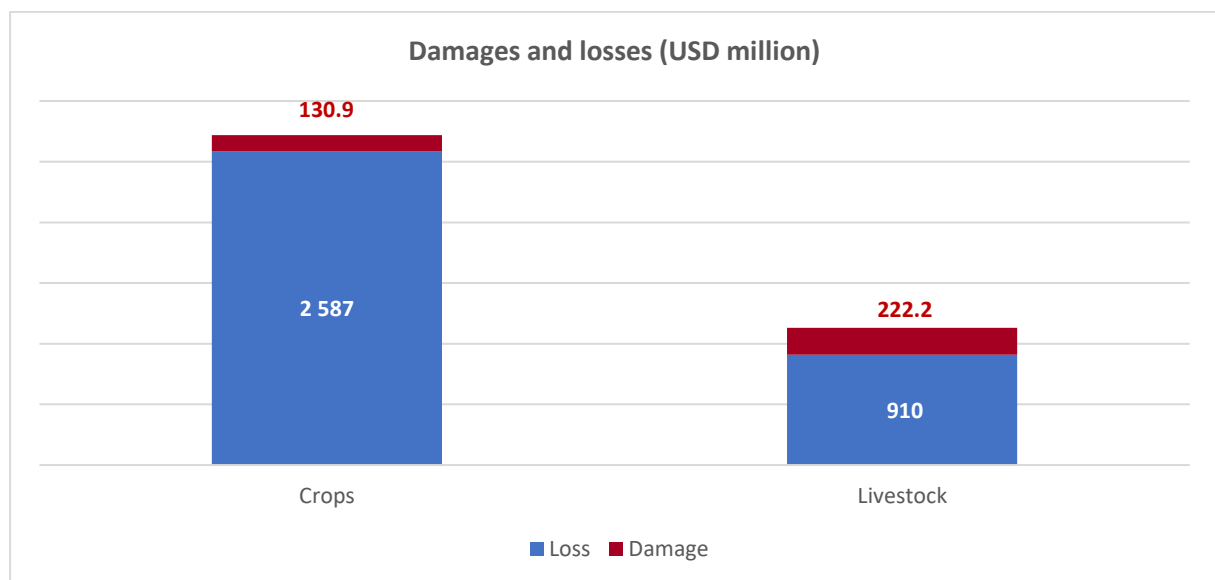
Changes in the operational decisions of the agricultural enterprises

Almost 40 percent of all agricultural enterprises reported to have **changed their farm operational decisions** due to war. This percentage is higher in the areas along the front-line oblasts, with around 45 percent of them reporting so. The main adopted changes are **limited use of agricultural inputs** (e.g. fertilizers, pesticides and seeds), **business diversification** (e.g. explored or started a new business) and **change in the output markets** (e.g. new buyer).

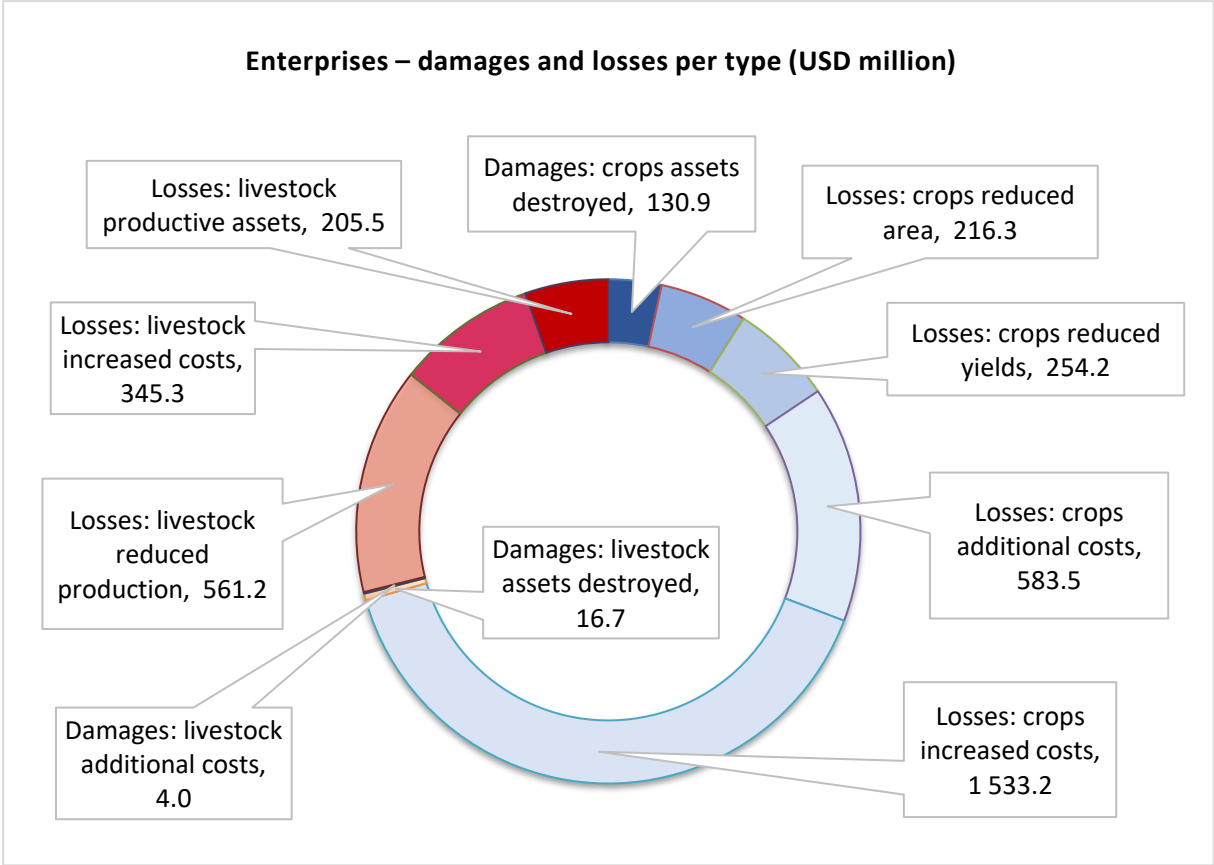


Agricultural damages and losses

The feedback from the respondents indicates that the total damages and losses for the Ukrainian agricultural enterprises segment amounts to **USD 3.85 billion in the first year of the war**, including USD 2.71 billion in the crops sector and USD 1.13 billion in the livestock sector. These damages and losses amount to approximately USD 147 000 per enterprise on average, not considering the temporarily occupied territories.



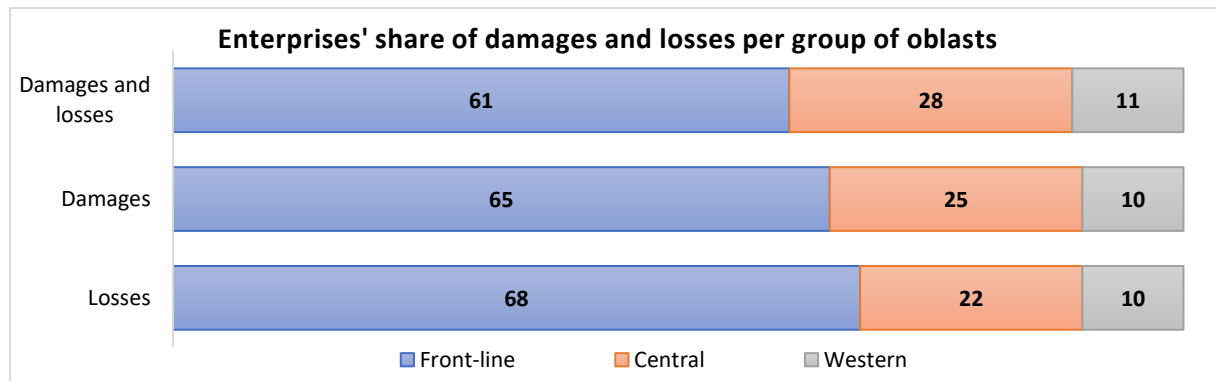
The effect of the war with highest overall value for both sectors, is the increased production cost, accounting for nearly half of the damages and losses (USD 1.878 billion), followed by losses due to reduced production, accounting for 21 percent of the total (USD 0.815 billion), and the additional costs (15.2 percent), which mostly include costs for demining (USD 0.562 billion).



In terms of geographical distribution of the damages and losses, 61 percent of the total impact from the war is concentrated in the front-line oblasts, although they account for less than 50 percent of the arable land, and about a third of the livestock production in Ukraine. The front-line oblasts also incurred most of the direct damages on account of destroyed and damaged assets and productive assets.

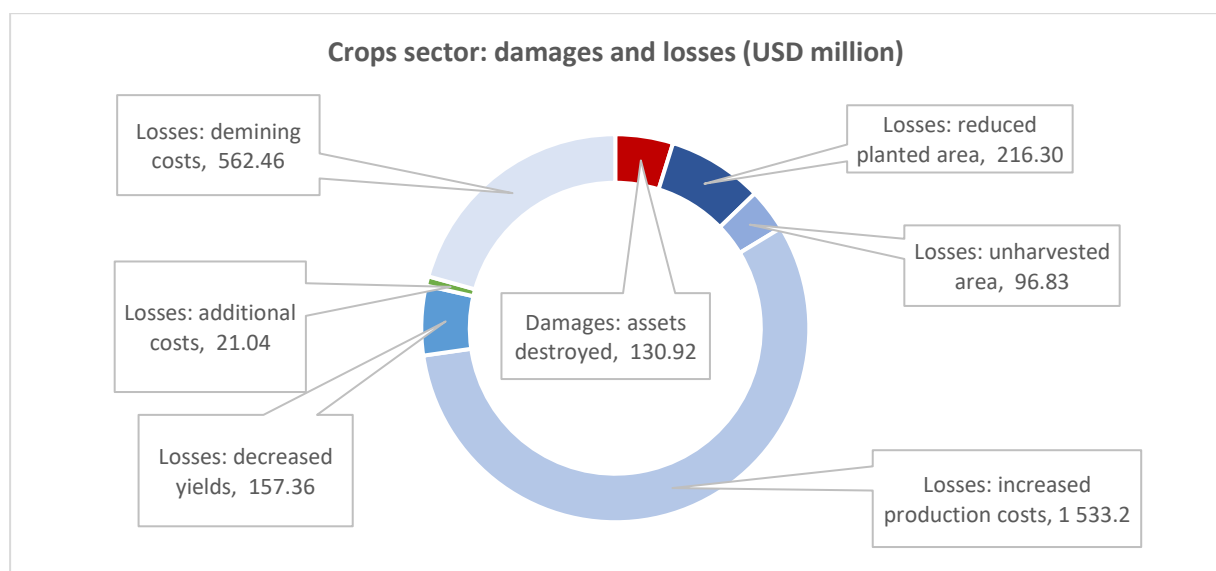
Damages

The overall damages in the agriculture sector were estimated at approximately USD 353.1 million, accounting for damages valued at USD 52 600 per enterprise (directly affected) in the crop sector, and USD 284 400 per enterprise (directly affected) in the livestock sector (53 percent in the bovine and 43 percent in the porcine subsector).



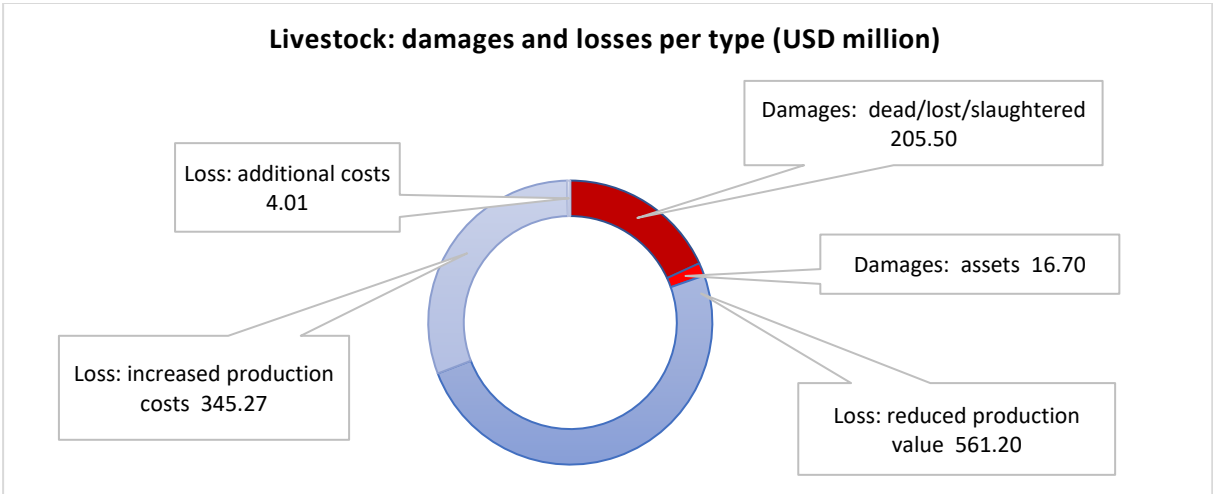
Crop sector

Destroyed assets: Over 11 percent of enterprises reported impacts to assets (e.g. stored production, inputs, equipment, and infrastructure in relatively similar shares). The average value of damage per enterprise (directly affected) is estimated at USD 52 645, or USD 5 809 per crop producer in general. The value of the total damages at the national level is estimated at USD 130.9 million. Most of the damaged assets and their recovery value are attributed to the front-line oblasts (89.4 percent) followed by central oblasts (9 percent).



Livestock sector

Destroyed animals and assets: Approximately 17 percent of enterprises in the livestock sector have reported damages to their livestock assets, of which 7 percent have reported death or loss of animals, 10 percent have reported forced slaughtering of animals and 2 percent have reported both types of damages. The total value of the destroyed (dead or lost) animals is estimated at **USD 128.5 million**, with 94.4 percent of that cost occurring in the front-line oblasts. Forced slaughtering is most prominent in front-line oblasts which account for 62 percent, followed by western oblasts with 25 percent and central oblasts with 13 percent of the total value of **USD 77 million**. Around 2.2 percent of enterprises reported damages to assets (stored production, inputs, equipment, and infrastructure in similar shares). The average value of damages per enterprise (directly affected) on account of lost assets has been estimated at USD 43 909 or at USD 4 891 per livestock producer in general. The total value of damages at the national level is estimated at **USD 16.7 million**. Most of the damaged assets are in the front-line oblasts (67 percent) followed by the central oblasts (33 percent).



Losses

The losses (changes in financial flows) in the agriculture sector are estimated at approximately USD 3.5 billion, including USD 2.87 billion for the crops sector and USD 910 million for livestock sectors.

Crop sector

Reduced production value: The production value in the crop sector (change in yields, area planted, and increased production costs) was reduced by a total of approximately **USD 1.9 billion**. The total losses resulting from the decrease in cultivated areas amounted to **USD 216.3 million** and are exclusively located in front-line oblasts, which experienced a decrease by 8.8 percent in the size of arable land compared with 2021. Central and western oblasts reported increases of 2 percent and 0.3 percent, respectively, in the total cultivated land. In addition, cultivated but contaminated and unharvested area has been reported by 5.1 percent of enterprises (29 hectares/enterprise), accounting for loss of **USD 96.8 million**.

The total value of losses on account of decreased yields is estimated at **USD 157.3 million**, overwhelmingly divided between wheat, sunflower and maize crops with national average yield decrease of 5.1 percent compared with 2021, and the highest yield decrease was recorded in front-line oblasts (10.4 percent). An average increase in production costs by 46 percent has been reported by 93 percent of all enterprises, amounting to an estimated **USD 1.533 billion**. The sharpest increase in production costs is evident in front-line oblasts (52 percent compared to 2021) and the lowest in western oblasts (34 percent).

Additional costs: The loss on account of **demining costs** (USD 0.8/m²) for the contaminated and unharvested area (approximately 70 300 ha) is estimated at **USD 562.4 million**, almost entirely associated with front-line oblasts. Moreover, around 5 percent of the enterprises reported additional costs for mitigating the impacts of the war (not included in the increased production and demining costs), amounting to **USD 21 million**. The highest share of enterprises with additional costs are reported in western oblasts (8 percent) and the lowest in the front-line oblasts (4 percent).

Livestock sector

Lost animals: Seven percent of enterprises reported damages on account of dead or lost animals with an estimated value of **USD 128.5 million**, with 94.4 percent of that cost occurring in the front-line oblasts. In addition, 10 percent of enterprises reported forced slaughtering of animals valued at **USD 77 million**, of which 62 percent in the front-line and 25 percent in the western oblasts. Moreover, the contraction of the livestock population in Ukraine is estimated at **USD 22.3 million**.

Reduction in income and increased production costs: Reduction of income (by 27.4 percent on average) on account of reduced production was reported by 63 percent of enterprises. The value of the loss is estimated at USD 306.8 million, of which 61 percent in the front-line oblasts, followed by the similar values in the central and western oblasts. The front-line oblasts reported sharpest reduction in incomes (42.1 percent) and western oblasts reported the lowest (21.6 percent). The average increase of production costs for all livestock producing enterprises has been evaluated at 34.2 percent, accounting for a total loss of **USD 345.2 million**. The highest increase of costs is evident in the front-line oblasts (42.1 percent), followed by central (33.5 percent) and western oblasts (27.1 percent).

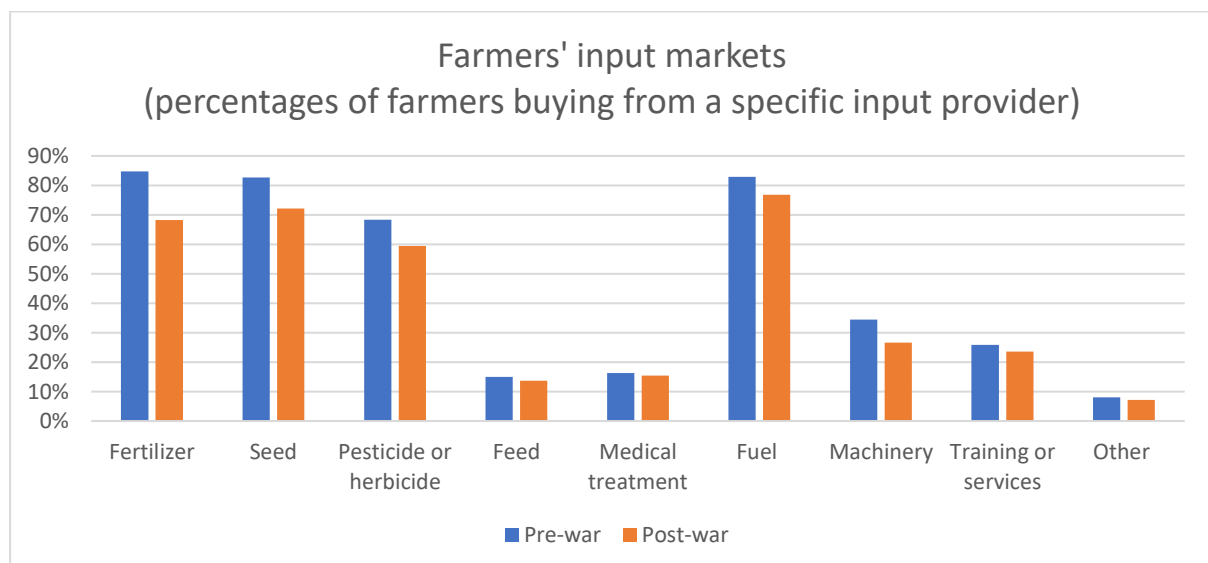
Additional costs: In total, 7.8 percent of the enterprises reported additional costs for mitigating the impacts of the war, amounting to **USD 4 million**. The highest share of enterprises with additional costs is evident in front-line oblasts (10.5 percent), followed by western oblasts (9.6 percent) and central oblasts (4.8 percent).

Impact of the war on agrifood value chains

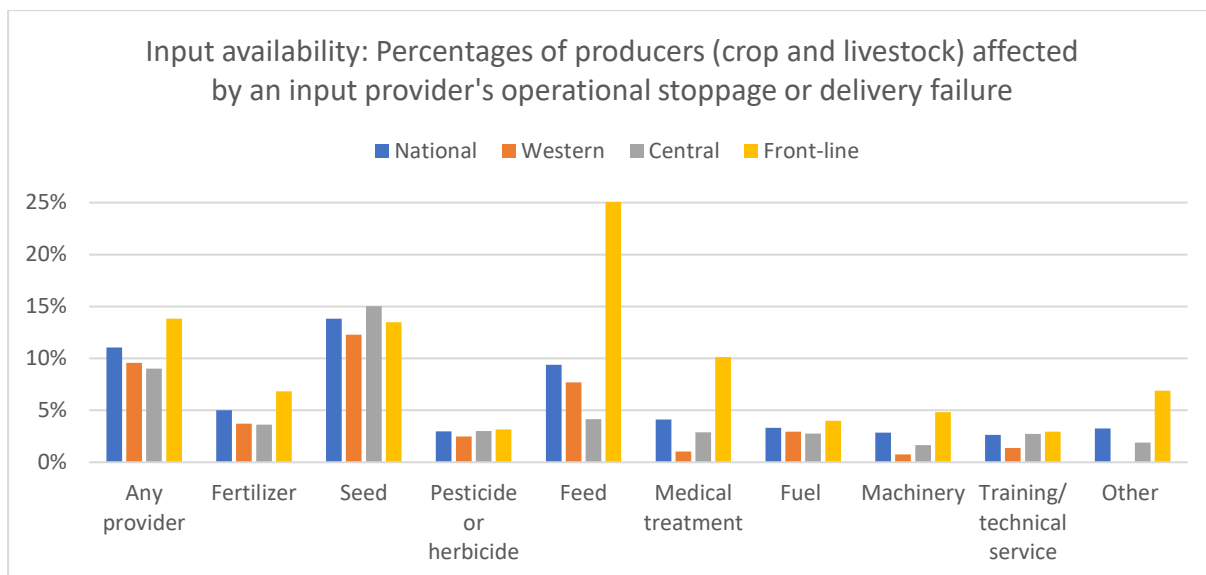
This section provides an overview of the impact of the war on upstream input providers and downstream output buyers, including a national overview and regional disaggregation by group of oblasts (western, central and front-line). Insights into the indirect impacts of the war on agricultural enterprises through the agrifood value chain can enable policy interventions to address a more comprehensive set of challenges faced by crops and livestock producers and be more effective in supporting their recovery and resilience.

Input supply disruptions: upstream impact

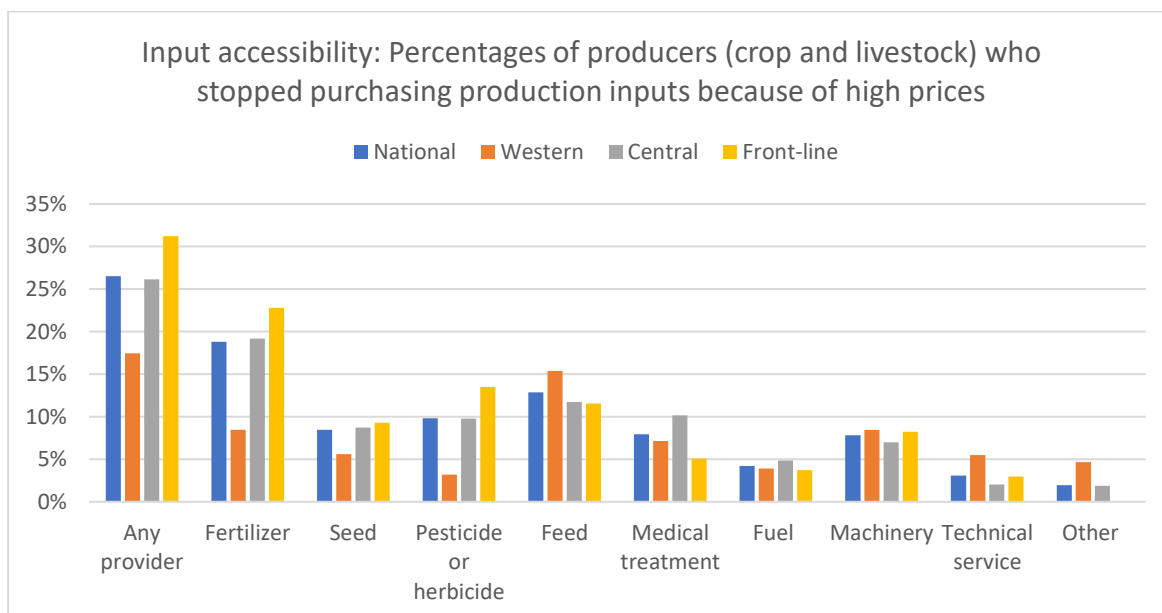
Our results reveal a substantial reduction in the number of input providers during the post-war period in comparison to the pre-war period. The decline is found to be similar for all input providers, with the exception of feed and medical treatment providers, which were comparatively less affected. This is likely due to the geographical concentration of livestock producers in the western region, away from the front-line.

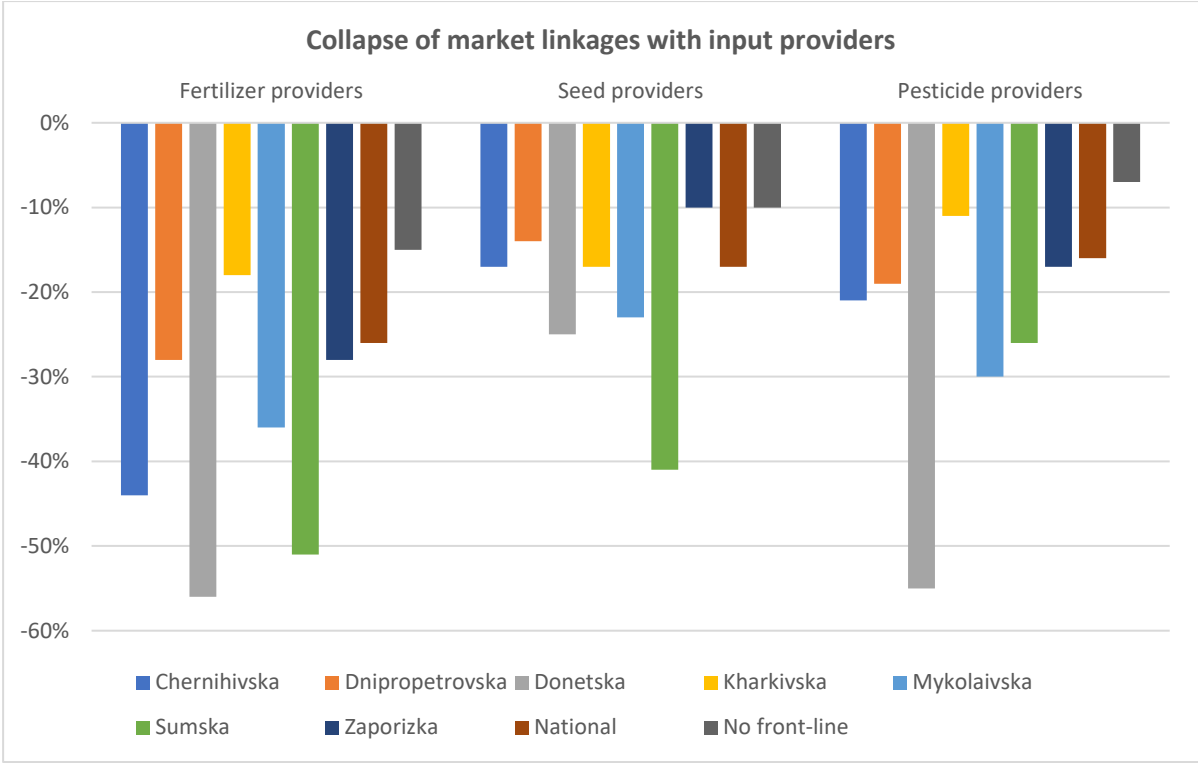


On average, 11 percent of all producers were impacted by the cessation of operations or inability of input providers to deliver the required quantities, resulting in constraints on producers' input availability. At the national level, seed providers were found to be the most affected by the war, with up to 14 percent of farmers impacted by a disruption of seed providers' operations (either cessation of operations or delivery failure), followed by feed providers (9 percent) and fertilizer providers (5 percent). Operational disruptions of input providers were more common in the front-line, but delivery constraints in the input markets have also affected producers in the western and central regions. The big impact on feed and medical treatment providers in front-line regions is likely attributed to the relatively smaller population of livestock farmers and weaker value chain connections in these areas, leaving them more vulnerable to disruptions.



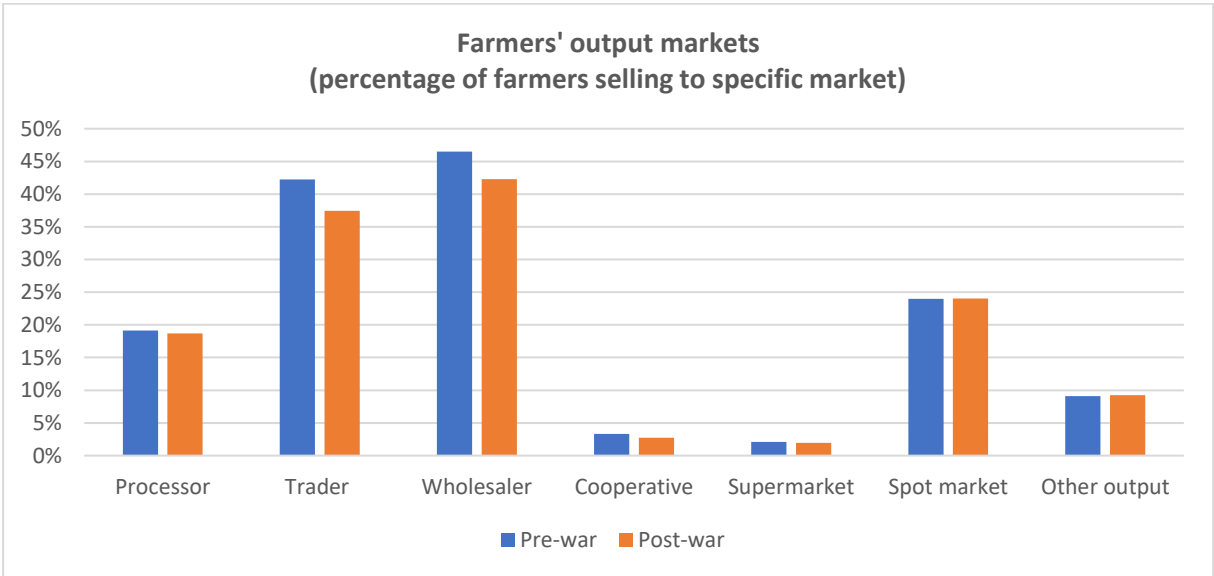
On average, 27 percent of all farmers stopped purchasing from a provider because the provider charged too high prices, reflecting constraints on producers' input accessibility reported price concerns (that lead to an interruption of the relationship between the producer and the input provider) were most pronounced for purchased from fertilizer and feed providers. The price impact tends to be bigger in but is not limited to front-line and is especially noticeable in the central regions. A collapse of linkages between farmers and crop inputs providers (fertilizers, seeds and pesticides) has been observed particularly in the oblasts along the front-line. Producers in Chernihivska, Donetsk, and Sumska experienced disruption in over 40 percent of their linkages with fertilizer suppliers. Sumska and Donetsk producers also reported a reduction of over 40 percent and 55 percent, respectively, in their linkages with seed and pesticide providers, compared with the period before the war.



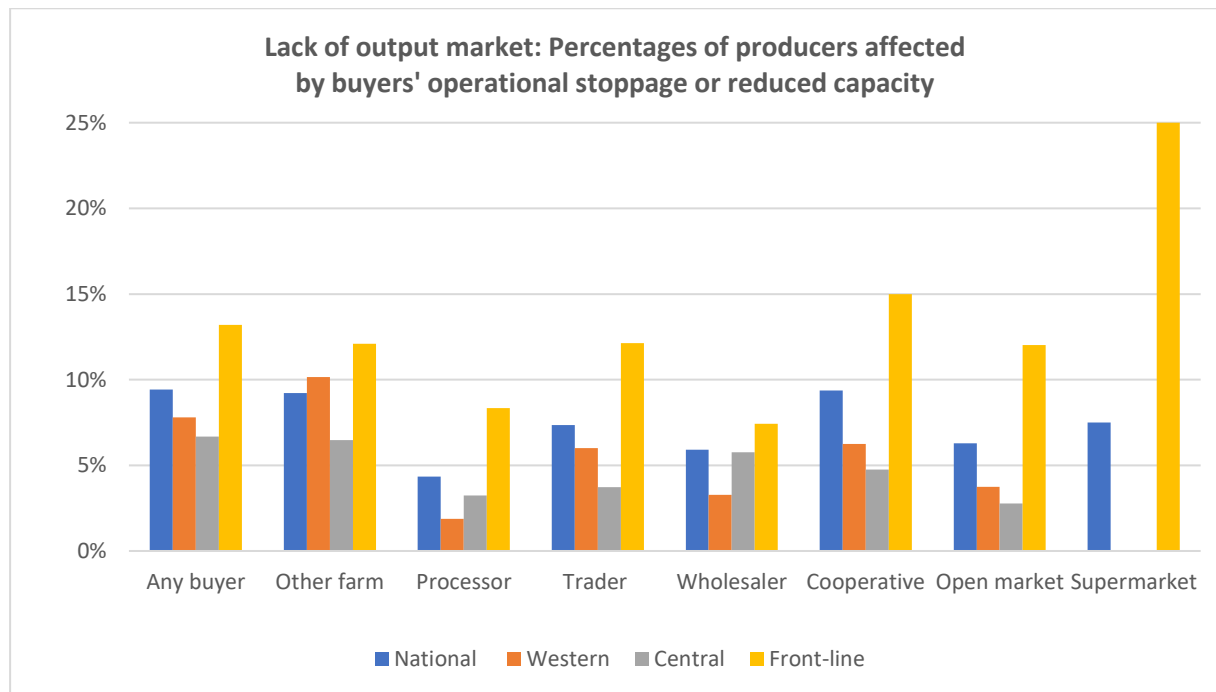


Output market disruptions: downstream impact

Before the war, most of the farmers in our sample sold their produce to wholesalers (i.e. operators who typically sell large quantities to other businesses). Traders, who sell smaller quantities, usually to end consumers, came in second, followed by spot markets and processors. After the war, while the general pattern of sales remains the same, we observed a decrease in the likelihood of farmers selling to wholesalers and traders. In contrast, the likelihood of selling to processors and in spot markets remains constant.



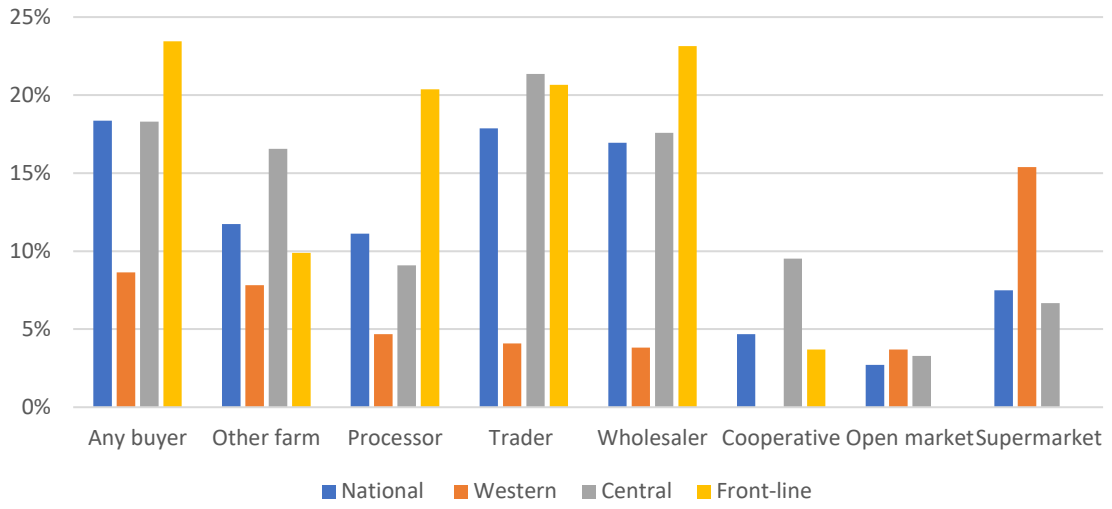
On average, 9 percent of all producers were impacted by output buyers discontinuing operations or being unable to accept additional quantities. Among the various types of buyers, “other farms” and traders or cooperatives were the most affected, while transformers and wholesalers were relatively less affected by the war. Farms, traders, and cooperatives are likely more vulnerable to disruptions due to their relative lower resources and bargaining power compared to larger buyers like transformers and wholesalers. Supermarkets showed a high degree of impact in regions most affected by the war (i.e. front-line areas) and little to no impact in non-affected areas. Supermarket in front-line areas most likely suffered important physical damage.



According to our findings, on average, 18 percent of all producers ceased delivering their produce to a specific buyer due to the low sale price offered. The percentage was highest in the front-line region (23 percent) and lowest in the western oblasts (9 percent). Among different types of buyers, the trading relationships with traders and wholesalers were most frequently interrupted due to their price increases, as compared to the relationships with other farms or transformers.

This could be attributed to a variety of factors, including established trust relationships with other smaller farms or the necessity to rely on specific processing and transformation services, no matter the price. Farmer- downstream buyer interruptions due to low sale prices are highest in the front-line oblasts, and lowest in the west of the country. Interestingly, in the front-line, relationships with supermarkets are never interrupted due to price, but always due to a capacity issue or full stoppage of the supermarket.

Lack of profitable output market: Percentages of producers stopping to sell to a buyer because of a low sale price

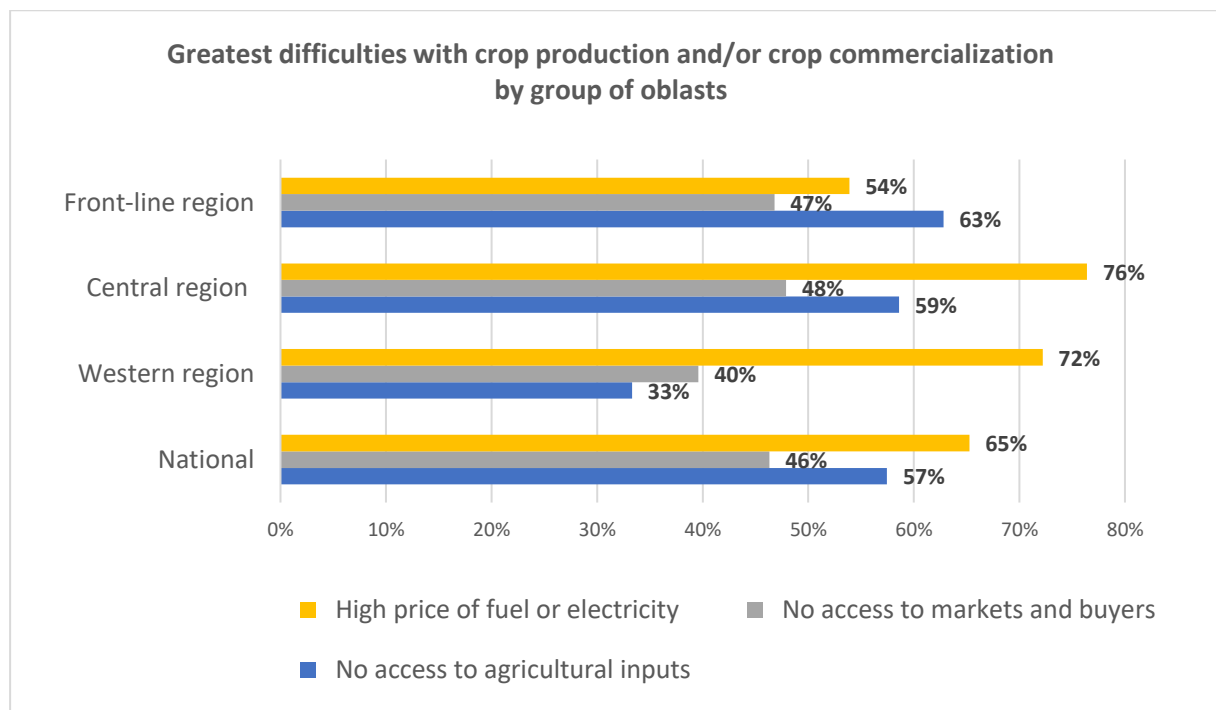


Main difficulties and greatest needs

The war in Ukraine has severely affected agricultural producers' ability to provide their own activities and their access to production inputs. This alarming situation has led the government and other international partners to initiate assistance activities, including the areas along the front-line. This section examines the main difficulties and related needs reported by agricultural enterprises during the survey.

Crop producers

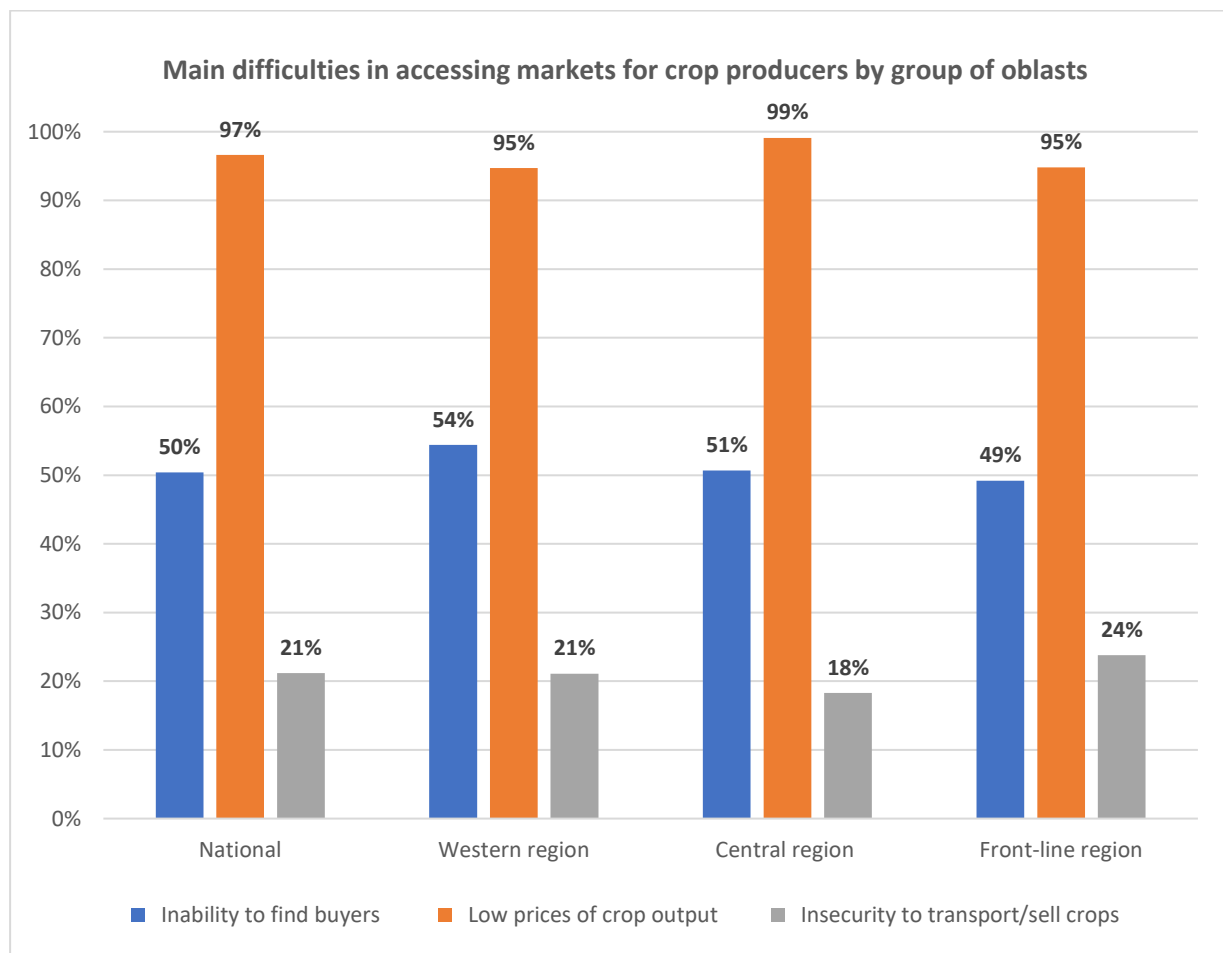
Almost two-thirds (65 percent) of agricultural producers experienced difficulties in terms of crop production and/or commercialization in 2022. In particular, the major difficulties reported were high prices of fuel or electricity to power agricultural equipment, problems with access to seeds and fertilizers, as well as market and buyers. Crops producers operating in areas along the front-line appear to be most affected, with approximately 75 percent of farmers reporting difficulties in production and commercialization. Farmers in this cluster, unlike others, more often identify access to seeds and fertilizers as the greatest issue in their operations. Further analysis revealed that agricultural producers that experienced difficulties with agricultural inputs were more likely to report revenue decrease, compared with those that did not have problems with inputs. However, 74 percent of the farms which did not report disturbances in access to agricultural inputs, still suffered revenue decrease. This means that access to production inputs was one of the reasons, but not the major one, which led to a decrease in revenues.



The reasons behind the difficulties in access to seeds and fertilizers are mostly price related. Overall, farmers mention high prices at least 8 times more than the availability of seeds or fertilizers. However, challenges related to the availability of seeds and fertilizers comes first for agricultural producers in

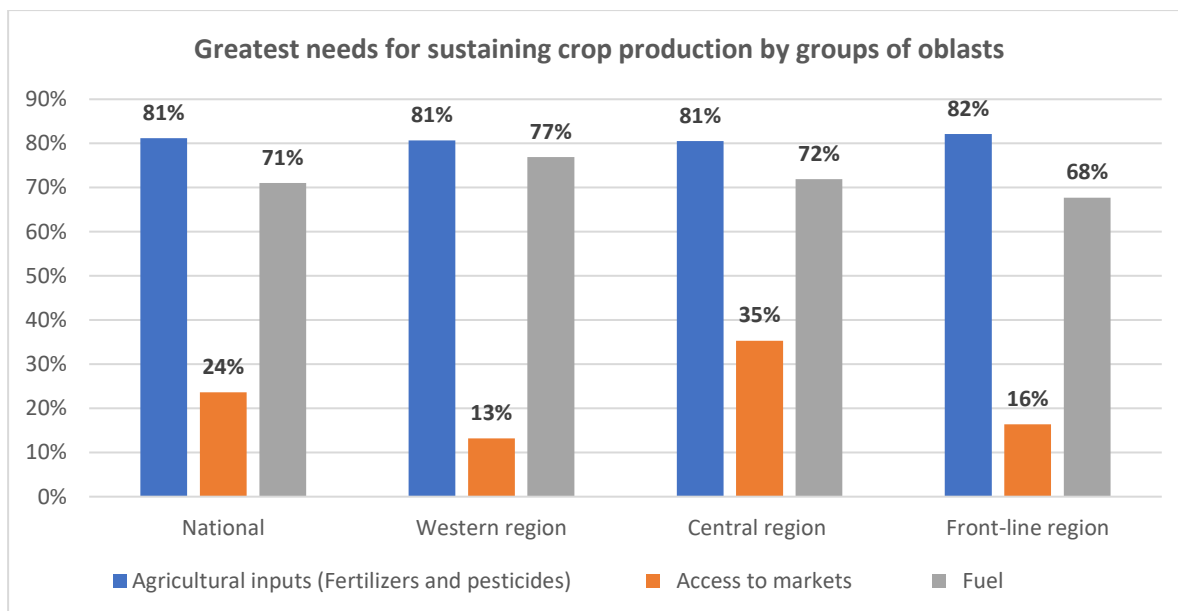
Khersonska oblast (100 percent of respondents experienced largest difficulties with availability of seeds, fertilizers and pesticides), which was largely occupied and remains in the epicentre of the ongoing military operations.

Main components of market and buyer accessibility difficulties for crop producers are low prices for produced outputs on one hand, and inability to find buyers on the other. Around 97 percent of farmers interviewed identified low prices among the problems with commercialization of crops produced. The blockade of Ukrainian ports increased domestic supply of the export-oriented crops (grains and oil crops), depressing the domestic prices. These challenges pose significant barriers to small farmer operations, which are critical for food security and small producer economic development.



Crop producers' needs to sustain their farming activities

The analysis shows that the greatest need of farmers engaged in crop production is accessing the **agricultural inputs** that they need to sustain their operations in the future. Among the inputs requested most frequently were fertilizers (81 percent of respondents), fuel (71 percent) and seeds (55 percent). Out of 23 oblasts where farmers were interviewed, 14 have 80 percent and more farmers that experience need in fertilizers, regardless of the proximity to the front-line. Oblasts that identified more frequently the need for seeds were Donetsk, Odeska, Sumska, Zakarpatska and Zaporizka. Meanwhile access to fuel was most requested (around 80 percent and more) in Donetsk, Lvivska, Mykolaivska, Odeska, Rivnenska, Ternopilska and Volynska oblasts.

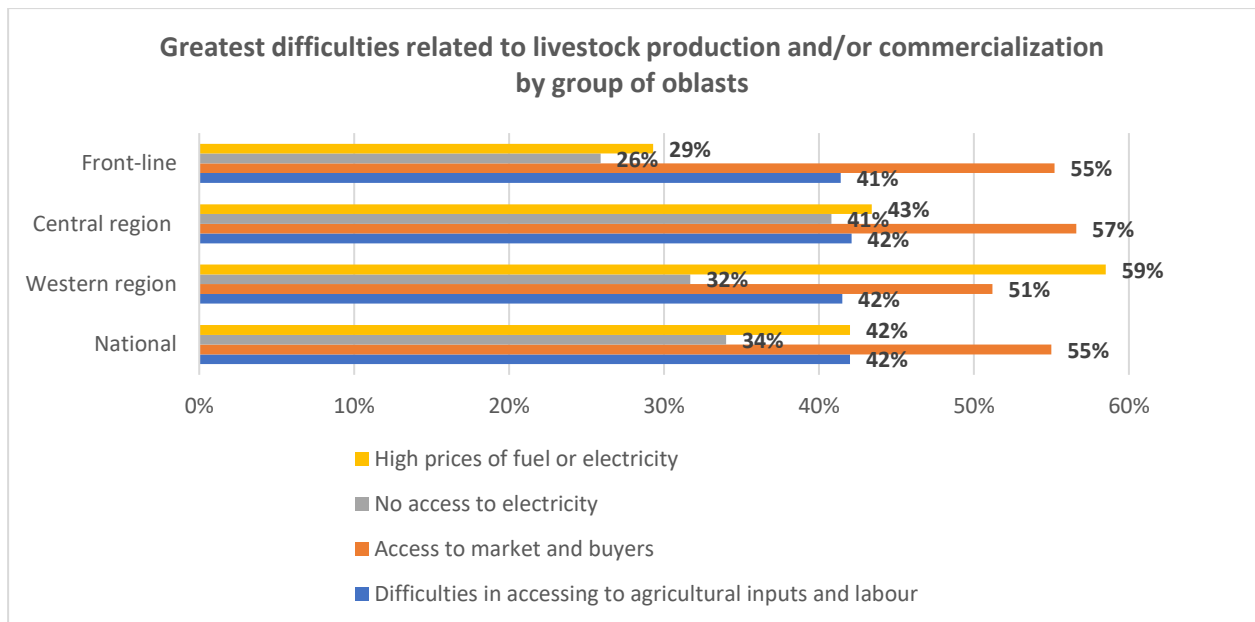


Furthermore, approximately one in every four crop producers (24 percent) reported the importance of **accessing markets** among the main needs. The trend is higher in the central region, particularly in Kirovohradska (70 percent), Poltavska (41 percent), Khmelnytska (35 percent) and Vinnytska (34 percent) oblasts.

Since October 2022 Ukraine has been experiencing long-lasting periods of power outages due to damages to energy infrastructure. Although, on a national level the **need for electricity** is mentioned by 6 percent of agricultural producers, stable power supply is more in demand among processors of crops (19 percent).

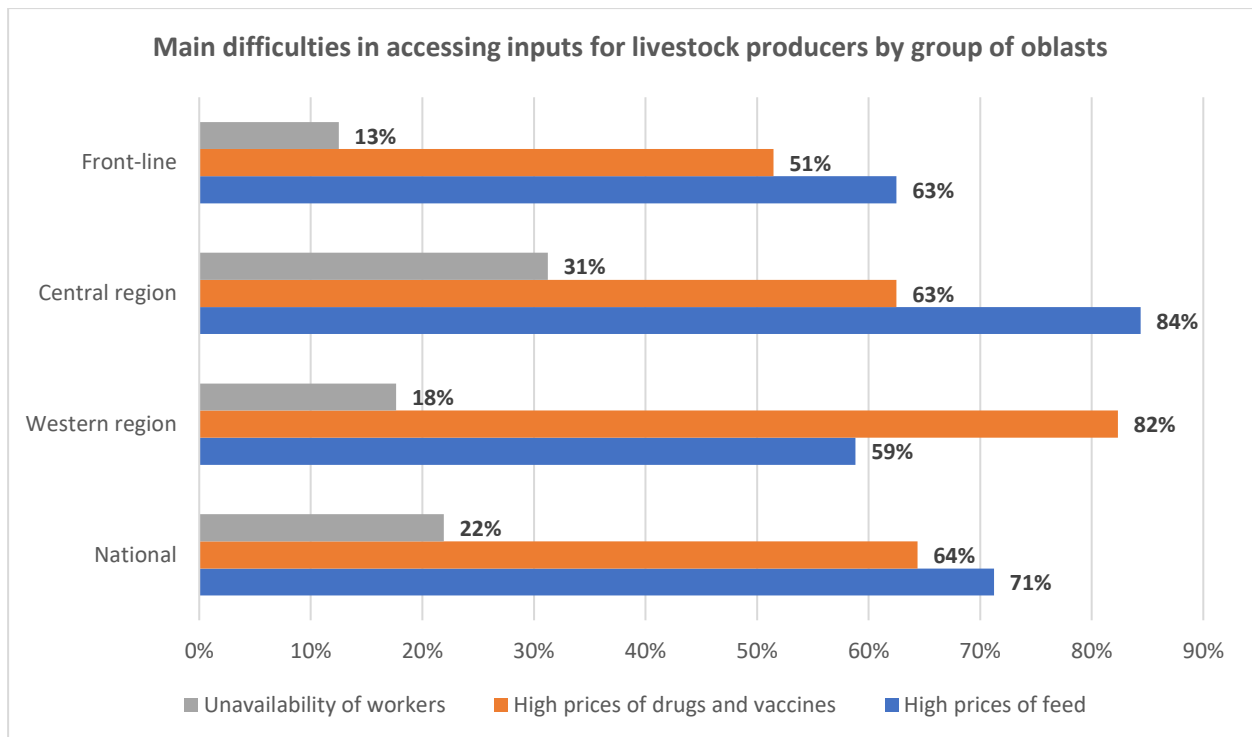
Livestock producers

Almost half (45 percent) of small-scale farmers engaged in livestock production reported to have experienced difficulties in their operations during the war. In particular, the main problems mentioned were access to markets and buyers (55 percent), access to feed, vaccines, drugs, machinery, and labour (42 percent), and high price of fuel or electricity to power agricultural equipment (42 percent) or even no access to electricity (34 percent). Agricultural producers in areas along the front-line oblasts appear to be most affected, with over 55 percent on average having reported difficulties in livestock production and commercialization. An alarming situation is observed in Kharkivska (90 percent), Sumska (80 percent) and Khersonska (67 percent).



In terms of the access to agricultural inputs (e.g. feed, vaccines, drugs, machinery, equipment, and workers) farmers struggled mostly with affordability. At the national level, around two-thirds of livestock producers identified high prices for feed (71 percent of respondents), as well as drugs and vaccines (64 percent). The problem is more concerning for livestock producers in western and central oblasts while in oblasts along the front-line farmers also faced unavailability of feed, drugs and vaccines for their livestock. When looking at the oblast level, it is observed that all (100 percent) livestock-specialized agricultural producers interviewed in Kharkivska and Khersonska oblasts experienced difficulties in accessing animal feed, followed by Zaporizka (50 percent) and Zakarpatska (50 percent) oblasts.

There is also evidence for labour-related problems in central oblasts, with one in every three farms (33 percent) mentioned the issue of workforce deficit.



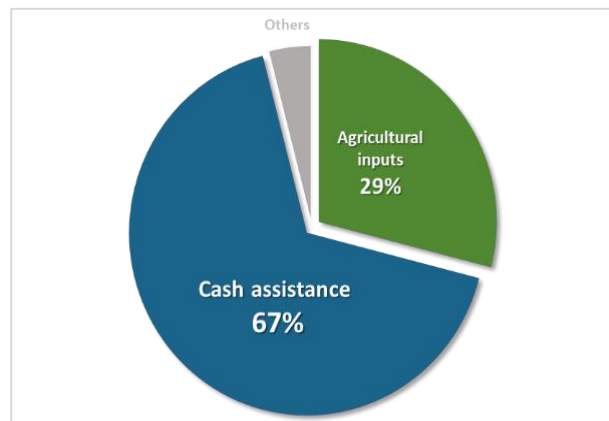
Commercialization difficulties of livestock related products, similar to crop producers, have two folded reasons. Firstly, around 85 percent of livestock producers interviewed nationally mentioned low market prices for their products. Furthermore, producers operating in oblasts along the front-line appear to be the most affected, with almost 91 percent of respondents having identified it as a market access problem. Also, half of the respondents (50 percent) were challenged by the insecurity in transporting or selling their livestock due to the ongoing military operations. Secondly, 57 percent of respondents interviewed nationally identified inability to find buyers as one the greatest commercialization problems. Even more frequently the problem was mentioned in oblasts along the front-line (69 percent), followed by western (52 percent) and central oblasts (51 percent).

Depressed domestic demand for meat and milk products due to the migration, decreased income, and logistical disruptions are among the key possible factors that caused commercialization difficulties. Further analysis also revealed a causal relation between the farm's revenue change during the war and problems with access to agricultural inputs. In fact, likelihood of revenues decrease tends to increase for livestock producers that experienced difficulties with access to market and buyers.

Level of indebtedness and assistance

Assistance

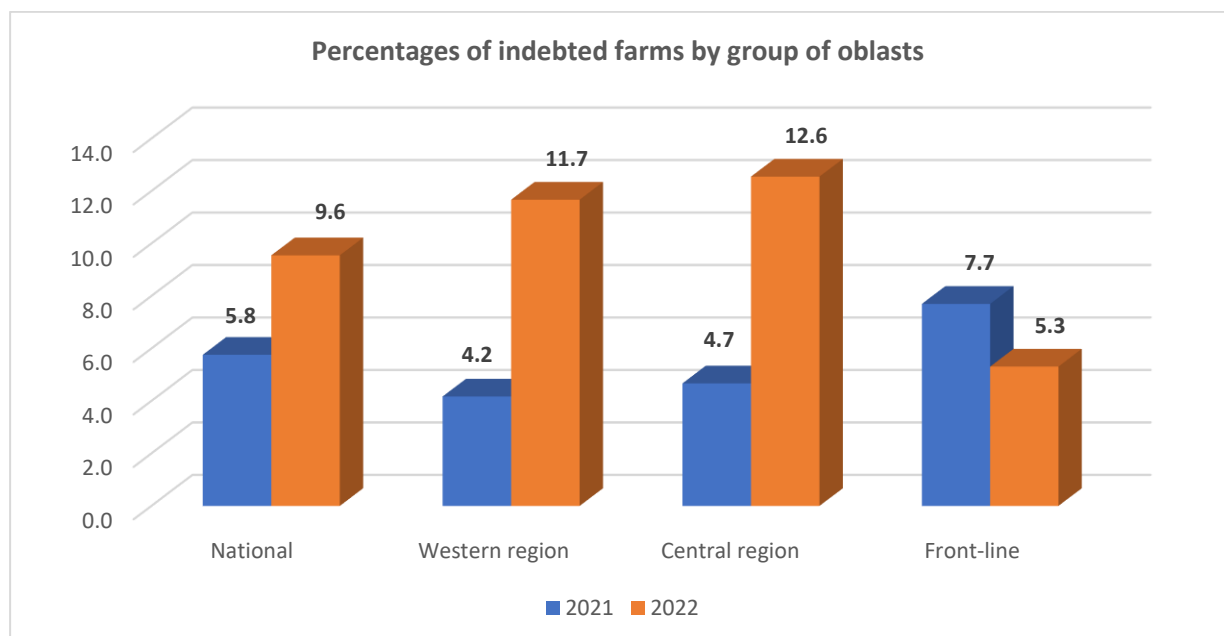
Approximately 20 percent of the respondents reported to have received aid or assistance (exceptional financial or in-kind support) in direct relation to the war in the last three to six months. Some oblasts along the areas of the front-line, recorded over 50 percent of producers receiving some sort of aid or assistance, (e.g. Sumska [51 percent] and Donetsk [90 percent]). Small producers reported receiving cash assistance (67 percent) and agricultural inputs such as seeds, fertilizers, and pesticides (29 percent).



Around 4 percent recorded "others" (e.g. veterinary services, fuel and technical consultation).

Levels of indebtedness

At national level, agricultural enterprises appeared to incur in **additional debts** compared to the same period before the war (from 5.8 percent in 2021 to 9.6 percent in 2022). The main reasons why agricultural enterprises incurred additional debts are to pay for inputs, pay for logistics, and repair or build facilities for farming. It is worth noting that over 80 percent of the agricultural enterprises that incurred in additional debts in 2022 have not done so in 2021, highlighting difficulties in business continuity.



When analysing by group of oblasts, central and western regions showed similar increases, with the share of agricultural enterprises that incurred in additional debts increasing from approximately 4–5 percent in 2021 to 12–13 percent in 2022. Oblasts with the highest increase are Volynska

(24 percent), Poltavska and Cherkaska (23 percent), Lvivska (18 percent), and Chernivetska (15 percent). On the other hand, agricultural enterprises operating in areas along the frontline recorded a decrease in the level of debts between 2021 and 2022, from 7.7 percent in 2021 to 5.3 percent in 2022. This opposite trend recorded in the enterprises along the front-line can be in part explained by the inability to access credit (only 13 percent of the respondents reported the ability to access credit in the front-line regions, compared to 27 percent for the enterprises in the central regions and 53 percent for the ones in the western regions).

Methodology

FAO has conducted a nationwide survey, targeting 1 927 agricultural enterprises (in both the crop and livestock sectors), with up to 250 hectares of land in 23 oblasts, including selected Rayons of Donetsk, Kharkivska, Khersonska and Zaporizka oblasts under the control of the Government of Ukraine. Luhanska oblast was exempted from the survey due to temporary occupation, as well as Autonomous Republic of Crimea and the city of Sevastopol (temporarily occupied).

Sample design

The sample included 23 oblasts and stratified approach was adopted at the oblast level targeting 1 927 agricultural producers randomly selected from lists made available by local authorities, association of farmers and private enterprises (Table 1). The sample included 386 livestock farmers with the provided corresponding shares below. The confidence level is 95/5/50, for between 50 and 100 percent of the livestock sector, depending on the type of animals (Table 2). Conducting the survey faced several limitations and challenges due to the ongoing war. The primary difficulty was the limited sample size and information on the state of small-scale agricultural producers, which was only available for the areas controlled by the Government of Ukraine. Therefore, a quantitative assessment of the situation among Ukrainian farmers under occupation was not feasible in this analysis. Reaching respondents was also complicated due to the war-related obstacles. The overall interview non-response rate is 47 percent, although it is higher in oblasts along the front-line and lower in central and western oblasts (56 percent versus 40 percent and 35 percent, respectively). Thus, the non-response rate is predominantly linked to conflict intensity. For instance, in Chernihivska, Dnipropetrovska and Khersonska oblasts less than one-third of farmers responded, which may be the most affected ones due to the war. Other reasons that are linked to attrition due to non-response are frequent power outages and lost phone connection (e.g. Poltavska, Vinnytska and Zakarpatska oblasts), distrust and confidentiality concerns as well as lack of confidence in potential benefits (e.g. Lvivska, Odeska and Poltavska oblasts), respondents' lack of time (e.g. Lvivska, Vinnytska and Zakarpatska oblasts), absence of the farm manager or owner due to migration or being part of the defence forces (e.g. Lvivska oblast). It is noteworthy to acknowledge that farmers that were experiencing a higher degree of negative impact from the war may be more inclined to refuse to participate in the survey. Thus, the analysis may underestimate the detrimental effects of the war on farmers, with most concerns of the front-line oblasts.

Damage and loss methodology

The FAO agriculture damage and loss methodology was used as basis to understand the impact of the war on the crop and livestock sectors. The methodology was adjusted and extended to account for the complexities related to the sector participants, the duration of the conflict and the types of effects on the production. On basis of the methodology, questions were developed for assessment of each type of damage and loss indicator, per agricultural subsector. The data collected per question was used for extrapolation of indicator values for calculation of damages and losses (e.g. share of enterprises with lost livestock and average number of livestock lost per species). In parallel, asset valuations (e.g. replacement values of assets, production costs and average yields and annual gross production

value) per unit were established on basis of review of pre-conflict literature and statistics for 2020 and 2021. The developed indicators were correlated in multiplication frames with the national statistical for the studied enterprise segment, for development of the overall impact results, on oblast, group of oblasts and national level (e.g. total number of livestock lost per species). As a final step, the values from the asset valuations were added to the impact results in the multiplication frames to produce the overall damage and loss valuations (e.g. total livestock lost at the average value per unit).

Data collection

FAO implemented the assessment with the support of four local implementing partners: i) Kyiv School of Economics, ii) All-Ukrainian Association of Village Councils and Amalgamated Communities iii) East-Ukrainian Agricultural Advisory Services for conducting the survey in Donetsk oblast; and iv) Office of perspective development for conducting the survey in Zaporizka oblast. FAO prepared, translated, and adapted to the local context the questionnaires for agricultural enterprises. The enumerators of the implementing partners have been trained to ensure an accurate common understanding of the overall questionnaire and to agree on the interview strategy. During the training, interviewers conducted a test phone survey and based on the feedback and recommendations, the FAO team updated the questionnaire. Considering the ongoing war and diminished security in some of the targeted areas, the implementing partners conducted phone interviews, based on the instructions and sample methodology provided by FAO. The respondents have been selected randomly, and the interviews have been implemented until the targeted number has been completed in each Oblast. As result, the implementing partner delivered a final and cleaned dataset in Kobo-Collect format to FAO for data analysis and preparation of the report.

Table 1. Sample distribution (agricultural enterprises)

Oblast	Target population of agricultural enterprises (up to 500 hectares of land)				Agricultural enterprises surveyed (up to 250 hectares of land)			
	up to 50 ha	50.01– 100 ha	100.01– 500 ha	Total	up to 50 ha	50.01– 100 ha	100.01– 250 ha	Total
National	15 793	5 020	9 124	29 937	1 132	391	404	1 927
Cherkaska	570	267	466	1 303	44	14	21	79
Chernihivska	235	125	344	704	25	11	14	50
Chernivetska	313	59	70	442	26	5	3	34
Dnipropetrovska	1 806	462	815	3 083	89	39	71	199
Donetska	329	143	288	760	29	9	13	51
Ivano-Frankivska	339	63	90	492	31	5	3	39
Kharkivska	428	237	522	1 187	28	20	21	69
Khersonska	679	257	467	1 403	25	21	15	61
Khmelnitska	592	203	341	1 136	52	8	14	74
Kirovohradska	1 352	510	759	2 621	107	37	36	180
Kyivska	560	211	384	1 155	57	12	10	79
Lvivska	449	152	225	826	29	15	13	57
Mykolaivska	1 935	452	681	3 068	146	33	35	214
Odeska	1 143	252	592	1 987	85	25	21	131
Poltavska	1 069	404	683	2 156	111	40	29	180
Rivnenska	211	47	119	377	15	5	4	24
Sumska	349	140	301	790	15	17	17	49
Ternopil'ska	406	107	229	742	18	12	14	44
Vinnytska	1 005	371	644	2 020	81	26	18	125
Volynska	346	100	184	630	22	7	12	41
Zakarpatska	431	27	29	487	38	7	2	47
Zaporizka	1009	328	652	1 989	40	10	10	60
Zhytomyrska	237	103	239	579	19	13	8	40

Table 2: Sample of livestock producers

	Cattle		Pigs		Sheep and goats		Poultry
Enterprises	1 792	Enterprises	1 297	Enterprises	513	Enterprises	316
<i>Less than 50 heads of livestock</i>	437	<i>Less than 100 heads of livestock</i>	404	<i>Less than 50 heads of livestock</i>	166	<i>Less than 4 999 poultry</i>	100
50–99	159	100–199	159	50–99	88	5 000–49 999	91
100–499	562	200–499	230	100–199	97	Total	191
Total	1 158	Total	793	200–499	87	Share in the total	60%
Share in the total	65%	Share in the total	61%	<i>More than 500</i>	75		
				Total	513		
				Share in the total	100%		
Share in the total numbers of animal	51%		35%		8%		13%
Number in the sample	198		136		32		49

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