

What if?

What if the war in Ukraine doesn't stop tomorrow or the day after or before the end of summer? Many people in Europe seem to be relieved that the Russian attack on Kyiv and central Ukraine didn't succeed. To many a concentration of the war in the east of Ukraine seems like a lesser evil than a full on war at the borders of the European Union. This however is an illusion and a very dangerous illusion as such. Without even taking into account the immense suffering of the Ukrainian people themselves, we simply have no idea what multiple crises are facing us if we don't put an end to this war. Why?

Because people don't understand the logistics of the global food chain. Because people don't understand the scale of the disaster with respect to global food security caused by this war. Because people are more afraid of a missile attack than by the slow motion impact of an elusive disaster of biblical proportions. Here I would like to try to make this disaster less elusive for you. Ukraine's main export food products are wheat, barley, sunflower oil and maize. I will focus on wheat in this paper.

If the war doesn't end but will be confined to the eastern part of Ukraine, what will happen to the production, harvest and export of wheat? And what will be the implications on a global scale?

1) PRODUCTION:

Wheat areas lying in occupied territory or formerly occupied territory:

Most of the land reserved for wheat production has already been seeded before winter, however of this land almost 20%-30% lies in occupied areas or in formerly occupied areas. In the occupied areas, Russia is deliberately obstructing farmers from working their fields and by bombing machine storages. In the liberated areas

there are still thousands of landmines in and around the fields. So effectively an estimate of 70%-80% of the Ukrainian land reserved for wheat production will be available for harvesting.

Lower yields due to problems with fertilizer and crop-protection:

The next step in the process of growing wheat is keeping it healthy. Organic farming is not the standard in Ukraine and it is impossible to make that switch within one season. So fertilizer and crop-protection against diseases is vital for a healthy crop, however the logistics for getting these products to the farms is severely hampered by the war. Due to the war, in Ukraine there is only limited availability of fertilizer. And if you can get your hands on fertilizer for your farm, prices have already tripled. If you don't use enough fertilizer, yields and quality of the crop can easily drop by 10%-20%. Next to fertilizer, crop protection is also essential. If the wheat for example gets infected with the disease fusarium and you can't spray against this disease in time, the yield will be significantly reduced. But not just that, the wheat will be toxic for human or animal consumption. This is only one example, you cannot predict what disease may affect your crop. Farming is all about taking the right actions at the right time, the windows of opportunity are small and every delay has a severe impact on the yield. So any hiccup in the delivery of these crop protection products to the farms will have an impact on the amount of wheat that can be produced. If the war continues, there will for certain be a reduction in yields caused by logistics delays due to the war.

Harvest

As said above, farming is working with small windows of opportunity. This counts especially for harvesting which takes place within a small window of a few weeks in summer. The wheat has to be ripe but not too ripe so that the grain for example spills on the ground, the weather needs to be dry enough so the crop isn't too moist. The harvest therefore takes place from early morning till late at night, whenever the weather allows it. Another important issue is that even in times of peace, it is always a logistical challenge to make sure that all spare parts are at the farm in time, imagine in times of war. You never know what spare part will be needed ahead of time, it is impossible to keep everything in stock that may be needed. And a combine harvester standing still, means no harvesting with that machine which immediately counts for a huge loss in harvesting capacity. The above mentioned issues can easily cause a 10% loss of potential yield. But even if there were to be no logistical problems, Russians have been bombing dairy farms, pig farms, food storages and distribution centres as well as preventing the people in the occupied areas from working on their farms. This shows their tactics of deliberately targeting the food

production in Ukraine. We should expect the Russians to try to continue to obstruct the harvesting process. An additional issue will be that during harvest season when it is all hands on deck, many of the Ukrainian farm workers will be fighting on the frontlines.

So *even if* 70%-80% of the fields seeded for wheat production can be harvested, the logistical challenges for the harvest due to the war and deliberate obstruction by the Russians will make it uncertain to say exactly how much of the planted wheat will actually be harvested this summer. We will only know after the harvest is over...

2) EXPORT

Even if we manage to fertilize, *even if* we are able to protect your crops from diseases and *even if* we can harvest the wheat in time, how will we export the wheat to those countries that are dependent on Ukrainian wheat? Lebanon, for example, is for 90% of its imports of wheat dependent on Ukraine. A country hosting the highest number of refugees per capita worldwide. The Government estimates 1.5 million Syrian refugees stay in Lebanon. This in combination with the explosion in the port of Beirut which also destroyed available wheat storage, the country is now on the brink of socioeconomic collapse; what will happen in this already geographically volatile area if they can't buy grain from Ukraine?

Seaports closed due to war

In Ukraine 85% of all wheat harvest is exported by ship via the ports on the Black Sea, of which around 60% leaves Ukraine through the ports in the region of Odessa. The rest leaves the country through ports that are now in occupied areas or places where there is still heavy fighting going on (in the regions of Kherson, Mykolaiv, Mariupol) some of those ports are already destroyed (Mariupol). The Odessa region is still under Ukrainian control and could with some additional effort increase the amount of wheat handled by their ports, but that doesn't help much if the Russians are controlling the Black Sea with their marine vessels. And *even if* the Russians would allow a corridor for ships to leave Odessa, which is extremely unlikely, the next obstacle will be the safety of the ships departing. Which captain would like to navigate their ships past sea mines and Russian warships; which insurance company is comfortable providing cover for potential losses caused by a blown up ship?

Transport over land

Even if we manage to seed, fertilize, crop protect and harvest 70% of the normal wheat production, but there is no possibility to export the wheat via the Black Sea ports this summer or fall, how do we get the harvest to countries like Lebanon? By train would seem to be the best solution, after all much of the grain arrives in Odessa by train as well. But then it is important to realize that the entire infrastructure around Odessa is built around the export of grain. You could look at Ukraine as a big river of grain flowing out into the world through the huge delta at the Black Sea. And what's more, all grain needs to be transloaded at the border crossings with Europe into wagons suitable for the European standard-gauge railway system. Ukraine is still using the Soviet broad-gauge railway system. The transloading docks for train wagons near Odessa are nearly 10 times the size of a transloading dock at the Romanian or Polish border. One border crossing over land on average will be able to handle an estimate of 500 tons of wheat in 24 hours. Romania, Slovakia, Hungary and Poland together have about 10 of such railway border crossings with Ukraine, which would amount to around 5.000 tons every 24 hours. Compare this to the 6/7 ports surrounding Odessa that can each load one ship in 24 hours with 40-60.000 tons of wheat. Transport by train could with some effort be scaled up to handle around 20% of Ukrainian exports; it will take 5 years to export all of the harvest by train.

Transport from other ports in Europe

Even if it would be possible to get large amounts of Ukrainian wheat into Europe over land, where should we go with it from there? We could transport it to other seaports like Rotterdam or Hamburg. However these ports are not equipped like Ukrainian ports with infrastructure for wheat export, and extra costs will have to be made for mandatory cleaning. The costs in Ukraine of the transport of wheat from the farm and onto the ship in Odessa free on board is \$30-\$40 per ton, the costs of transport of wheat from the farm in Ukraine onto the ship in Rotterdam free on board will be at least \$150 per ton. This increased cost per ton will make growing wheat in Ukraine unprofitable for farmers.

3) Other implications:

Other main export products from Ukraine

In the above we focused on the problems concerning the wheat production and export from Ukraine. Most of the problems described above count as well for the other main export products coming from Ukraine, like sunflower oil, barley and maize.

A decrease in export from Russia as well

Russia and Ukraine together are responsible for 12 of every 100 calories eaten every day by the world population. Russia may try to profit from the rise of wheat prices and manipulate other countries on a food market by creating artificial wheat deficits. Sanctions may be imposed trying to prevent Russia from exporting its wheat in order not to have the aggressor profit from its crimes, however not allowing Russia to export its wheat will cause even more starvation and poverty in Africa and the Middle East then can be expected with the fall out of Ukraine's export. And although Russia may profit from the rising wheat prices, it is important to realize that the Azov Sea contains 45% of Russia's grain export capacity, its effective closure due to the war having a profound impact on how much Russia can ship themselves. Additionally Russia may suffer from the sanctions imposed on them by having problems with supply of spare parts, fertilizer and crop-protection products and a decrease in their yields may be expected as well.

Russia may use this situation to gain political influence by offering support to countries that get into economical problems in exchange for their silence about or support for Russia's actions in Ukraine. Think about China which has a 10-20% share in Ukraine's exports in normal years, and Indonesia and Turkey with each a 10% share. But also a European country like Spain are in large part dependent on Ukrainian grain.

Starvation

We cannot predict what will happen if countries like Lebanon, but also Iraq, Iran, Indonesia and many countries in the horn of Africa will remain without Ukrainian wheat. Even the World Food Program gets its wheat from Ukraine and Russia. There will be starvation for sure, an estimate is that 31 million people in West and Central Africa alone may not have enough food to eat in the coming months, a large part of it caused by the war in Ukraine that has driven the food prices up already.

4) Conclusions:

- An estimate of only 70% of the normal area may be harvested this year with wheat. We need to assume losses of at least 10% of the potential harvest due to war related and logistical problems during the growing season and should foresee another loss of 10% of potential harvest because of war related and logistical problems during harvest season. **As a result an optimistic estimate of the percentage of wheat harvested this year compared to an average year will be 50%-60%.**
- Even if the war ends before the conclusion of summer, it will be a logistic impossibility to get Ukrainian grains and oilseeds harvested in time and exported to those countries that need it. Furthermore, considering that there is still around 30 million tons of last year's harvest (including maize) lying in Ukraine waiting to be exported, a best guess of how much of this summer's harvest will be exported to the countries dependent on Ukrainian wheat may well be zero.
- Russian export of grain will also severely be impacted by the war. Whilst this maybe a difficult and politically sensitive point to make, it is a fact that a cessation of hostilities is also the key to allowing Russia to export more which is crucial.
- The war in Ukraine may well cause a decrease of 30-50% of the export in grain from Russia and Ukraine combined. This may cause in the short term a physical deficit of wheat in countries normally dependent on Russian and Ukrainian grain, but for sure will cause the prices of grain to double compared to January 2022, but this could easily be more.
- Millions of Ukrainian refugees have come to Europe since the beginning of the war and we have welcomed in Europe the Ukrainian refugees with open arms, most of them are currently in Poland. How long will we be able to maintain this benevolent spirit? We know from the Covid pandemic that the spirit of 'we can do this' can be short lived. And the food crisis caused by the war, makes it so that we can expect more refugees coming to Europe from the Middle-East and Africa. Many of them are already living in horrible conditions in refugee

camps in for example Turkey, Lebanon and Somalia and are dependent on food coming from Ukraine through the WFP and other aid organizations. These organizations normally buy their grains from Russia and Ukraine themselves, which means that their supply will be impacted as well. These people are not going to sit and wait until they die from starvation. And history has shown that Europe does not always give refugees the same warm welcome as we gave the Ukrainians. The political implications of millions of refugees coming in via Southern Europe may be severe. How will Europe manage to stay united under the pressure of rising food and energy prices and millions of refugees coming in from the south and the east?