

# **Unleashing Ukrainian Agricultural Potential To Improve Global Food Security**



**June 2013**

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*Definition: Thought this report we apply the term **grains** to refer to wheat and coarse grains (including barley, buckwheat, maize, millet, oats, rye and sorghum) to preserve consistency between the Ukrainian and international statistics. Our definition of grains, however, excludes rice because of its relative unimportance in trade and production of agricultural commodities in Ukraine.*



# Unleashing Ukrainian Agricultural Potential To Improve Global Food Security

The Bleyzer Foundation Position Paper

## 1. Global Agricultural Demand – a Unique Opportunity for Ukraine

Ukraine – known a century ago as the breadbasket of Europe – today has the potential to become the breadbasket of the World, and to position itself as a major player in global food security. This is a unique opportunity for a country of 45 million located in the center of Europe – one that has been torn over the last two decades between its Soviet past and fledgling democracy. Global agricultural demand over the next several decades will continue to grow and will be affected by four major trends, two of which emanate from major demographic pressures (population growth and urbanization) and two that are consequences of economic development (higher per-capita income in emerging markets and higher demand for bio-fuels). Ukraine is uniquely positioned to capitalize on this growing demand.

### (i) Population Growth

World population is expected to grow from the current level of 7 billion to over 9 billion by 2050. This increase is equivalent to adding six countries the size of the USA to the current number of Earth’s inhabitants. In addition, there will be a need to better feed over a tenth of the current population, which today is undernourished. This is the equivalent to two times the population of the USA. As a result, during the next few decades, there will be an additional need to feed a population equivalent of about eight times the current population of the USA. This will put heavy demands on agriculture.

### (ii) Urbanization

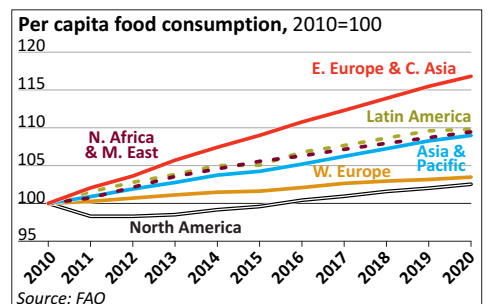
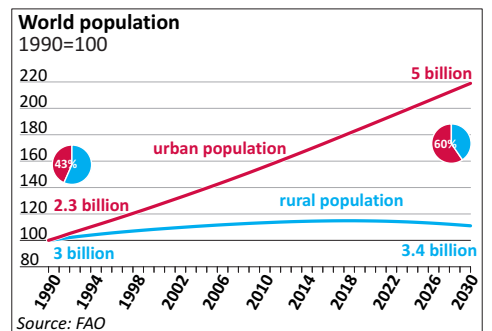
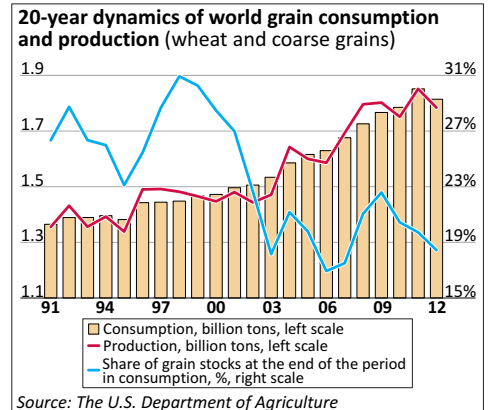
The second demographic pressure on agriculture will come from the rapid pace of urbanization in the world. The world’s urban population is expected to increase by 20% over the next decade, mostly due to growing cities in the developing part of the world. Due to changes in lifestyle of the urban population, per capita consumption of food will increase, putting additional pressures on food supply.

Furthermore, a diversion of water and land to urban use will undermine sustainability of traditional farming methods. These pressures will have profound implications not only for food consumption, but also for economic development, environmental pollution and utilization of natural resources, most importantly – water and land.

These dramatic demographic trends of population growth and urbanization are just a part of a broader story of intensifying demand pressures on world agricultural markets. Increases in per-capita income and higher demand for bio-fuels are also important, as discussed below.

### (iii) Increases in Per Capita Income

The pace of growth in income per capita in emerging economies will be three times higher than in developed nations. This will continue to drive per capita consumption of foods in developing nations. In fact, as developing countries get richer, they consume more calories as

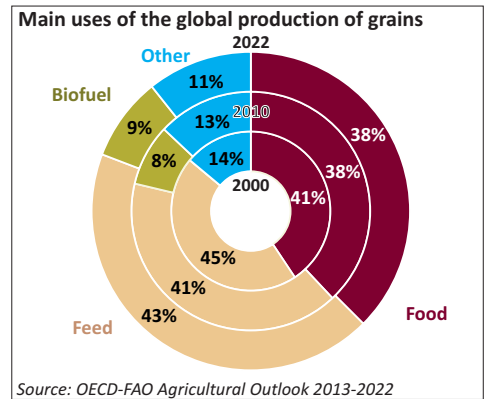
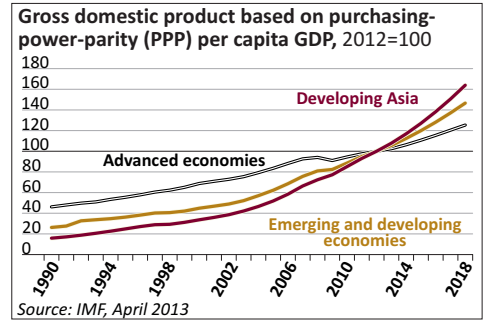


well as go through a dietary shift away from grains to meat, dairy and vegetables – foods whose production requires a more intensive use of land, energy and water. The Food and Agriculture Organization (FAO) estimates that in order to accommodate changing diets in developing countries, meat production will need to nearly double by 2050 from its current level.<sup>1</sup> This means that the production of soybeans (which is mostly used to feed farm animals) and other types of foods for farm animals will have to double as well.

**(iv) Higher Demand for Bio-fuels**

FAO estimates that over the next decade biodiesel production and fuel use of ethanol will grow by about 70%-80%. This increasing demand for biodiesel and bioethanol is a big factor behind the recent surge of global demand for corn, sugar cane and vegetable oil – which are used as a feedstock for the production of bio-fuels. This means that more land will be diverted to nonfood crops, leading to tighter supply and higher food prices in the coming years and decades.

In summary, population growth, urbanization, economic growth with a shift toward animal protein-based diets, and the requirements of agro resources for bio-fuels will sustain a steady growth in global consumption of agricultural commodities. According to estimates by The Bleyzer Foundation, the European Bank for Reconstruction and Development and other agencies, these trends imply that potential world’s agricultural consumption will increase by about 70% over the next 30 years (see Attachment II for details). World consumption of grains will increase from 1,865 tons in 2011 to 2,387 million tons by 2021 and to 3,215 million tons by 2041. Clearly, the world faces a serious challenge to supply more agricultural products in a more sustainable manner, as noted below.

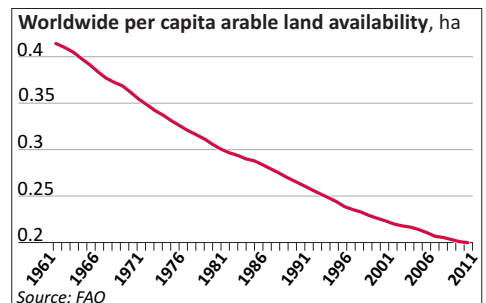


**2. Global Agricultural Supply**

On the agricultural supply side, the response of agriculture production to increasing demand is being constrained by the global shortage of suitable land, slowing agricultural productivity growth and environmental degradation.

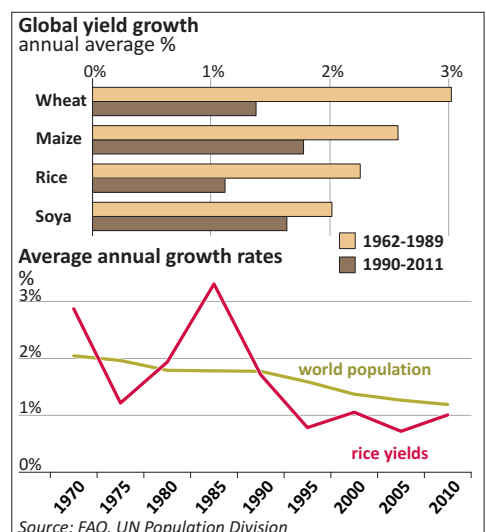
**(i) Global Shortage of Suitable Land**

Population growth and increasing urbanization are already diminishing the amount of land suitable for agriculture. According to FAO estimates, the global availability of per-capita arable land declined from about 0.4 hectares in 1962 to about 0.2 hectares currently, as shown in the chart. These land limitations mean that future agricultural supply may have to come mainly from productivity increases.



**(ii) Slowing Agricultural Productivity Growth**

Although increases in global agricultural productivity should play a dominant role in the future, the fact is that today the growth of agricultural productivity is already slowing. As shown in the charts on the next page, global yield growth for wheat slowed from almost 3% per annum in 1962-1989 to 1.3% pa in 1990-2011. Maize, rice and soy also experienced declines in global yield growth during these periods. Although population growth has also declined, as shown in the chart, the rate of population growth exceeds the growth rates of agricultural yields in most commodities.



One of the factors affecting agricultural productivity is the fact that the shortage of fertile agricultural land means that marginal and less attractive lands need to be brought under cultivation. These marginal lands are not as productive as older

<sup>1</sup>FAO, World agriculture towards 2030/2050, the 2012 revision.

land. Furthermore, improvements in existing farming methods are reaching the point of diminishing returns as manifested by slowing growth of crop yields.

Agricultural productivity is also being affected by growing competition for water. Agriculture, which accounts for about 70% of total annual global water consumption, will be competing for water with cities more aggressively as urbanization increases. In addition, an increasing production of water-thirsty commodities (such as meat and biofuels) will continue to deplete the overall water supply.

Another factor affecting agricultural productivity is climate change. The International Food Policy Research Institute (IFPRI) believes that climate change will be a major challenge for sustained growth of productivity and yields in agriculture. In particular, the IFPRI estimates that less stable climate conditions will be accountable for half of the overall food price increase in the future. More than that, according to the Global Climate Risk Index, low-income developing countries will suffer most from the consequences of the changing climate.

**(iii) Environmental Degradation**

Pollution and soil erosion are already limiting the upside potential for further yield gains in agriculture. They make crops more susceptible to pest damage, while deforestation and extensive use of pesticides are stressing fragile ecosystems.

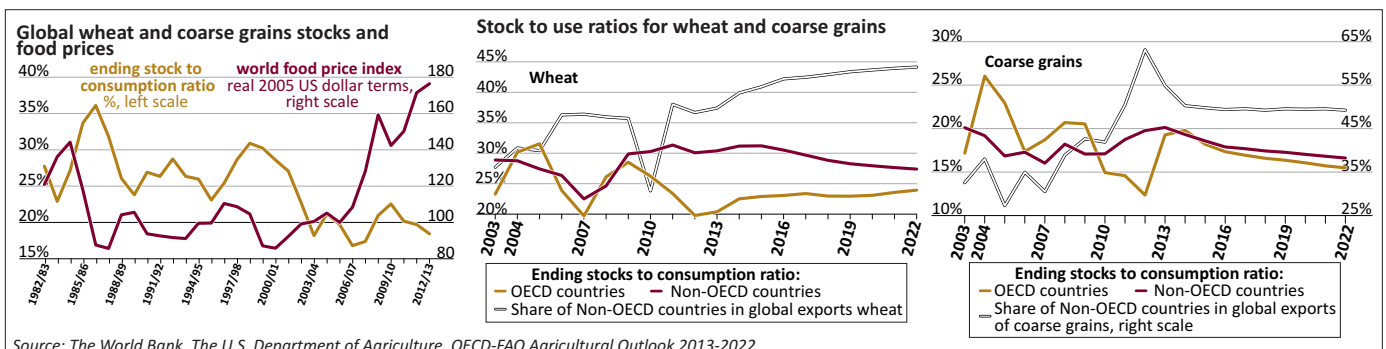
**3. Global Supply/Demand Balances and Agricultural Prices**

As noted in Attachment II, the above constraints to future agricultural supply will limit the rate of growth of world production of grains to about 1.3% pa. Accordingly, world grain production would reach 2,123 million tons by 2021 and 2,557 million tons by 2041 (according to OECD-FAO estimates). These numbers fall short of potential consumption of 2,387 million tons of grains by 2021 and 3,215 million tons by 2041, as noted earlier. Therefore, the potential worldwide shortage in grains may reach 264 million tons per year in 2021 and 658 million tons per year in 2041. In order to meet future food requirements, significant investments in productivity-enhancing technologies will be needed. This involves investments in modern agricultural machinery, fertilizers, improved seeds, plant protection, storage, transportation, and other on-farm facilities. Investment requirements are discussed in the concluding section of this note.

Given buoyant agricultural demand and constraints on agricultural supply, even over the short-term, food prices are likely to remain high. Agricultural production is not elastic in the short-term - farmers cannot respond quickly to demand changes. Thus, grain stocks play an important buffering role in mitigating short-term disruptions between supply and demand, which helps smooth price fluctuations. However, a series of recent supply shocks has led to a depletion of global grain stocks. Under current trends, these stocks will not be replenished soon. This means that future disruptions to global agro markets will likely trigger a stronger price response than in the past.

Over the longer term, higher demand and constrained supply mean that the global stocks of major grains will remain low. This should keep world food prices on a steady uptrend over the next few decades, especially taking into account that developing countries, where food consumption growth is faster, are taking on an increasingly more important role as exporters of grains.

To conclude, current and future trends in agriculture indicate that agricultural demand is bound to increase at a fast pace, whereas future agricultural supply faces great uncertainty. This means that major efforts and investments are needed to enable the world to feed itself. These trends also imply that investments in the agro business will deliver above average returns in the foreseeable future.



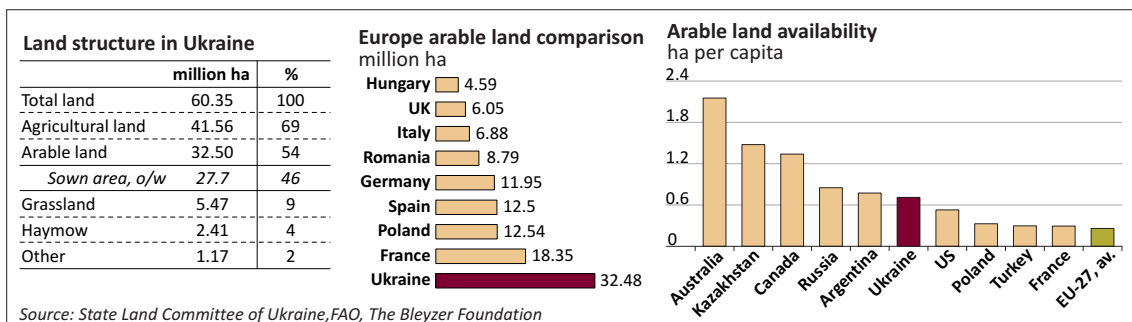
## 4. Ukraine’s Comparative Advantages in Food Supply

Ukraine is in a privileged position to play a dominant role in global food supply, offering excellent opportunities for investments in agriculture. After all, Ukraine has a diverse farming industry which can competitively supply the world with many staple agricultural commodities. Indeed, according to the FAO, Ukraine is among the world’s top 15 producers in the following commodities: sunflower seed, pome fruit, sour cherries, barley, currants, natural honey, mustard seed, gooseberries, walnuts, oats, raspberries, rye, carrots and turnips, cucumbers and gherkins, vetches, cranberries, eggs, sugar beets, chicory roots, buckwheat, potatoes, cherries, stone fruit, rapeseed, peas, garlic, indigenous rabbit meat, linseed, cabbages and other brassicas, maize, quinces, soybeans, flax fiber and tow, blueberries, apples, indigenous horse meat, plums and sloes, apricots, wheat, tomatoes, hops, strawberries, anise, badian, fennel, and corian.

Ukraine’s comparative advantages include: (i) a natural endowment of high quality fertile land that has already enabled large production and exports; (ii) high quality and relatively cheap labor force (compared to other European countries); (iii) a reasonably developed infrastructure; (iv) close location to the world’s key agro markets, and (v) a unique potential to generate superior returns on investments with the application of modern technologies.

### (i) Ukraine’s Agricultural Land

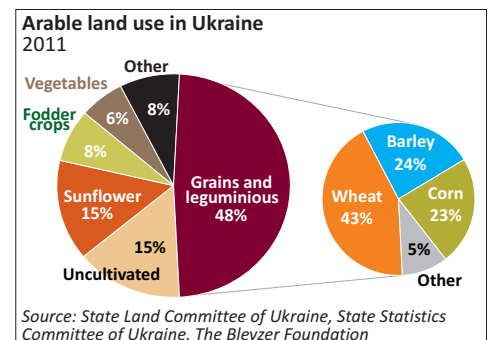
Ukraine, along with Denmark and Moldova, are the only three countries in the world in which arable land represents more than 50% of total land. Given its large size, Ukraine has more arable land than any other country in Europe with 32.5 million hectares. Ukraine’s arable land is about 4 times the size of the arable land of Italy, 3 times the arable land of Germany, 6 times the arable land of the UK, and equal to the combined arable lands of France and Spain. This gives Ukraine 0.71 hectares of arable land per capita, compared to only 0.26 ha for the EU-27.



Furthermore, Ukraine’s arable land is one of the most fertile in the world. The country is endowed with one of the world’s largest deposits of “black-earth” soil, known as Chernozem, which is rich in agricultural nutrients and has superior capacity to hold water. In particular, Ukrainian Chernozem has high humus content – the average depth of the humus layer in Ukraine is 40-60 cm versus 5-30 cm in the EU. Ukraine has about one-third of the world’s total black-earth soil. Black soil comprises about 60% of all cultivated land in Ukraine.

In addition, most of the Ukrainian agricultural land is in plains, with large and even fields averaging 100-150 ha, compared to much smaller European fields. These large fields should further facilitate the use of modern agricultural equipment and technologies.

Fertile and abundant land, with a temperate climate and sufficient rainfall, is well suited for the production of grains, oilseeds, sugar beets, and other crops. In fact, most of the territories in Ukraine receive between 500-1,000 mm of annual rainfall, which allows for productive farming without irrigation. Of its total arable land, 48% is dedicated to grains and legumes, 15% to sunflower, 8% to fodder crops, 6% to vegetables, and 8% to other products. About 15% of the arable land is uncultivated. Its rich land and favourable weather conditions have made Ukraine one of the largest agricultural producers and exporters in the world. An additional potential benefit to productivity is that Ukraine is now a non-GMO country (Genetically Modified Food is not allowed). This means that there is a substantial productivity potential in the future if GMO-traits in crops such as corn, soybean, sugar beet and potatoes were to be legalized. The government is now actively considering this possibility.





Yet, despite its highly productive soils, Ukraine still enjoys affordable land prices, which makes the entry into the local agro business especially attractive. Indeed, lease payments and land valuations in Ukraine are significantly lower than in other countries. For example, as shown in the chart, average annual rental of Ukrainian farmland is \$74/ha vs. \$314/ha in the U.K., \$234/ha in Spain, and \$93/ha in the Czech Republic. Although there is not a market value for the price of land, a possible value indicator is the government's cadastral value for land. It is \$2,600 per ha, compared to per ha prices of \$3,476 in the Czech Republic or \$4,039 in Latvia.

**(ii) High Quality and Relatively Cheap Labor Force**

Labor intensity in Ukrainian agriculture is relatively high. The sector employs about 5% of the labor force (as per ILO methodology). Including temporary and seasonal workers as well as small farms, the sector employs 15% of the labor force (as per World Bank methodology). One of the reasons for this high employment ratio is the existence – along with large and efficient fields – of many small, privately run farms. On these smaller farms, productivity per worker is low, because many farmers cannot afford better machinery, seeds and fertilizers. This also means that consolidation of small farm holdings is a viable option to boost efficiency and earn decent returns on investments in Ukraine's agro businesses.

On the upside, labor costs in agriculture are relatively low, which helps partly mitigate the impact of lower productivity on competitiveness. In 2012, the average monthly wages in the sector were almost 33% lower than the mean level for the total economy.

Ukrainian agriculture also benefits from a highly educated labor force. According to the World Economic Forum's Global Competitiveness Report 2012-2013, Ukraine has one of the highest tertiary (university) education enrollment levels in the world (10<sup>th</sup> out of 142 countries). As of 2008, the tertiary enrollment ratio in Ukraine was 79.4, which was close to the enrollment ratio of the United States (82.9) and was the fourth highest in all of Europe. This means that there is no shortage of well-trained and relatively inexpensive workers in Ukraine who can operate modern agricultural machinery, perform crop research, adopt advanced agricultural techniques, and manage modern farms.

**(iii) Reasonably Developed Infrastructure**

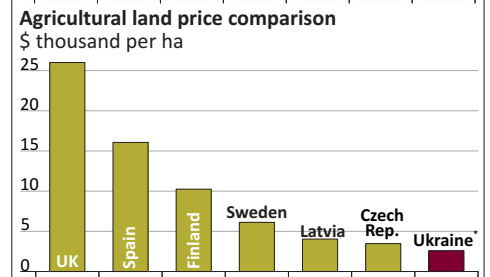
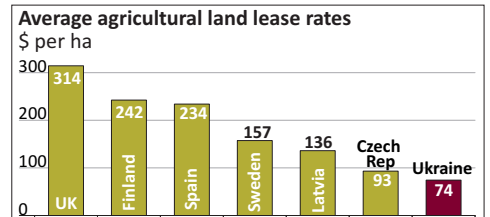
Ukraine possesses relatively well-developed infrastructure to support agricultural exports. The total transport network includes 21.7 thousand km of railroads, 165.8 thousand km of roads, 2.2 thousand km of operational river shipping routes with access to the Azov and Black seas. Railroad transport is the main means of passenger and cargo transportation. Ukrainian railroads carry almost 58% of cargo. According to the Global Competitiveness Report 2012-13, Ukraine is ranked 24<sup>th</sup> out of 144 countries in terms of quality of railroad infrastructure.

Ukraine also possesses the highest port potential among all countries in the Black Sea region. There are 18 merchant seaports along the coastline of the Black Sea region. The waterfront and port territories are equipped with about 600 gantry cranes, thousands of lift trucks of different types and other port machinery. The most important Ukrainian ports are those in Odessa, Ilyichevsk and Yuzhniy. These three ports alone account for around 56% of the entire cargo turnover in Ukrainian merchant seaports.

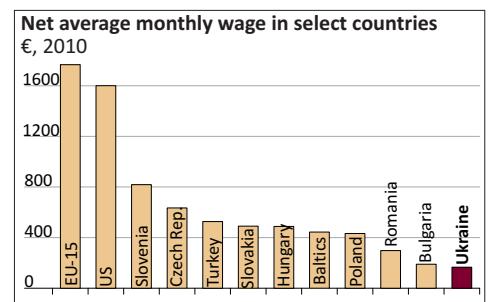
Although Ukraine requires improvement in the quality and efficiency of cargo transportation, as well as customs reform, the infrastructure sector is one of the country's competitive advantages for agricultural exports.

**(iv) Geographic Location**

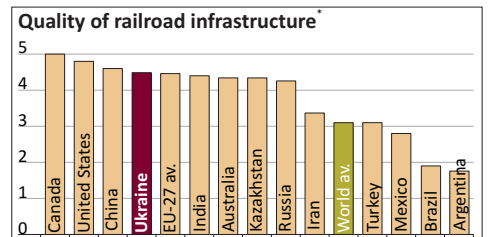
Ukraine is located at the crossroads of Europe and Asia. It borders the Black Sea and has a good rail network. As a result, Ukraine has a comparative advantage for exports to its major markets, which are in the Middle East, North Africa and the European Union, as noted in the chart.



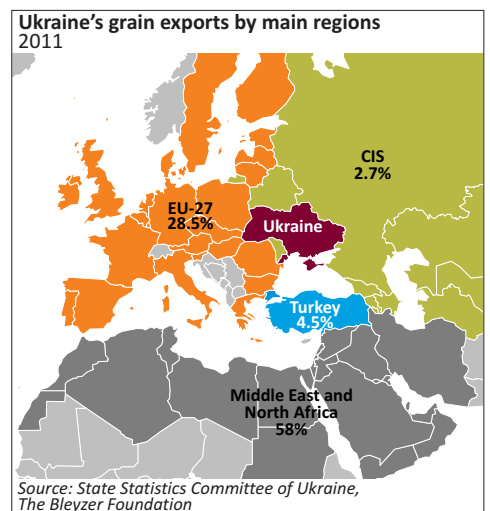
\*The cadastral value of agricultural lands in Ukraine is \$2,600 per ha



Source: Eurostat, SSC of Ukraine, The Bleyzer Foundation



\*The railroad quality was assessed from 1 (extremely underdeveloped) to 7 (extensive and efficient by international standards)  
Source: The Global Competitiveness Report 2012–2013



Source: State Statistics Committee of Ukraine, The Bleyzer Foundation

## 5. Ukraine's Agricultural Output and Exports

In the 19<sup>th</sup> century, Ukraine was known as the “breadbasket of Western Europe”. In the 20<sup>th</sup> century, it became the “breadbasket of the Soviet Union” producing about 25% of all agricultural output of the former Soviet Union. Today, Ukraine is among the world's top 10 producers of wheat and coarse grains (corn and barley), with about 55 million tons harvested in the 2011/12 marketing year.

	Production, 2011			Exports, 11/12 marketing year		
	Global rank	million tons	Domestic consumption, % of production	Global rank	million tons	% of the world exports
US	1	378.1	85%	1	72.2	27.3%
China	2	316.6	99%	13	1	0.4%
EU-27	3	284.7	96%	5	22.5	8.5%
India	4	128.6	95%	11	2.5	0.9%
Russia	5	89	75%	4	24.1	9.1%
Brazil	6	70.6	85%	8	11.5	4.4%
<b>Ukraine</b>	<b>7</b>	<b>54.9</b>	<b>51%</b>	<b>6</b>	<b>22.4</b>	<b>8.5%</b>
Canada	8	47.1	62%	7	21.1	8.0%
Argentina	9	44.4	40%	2	28.9	10.9%
Australia	10	42.7	36%	3	26.4	10.0%
Turkey	11	29.6	100%	10	4	1.5%
Mexico	12	29.5	150%			
Kazakhstan				9	9	3.4%

*\*When domestic consumption relative to production is close to or exceeds 100%, it means the country consumes more grains than it produces*  
Source: USDA

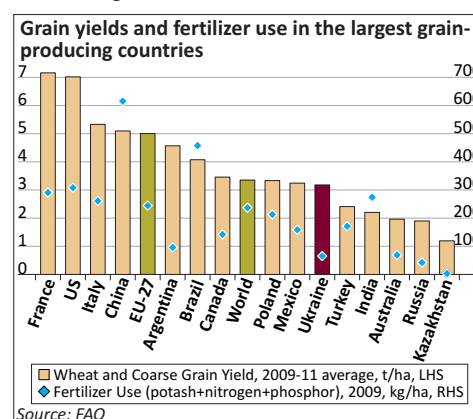
Unlike other large grain producing countries, such as China, India, Brazil, Turkey and Mexico, where domestic production is mostly used to supply local markets, only about half of Ukraine's grain output is consumed domestically. This makes Ukraine one of the top 3 leading exporters of coarse grain (barley and corn) in the world. For wheat and coarse grains, Ukraine is among the top 6 exporters, selling abroad as much as the entire EU-27 and more than Canada or Brazil (see table above). In the 2011/12 marketing year, Ukraine exported nearly 23 million tons of these grains, or about 8% of the world's total exports.

Notwithstanding its strong global position as a producer and exporter of grains, Ukraine still has enormous potential for improvement. This potential can be achieved through investments in agro technology, aimed at improving agricultural yields. At present, despite fertile soil and a favorable climate, average crop yields in Ukraine remain significantly lower than in Western Europe and even fall short of world averages.

Over the last three years, Ukraine recorded two years of high grain harvests with a record high in 2011. Despite this large output, Ukraine's three-year average crop yield of 3.2 t/ha for wheat and coarse grains was about 54% lower than in the US and about 40% lower than in the EU-27 and China. The respective yields for wheat and coarse grains in France, with which Ukraine is often compared, are 2.3 times higher than in Ukraine.

This productivity inefficiency results from decades of poor management and under-investment in agro machinery, fertilizers and high-quality seeds. Thus, Ukraine's fertilizer usage is almost 4 times lower than EU-27 and world averages. In addition, Ukraine's harvesting losses are about 20%, mainly due to outdated agricultural machinery and poor storage facilities. Furthermore, about 15% of total arable land is not cultivated.

All of this means that, by adopting Western agronomic techniques (agricultural machinery, fertilizers, seeds, and management practices) and bringing uncultivated land back into production, Ukraine could potentially boost its grain production to 150 million tons of wheat and coarse grains per annum (see the Attachments to this note for detailed analysis). Assuming domestic consumption remains relatively unchanged, Ukraine's exports could reach 125 million tons per year, transforming Ukraine into the world's largest exporter of wheat and coarse grains. In fact, Ukraine could surpass today's largest exporter of wheat and coarse grains, the USA, which exports about 85 million tons of these grains. For Ukraine's export potential to be realized, however, significant investments in agro technology, including fertilizers, machinery and infrastructure (such as storage capacities, transportation, sea ports) are required. This will also require improvements in government policies in the agricultural sector, as noted below.





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## 6. Government Policies in the Agricultural Sector

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Over the last few years, Ukraine has made progress in implementing major economic reforms in the agricultural sector. In particular, in the mid-1990's, the government liberalized most agricultural prices. Although the government still applies limits on increases in retail prices for some staple food products (e.g., sugar, bread, etc.), in general wholesale and retail prices for food are freely determined by market forces.

Subsequently, in 1999, the Government abolished agricultural cooperatives, transferring ownership of all collective farms to employees, with the temporary constraint that they could only farm or lease the land. The land sale moratorium has been repeatedly extended, with the result that land continues to be farmed by owners or under leases. The land sale moratorium is expected to be lifted in the near future.

In 2001, a new Land Code was enacted in Ukraine, which established the main legal rules for private land ownership and land markets in Ukraine. In particular, the Code defined land ownership as "the right to own, use, and dispose of land"; land can be acquired by private, legal and foreign entities with limitations on sale and purchase of agricultural land.

In 2011, substantial changes were made to the legislation to facilitate the eventual legal sale of agricultural land in Ukraine. The law on the State Land Cadaster was approved in August 2011 and came into effect at the beginning of 2012. This law stipulates the creation of a unified register of all agricultural land plots, which will be available online. Later on, at the end of 2012, the ban on sales of farmland was extended by three years to January 1<sup>st</sup> 2016 to provide the government with more time to pass legislation which will enable a smooth transition towards a market-based exchange of rights to own agricultural land. Subsequently, a draft law on the Transfer of the Agricultural Land was released at the beginning of April 2013. Although, this draft extends the right to own farmland only to citizens of Ukraine, Ukrainian-owned farms, and state and local authorities, it outlines clearer and friendlier rules for all investors in Ukrainian agriculture. More specifically, legal entities and foreigners will continue to have the right to lease land. The draft law also establishes that the transfer of farm land ownership will not forfeit existing lease rights on such land. Equally important, to encourage a speedier adoption of modern commercial farming and enhance the attractiveness of Ukraine's agriculture to foreign investors, this draft law sets rules for more secure farmland tenancy (by establishing a minimum lease term and more preferential treatment of longer term leases) and creates more favorable conditions for farm consolidation (for example, by placing a limit on the minimum size of a farm).

Other government policies also influence the development of agribusiness, as is done all over the world. Government support is carried out primarily through VAT reductions and flat tax benefits, as well as through the provision of subsidies and selective market interventions to stabilize domestic prices and promote domestic processing. In fact, agricultural producers in Ukraine have the ability to retain VAT payments to cover operating expenses. Another significant tax privilege for agricultural producers is the low agricultural land tax that replaces corporate income taxes for agribusiness firms that have 75% or more of their revenue coming from crop production. The land tax is applied per ha and varies according to the government assessment of the farmland value and, on average is much lower compared to the 19% tax rate on corporate profits in Ukraine. In addition to tax benefits, agricultural producers in Ukraine may receive a number of direct subsidies and rebates from the state budget, including subsidies for the purchase of machinery, fertilizers and inputs produced in Ukraine, and foreign machinery that does not compete with domestically produced equivalents; subsidies on production to maintain supplies of certain crops on the local market including wheat, barley, and sugar beets; and partial interest rate and insurance premium reimbursements on loans provided by Ukrainian banks and crop insurance.

The above tax benefits, subsidies and reimbursements have contributed to making agricultural production in Ukraine quite profitable. They support the natural comparative advantages and upside potential for Ukraine. Investment in land consolidation is likely to continue over the next five years, giving rise to some of the largest commercial farming operations in the world.

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## 7. Conclusions and Investment Prospects

Current global trends indicate that food security will be a major issue for the world over the next few decades. Global demand for food is likely to continue increasing at a fast pace, whereas food supply faces a number of constraints. As noted earlier, world grain scarcity may reach 264 million tons by 2021 and 658 million tons by 2041. In addition to possible food scarcities, the prices of agricultural commodities are likely to remain high. This means that food security may be a source of social and political instability in the most vulnerable regions of the world.

Ukraine is well positioned to play a major role in alleviating the problem of global food security. The country

has tremendous potential for producing agricultural products and becoming the world's leading agricultural exporter. In fact, Ukraine may be able to cover about 50% of the global food shortage envisaged for 2021. This could be achieved through more intensive use of modern agricultural technology, better management and improved infrastructure.

All of this provides for attractive investment opportunities in the sector. Several local agencies (The Bleyzer Foundation, National Academy of Agrarian Sciences, Ukrainian Grain Association) and international agencies (World Bank, European Bank) have estimated that Ukraine will need a total of about \$50 billion to \$80 billion of investments to realize its agricultural potential (see Attachment II for details). These sums include investments in agricultural machinery, fertilizers, plant protection, storage, transportation, and other on-farm facilities. Under the assumption that agricultural output could increase by about 10% per year, it would take about ten years for Ukraine to realize this potential, with investments of about \$5-8 billion per year. This level of investment will require significant contributions from large foreign and domestic investors.

In order to undertake these large investments in the agricultural sector, foreign and local investors will require a supportive investment climate for the country as a whole, with adequate incentives and predictable risks. Since the breakup of the Soviet Union, over the last 20 years, the country has made progress in improving its business environment and in creating a free and competitive market. In fact, today, Ukraine can show many areas of progress: (i) its 1996 constitution guarantees private property and market-based principles for the country's economy; (ii) it is now a member of the World Trade Organization; (iii) it has been recognized by the US and Europe as a functioning market economy; (iv) it has a largely free international trade system; (v) most domestic prices are un-regulated – except for some food items; (vi) except for a handful of “strategic” public enterprises in energy and large infrastructure, most public companies have already been privatized; (vii) about one third of the banking sector is now foreign-owned; (viii) a new Tax Code has been enacted that reduced the total number of taxes, will reduce the corporate tax rate from 19% today to 16% by 2014 and will reduce the VAT rate from 20% to 17% in 2014; (ix) a new Customs Code has been enacted to make customs procedures more in line with European standards; (x) it has made some progress in business de-regulation by eliminating a number of licenses, reducing the number of inspections, and simplifying procedures for starting new businesses; and (xi) it has initiated and formally finalized negotiations with the EU on an Association Agreement including a Free Trade Agreement. As a result of these policy changes, since the breakup of its planned economy, the Ukrainian private sector has developed to that extent that it now generates over two-thirds of GDP. GDP per capita in US Dollar terms has increased from less than \$500 in 1992 (after Ukraine gained its independence) to a current level of nearly \$4,000 (according to the latest IMF estimates). Improvements in the country's business climate allowed it to attract significant amounts of Foreign Direct Investments, which reached a record total stock of \$56 billion at the end of the first quarter of 2013.

Despite the progress made in Ukraine's investment climate, additional policy reforms are needed to create a more transparent, predictable, and even-level playing field for all enterprises. The Bleyzer Foundation, along with international organizations and other NGOs, have identified many of the policies areas where reform is needed. In particular, there is a need to (i) improve the workings of the legal system to make the Judiciary more effective, transparent and accountable; (ii) further de-regulate business activities by reducing the number of permits needed for registering property, starting a business, carrying construction activities, and securing utility provision; (iii) eliminate threats to property rights; (iv) facilitate the paying of taxes and reduce inconsistencies in the administration of taxes; (v) improve the efficiency of public administration; (vi) deal with corruption; and (vii) improve the country's international image.

The Bleyzer Foundation (TBF) has been playing an important role in assisting the governments of Ukraine to improve its business climate and attract larger amounts of investments. The Bleyzer Foundation is an international economic policy-oriented think tank that started its activity in Ukraine in 2001. Since then, it has published a number of documents relating to policy measures required to improve the business environment. It has worked with the US-Ukraine Business Council, the Grain Association of Ukraine and other NGOs to identify measures to remove constraints to investments. It actively cooperates with the Presidential administration, the Cabinet of Ministries, the Ministry of Economic Development and Trade, the Ministry of Finance, the National Bank, and number of other government and non-government institutions in formulating effective economic policies. TBF is involved in a number of new economic initiatives in the country, including those are related to agro sector development. TBF activity in agro matters includes: (i) organizing public discussions such as conferences and round tables on the most important topics of the future of Ukraine's agro sector; (ii) participating in government and non-government working groups and other initiatives on matters related to the country's agro sector; (iii) active cooperation with the US-Ukraine Business Council, AmCham, European Business Association, and other business oriented associations on agro matters; and (iv) publications in Ukrainian and international media on agro topics.

## ATTACHMENT I

### Factors Influencing Agricultural Yields in Ukraine

Although, soil quality and climatic conditions greatly influence crop yields, productivity in agriculture is mostly driven by adequate use of fertilizers, investments in modern machinery and irrigation systems, and effective farm management. Indeed, despite favorable climate and fertile land, Ukraine often falls behind its European peers in cross-country comparisons of grain yields. After all, fertilizer use in Ukraine is much lower compared to many developed countries: farmers in the EU apply almost four times more fertilizer per hectare versus Ukrainian farmers. For instance, the National Academy of Agrarian Sciences of Ukraine (NAASU) argues that the annual requirement of inorganic fertilizer nutrients in Ukraine amounts to about 250 kg per ha. In reality, local farmers apply just a third of this norm (on average, the use of fertilizers stood at roughly 70 kg per ha in 2012). This insufficient addition of fertilizers results in an excessive loss of nutrients in the soil which leads to farmland exhaustion and low grain yields in the future. Meanwhile, the annual use of organic fertilizers remains at just 0.6 tons per Ha versus the required level of about 8-10 tons per Ha.

Second, productivity growth in Ukrainian farming is constrained by the shortage of capital spending on modern agricultural machinery. In fact, countries with mature and highly productive farming, such as France, Canada, Australia, and the U.S. have a much higher level of capital investments per Ha compared to Ukraine. On the upside, there are signs that Ukrainian farmers are starting to upgrade their machinery and equipment by, for example, replacing old tractors and harvesters with fewer, but more productive, units. Having said that, harvesting losses in Ukraine (as can be seen in the table) still stay close to 20%, even though by international standards they should not exceed 3-5%.

Indicators	Years	Harvested	Grown	Losses
Yields, t/ha	2008	3.47	4.15	16.4%
	2009	2.97	3.71	20.0%
	2010	2.69	3.52	23.6%
	2011	3.70	4.40	15.9%
Harvest, mn. tons	2008	53.3	63.7	16.4%
	2009	46.0	57.5	20.0%
	2010	39.3	51.6	23.6%
	2011	56.7	67.5	15.9%

Source: The National Academy of Agrarian Sciences of Ukraine publication "The Current State of Agro Sector Reform in Ukraine" (2012)

These huge losses do imply that many farmers still lack adequate access to financing to buy modern agricultural equipment. According to the NAASU, Ukrainian farmers will need about \$3 billion a year over the next five years to fund capital replacement costs. Meanwhile, harvesting losses are eating up over \$1 billion annually as farmers continue using outdated machinery.

Lastly, weather conditions in Ukraine are suitable for highly-productive commercial agriculture without extensive irrigation. Irrigation is mostly used in the dryer southern regions of the country, while the highest total irrigated area was recorded in Ukraine in 1990-1992 at 2.6 million hectares, or around 7% of all cultivated land. Although, by mid 90s the irrigated area decreased sharply by about 70%, the use of irrigation systems has since been almost fully restored. Currently, about 2.4 million hectares are irrigated in Ukraine, which is about 50% of the land potentially suitable for irrigation. According to FAO estimates, with adequate investments, Ukraine could irrigate 5.5 million ha of agricultural land, which would produce considerable gains in grain yields. Indeed, agricultural research and practical experience indicate that a properly irrigated farmland can help double grain yields while vegetable yields may jump by 3-5 times. However, enlargement of irrigated territories would require significant investments to prevent and minimize soil erosion. After all, bad irrigation systems expose farmland to underflooding, salinization, leaching of nutrients from the soil, and deterioration of water quality. These factors as well as substantial capital costs may explain a rather limited expansion of irrigated farmland in Ukraine.

### Potential Crop Yields in Ukraine

Obsolete agricultural machinery, insufficient application of mineral and organic fertilizers and pesticides severely restrain the ability of Ukrainian farmers to capture the full genetic potential of Ukrainian crops (see table).

According to the data on genetic potential of wheat, barley and corn, Ukraine can produce as much as 180 million tons of grains on all suitable arable land. For example, to investigate the potential grain yields in Ukraine, the NAASU runs agricultural experiment stations in six natural and climatic zones of Ukraine, where winter wheat is cultivated with strict compliance with all technological requirements, such as fertilizers and pesticides use. Four years of these experiments showed that wheat yields varied from 8 to 9 tons per ha or about 75% to 85% of this crop's genetic potential. This is more than twice the yields currently achieved by Ukrainian farmers (or about 2.5-4.0 tons per ha).

Crop plant	Genetic potential, t/ha	Actual average yields compared to genetic potential, %
Winter wheat	10-11	30%
Barley	10	25%
Corn	12-13	53%
Sunflower	3.5-4	46%
Sugar-beet	50-60	61%

Source: The National Academy of Agrarian Sciences of Ukraine publication "The Current State of Agro Sector Reform in Ukraine" (2012)

Achieving similar results for other staple grains (such as barley and corn) would imply improving grain yields in Ukraine to the best levels in the Western Europe. This means that if the distribution of the future crop rotation



resembles the current distribution of the harvested area, Ukraine could potentially produce over 100 million tons per year of wheat, barley and corn (40 million tons of wheat, 15 million tons of barley, and 45 million tons of corn) just by increasing fertilizer use and enhancing crop protection. In addition, if a portion of the currently uncultivated arable land (about 15% of the total) is put back into the cultivation of the most productive grains, the annual output of these three crops could potentially reach about 120 million tons. Finally, better harvesting and agro machinery will help cut harvesting losses to the international norm of just 5%, which may push the total grain harvest to about **150 million tons, which is 83% of the genetic potential**. On this basis, Ukrainian grain exports may reach 125 million tons, given that domestic consumption is likely to stay at 25 million tons.

## ATTACHMENT II

### Unique Grain Export Potential of Ukraine

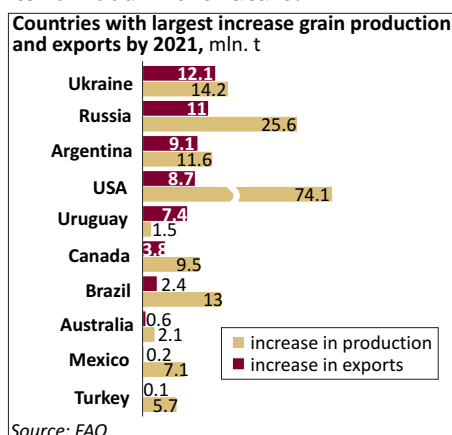
Food security is poised to remain the most urgent issue on the policy agenda of many governments in the future. Indeed, the table below reveals the extent of food shortages that may emerge in 10 to 30 years.

	2011	2021	2041
World Population, bln	6.97	7.73	8.92
OECD-FAO Production	1 864	2 123	2 557
OECD-FAO Consumption	1 865	2 114	2 544
<b>TBF Consumption</b>	<b>1 865</b>	<b>2 387</b>	<b>3 215</b>

OECD-FAO forecasts that future expansion of global grain production will be limited by the scarcity of arable land and technological constraints. Thus, world grain production is projected to grow from 1,864 million tons in 2011 to 2,123 million tons by 2021, or by about 1.3% pa, compared to about 2.0%-2.5% pa achieved over the past 10 to 50 years. On the grain consumption side, OECD-FAO projections simply assume that the world will consume whatever is produced. However, this assumption may conceal potentially large food scarcities in the future, a situation recognized in the OECD-FAO report. Alternatively, the The Bleyzer Foundation calculates "potential" world grain consumption (or desired consumption) based on continued rapid income and population growth in the emerging world, continuation of migrations of rural population to urban areas as well as higher demand for bio-fuels. On this basis, global grains consumption during the next decade will increase at least at the same rate as in the past 10 years, or by about 2.5% pa, reaching 2,387 million tons by 2021. This means that by 2021, there will be a deficit of 264 million tons of grains per year. Assuming that after 2021 the growth of consumption may slow down to 1.5% pa, by 2041, the global grain deficit would increase to 658 million tons per year.

### Countries with Large Potential to Increase Grain Exports

Our country-by-country analysis agrees with the OECD-FAO projections that Ukraine is the country with the highest potential in the world to significantly increase exports of wheat and coarse grains (as shown below) and meet the growing global requirements for food in the future.



Based on current conditions and trends, FAO estimates that Ukraine could expand exports by 12 million tons over the next decade (to about 31 million tons by 2021). Thus, according to OECD-FAO, Ukraine would supply at a minimum about 26% of the world's increase in grain exports during the next decade.

FAO projections for Ukraine are rather conservative since they are based on the status quo assumptions of continued moderate improvement of yields and a gradual expansion of harvested area under grains. Yet, Ukraine

could export about 125 million in about 10 years (as noted in Attachment I above), if adequate investments are made in agriculture, modern farming technologies are widely adopted, farm consolidation continues, and more arable land is used to grow crops for which Ukraine has a substantial comparative advantage, such as wheat and coarse grains. In fact, Ukraine has a potential to emerge as the biggest grains exporter in the world.

OECD-FAO forecast that developed countries (mainly the US, Canada, the EU, and Australia) would increase their grain exports by only 7 million tons during the next ten years (from 149 million tons to 156 million tons), which is less than the minimum amount obtainable by Ukraine. Although these developed countries would expand grain production by 1.3% pa in the next decade, exports will be limited by their higher domestic use. Actually, exports from the EU are expected to decline by 5 million tons by 2021.

Similarly, most emerging countries will also face constraints to expansion of grain exports due to arable land limitations, growing populations and poor infrastructure or technologies already in use in farming. As a result, OECD-FAO projections imply that during the next decade, the largest increases in grain exports among emerging countries would primarily take place in Russia (11 million tons), Argentina (9 million tons), Kazakhstan (5 million tons), and Brazil (2 million tons). All other countries will have negative balances.

As shown in the OECD-FAO table above, unlike Ukraine, other emerging countries with the greatest potential to increase grains output will use this expansion of local production almost exclusively to meet growing domestic consumption, with no surplus available for export. In fact, some of them will remain net grain importers. In particular, Brazil will continue to be a large grain producer and net exporter, but it will also use the bulk of its production increases for domestic use, with relatively negligible increases in exports. Kazakhstan will use half of its grain production increases for domestic consumption. In the recent past, Kazakhstan was able to increase production due to higher yields (from a very low base) and area expansion into marginal lands. However, according to FAO, this trend is not expected to continue at a significant pace, due to a number of limiting factors, including dry climate and risks of drought, geographic location with high transportation costs, poor infrastructure and lack of ports, saturation of Central Asian grain markets, and inadequate management capabilities.

Other countries face similar constraints. For instance, Egypt's potential to increase grain production and exports is limited by the fact that it is already using intensive agriculture, with yields comparable to the EU, thanks to its fertile land along the Nile. Yields for other African countries are low, but yield increases are likely to be limited by the quality of land.

Ukraine, on the other hand, should be able to increase yields to levels comparable to EU levels, due to the quality of its "chernozem" black soil, which is rich in agricultural nutrients and has a superior capacity to hold water.

### **Required Investments in Agriculture**

As discussed earlier, over the longer term, Ukraine can export four times more grain than the amount forecasted by FAO (up to about 125 million tons of grains/year), provided that suitable investments in agriculture are made. In fact, Ukraine is using only about 30% of the capital per hectare in agriculture that is used by the EU, as noted in the chart below:

<b>Capital per hectare in agriculture, \$ USD (2005 prices)</b>								
	2000	2001	2002	2003	2004	2005	2006	2007
Ukraine	1 448	1 491	1 467	1 445	1 429	1 416	1 410	1 405
European Union + (Total)	4 245	4 324	4 360	4 409	4 352	4 397	4 393	4 427

*Source: FAOSTAT*

The fact that capital stock per hectare in agriculture in Ukraine is about \$3,000 lower than in the EU allows us to estimate investment requirement of the Ukrainian farming which will help boost yields to European levels. We assume that in order to close the gap between the yields in Ukraine and EU by 50%-75% in 10 years, Ukraine will need to raise its capital stock in agriculture by about the same proportion or by \$1,500-\$2,500 per hectare. Thus, considering that Ukraine has over 30 million hectares in arable land, the agro industry may need about \$50 billion within the next decade.

Thus, assuming that (i) Ukraine can potentially reach grain yields that are similar to the best in Western Europe, and (ii) arable land use is shifted toward crops with the highest competitive advantage (more specifically, we base our projections of the future land use in Ukraine on the current land distribution of the best farms in Ukraine, which means that production of some other crops will go down), Ukraine can produce of 150 million tons of grains, including 125 million tons for exports, as calculated in the table on the next page.

If Ukraine were to use even better farming techniques, it is feasible to achieve yields of about 75% of the grain's genetic potential, given its superior soils and land configuration. Based on these assumptions, Ukraine will be able

	Prod.	Con.	Sown Area, ml. Ha		Yields, t/Ha			Projections, million Ha		
	2012 million tons		2012	Based on Harmelia pattern	Current	75% of genetic potential	<b>Future</b>	Prod.	Con.	Exports
<b>Grains (wheat and coarse grains)</b>	<b>43.5</b>	<b>22.3</b>	<b>13.3</b>	<b>22.2</b>				<b>150</b>	<b>25</b>	<b>125</b>
Wheat	15.7	12.6	5.6	10.5	2.9	8.2	<b>6.1</b>	64	14	50
Corn	20.9	5.3	4.4	6.2	4.8	9.8	<b>9.6</b>	60	6	54
Barley	6.9	4.4	3.3	5.5	2.1	7.5	<b>4.7</b>	26	5	21
Legumes	2.7		2.1	2.1				8		
Sugar Beets	18.4		0.5	0.2				7		
Sunflower and Oil Seeds	8.4		5.2	2				3		
Potato	23.3		1.5	1.5				23		
Vegetables	10.1		0.5	0.5				10		
Fodder Crops (fruits and berries)	2		2.5	1.5				2		
Idle land			4.4							
<b>Total Agriculture</b>	<b>108.4</b>		<b>30</b>	<b>30</b>				<b>195</b>		

to produce about 190 million tons of grains and export 165 million tons of grains, which may be possible over the long-term if there were to be a widespread adoption of the best farming methods.

Yet, even under our baseline scenario, Ukraine will be the world's biggest exporter of wheat with 50 million tons per year, compared to other wheat exporters in the 2021 OECD-FAO projections, namely Russia, (26 million tons), United States (24 million tons), Canada (20 million tons), EU-27 (17 million tons), Australia (17 million tons) or Argentina (9 million tons). Ukraine will also be the largest exporter of coarse grains (mainly corn and barley) with 75 million tons per year versus other coarse grain exporting countries: United States (62 million tons), Argentina (25 million tons), Brazil (11 million tons), Canada (6 million tons), Australia (6 million tons), and EU-27 (5 million tons).

Lastly, most net exporting countries such as Kazakhstan, Turkey and Brazil, have the potential to increase output and will also require large investments in farming on par with Ukraine. Yet their production and export surpluses will be significantly less than in Ukraine. Furthermore, in such big countries as Turkey and Brazil, the bulk of the grain harvest is likely to be used domestically. **Only Ukraine has a large potential to increase grain exports and to meet the requirements of enhancing global food security and contribute significantly to securing food supplies for countries with the fastest growing demand for foods, principally in the GCC region, Africa and Asia.**





*Headquarters*

123 N. Post Oak Ln., Suite 410  
Houston, TX 77024 USA

Tel: +1 (713) 6213111 Fax: +1 (713) 6214666

Email: [sbleyzer@sigmableyzer.com](mailto:sbleyzer@sigmableyzer.com)

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