

## Global Food Security and Role of 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

### **Rapid growth in global agricultural demand**

Over the next several decades, global agricultural **demand** will expand rapidly due to four major trends:

#### **1. Rapid Population Growth**

- The world population is expected to grow from the current level of 7 billion to over 9 billion by 2050, with most of the increase in emerging economies
- This increase is equivalent to adding **six** countries the size of the USA to the world's population.

#### **2. Rapid Pace of Urbanization**

- The world's urban population is expected to increase by 20% over the next decade, mostly due to growing cities in the developing world
- The urban population lifestyle boosts per capita consumption of food

#### **3. Increases in Per Capita Income**

- Consumption of food in developing nations is driven up by the growth rate in income per capita.
- Growth rates of income per capita in emerging economies are expected to be **three times higher** than in developed nations
- In fact, developing countries will consume more calories as well as go through a dietary shift to foods, such as meat, whose production requires a more intensive use of land, energy and water

#### **4. Higher Demand for Biofuels**

- Increasing demand for biodiesel and bioethanol is a big factor behind the recent surge of global demand for corn, sugar cane and vegetable oil.
- More land will be diverted to non-food crops, leading to tighter supply and higher food prices.

On the other hand, **global agricultural supply is being constrained by:**

#### **1. Global shortage of suitable land**

- 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

#### **2. Slowing agricultural productivity growth**

- Global yield growth for wheat slowed from almost 3% per annum in 1961-1990 to 0.5% p.a. in 1990-2007
- Maize, rice and soy also experienced declines in global yield growth

#### **3. Environmental degradation**

- Pollution and soil erosion are already limiting the upside potential for further yield gains in agriculture

### **Agricultural Prices, Food Stocks, and Need for Investments in Productivity**

#### **1. World grain stocks are likely to remain at the current low levels, indicating that world food prices will continue to rise in the future**

- Over 2000-2011, the average price growth for cereals was already high at 7.5% p.a.
- Prices for vegetable oils are expected to grow by more than 40% over the next 10 years

#### **2. Significant investments in productivity enhancement technologies** are needed to enable the world to feed itself and meet future food requirements.

- There will be a need for modern agricultural machinery, plant protection, improved seeds, fertilizers, storage, transportation, and other on-farm facilities

#### **3. Investments in the agro business will deliver above average returns** in the foreseeable future, particularly in countries that possess large stocks of fertile land, such as Ukraine

**Ukraine's Advantages in Food Supply:** Ukraine's Comparative Advantages include:

**1. Natural Endowment of High Quality Fertile Land**

- Ukraine's arable land is some 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.
- It has large and even fields averaging 100-150 ha (compared to 5-10 ha on average in Europe)
- Land prices are affordable at \$88/ha vs \$314/ha in UK
- Ukraine receives between 500-1,000 mm of annual rainfall, which allows for productive farming without irrigation

**2. High Quality and relatively Low-Cost Labor Force**

- Ukraine's labor force is well-educated: the country has one of the highest university enrollment levels in the world (at 79%, 7<sup>th</sup> out of 142 countries)
- Yet, monthly wages are one of the lowest in Europe
- This results in a well-trained and inexpensive workforce who can operate modern agricultural machinery, perform research, adopt advanced agricultural techniques, and manage modern farms

**3. Reasonably Developed Infrastructure**

- Ukraine possesses good infrastructure to support exports, on par with the EU, US and Australia
- 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.
- Quality of railroad infrastructure in Ukraine according to World Economic Forum is 4.4 compared to 4.8 in US, and 3.1 average in the world
- Ukraine has 18 merchant seaports: Odesa, Illichivsk and Yuzhny ports alone account for around 56% of the entire merchant cargo turnover
- Ukraine possesses the highest port potential among all countries in the Black Sea region

**4. Good Geographic Location**

- Ukraine is strategically located in the middle of a large and growing global trade zone, at the crossroads of Europe and Asia
- It has access to the Black Sea and has a good rail network to ports and shipping
- Given its location, Ukraine has a comparative advantage for exports to major markets, like the Middle East, North Africa and the European Union.

**5. Potential for Superior Returns**

- Based on Ukraine's resources, export of grains could grow 5-6x over ten years, from 22 million tons of grain exports achieved in 2011/12, to about 110 – 130 million tons.
- Ukraine consumes significantly less than what it produces: This is unlike other large grain producing countries, such as China, India, Brazil, Turkey and Mexico, where domestic production is mostly used to supply local markets.
- Ukraine can increase yields, while developed countries are constrained by yield growth
- Ukraine's three-year average crop yield of 3.2 tons/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**
- 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 **130-150M tons** of wheat and coarse grains per annum **or 3X current production levels**

## Social Side-Effects of Agricultural Expansion

- Although the expansion of Agriculture in Ukraine will yield global benefits by alleviating food security concerns, the Ukrainian government is concerned about two negative social side-effects in Ukraine:
  1. Improved productivity in agriculture and the use of better equipment will lead to **reductions in the agricultural labor force**: Excess labor will need to be accommodated in order to minimize unemployment and social tensions
  2. More intensive use of farm land may lead to **soil erosion** and nutrient loss and will need to be addressed (salinization is not a serious problem in Ukraine as most agriculture is not dependent on saline ground water).
- 1. Solutions to these issues must be included in any large-scale agricultural investment, especially if government guarantees, tax breaks, or other agreements are sought with the government

### 1. Dealing with Unemployment caused by Agricultural Expansion

- Most countries that modernized and increased productivity in their agricultural sectors faced reductions in jobs in agriculture (Poland, Romania, Central Asia, OECD countries)
- In Ukraine, employment in agriculture has been declining since 1991: in 2011, employment in agriculture represented 17% of total employment, compared to 23% in 1999 and over 30% at independence in 1991
- In 2011, agricultural employment amounted to 3.4 million workers (including farm owners, family workers, self-employed and salaried staff); salaried staff amounted to 730,000 workers (5% of total employment)
- Although there will be further job reductions in Ukrainian agriculture, labor input in Ukraine's farming compares rather well to other big grain producers. Therefore, further reductions in agricultural employment may be modest and the gains in agricultural output will come from investments in technology.
- Nevertheless, there will be a need to create Opportunities for Rural Employment as the experience in many countries is that displaced agricultural workers moved to cities creating social tensions if rural employment opportunities were limited.
- To avoid these migrations in Ukraine, agricultural investments could be accompanied with actions to promote rural development and jobs, including:
  - Upgrading human capital with investments in education through, for example, vocational training.
  - Improving access to credit for rural entrepreneurs
  - Investing in local infrastructure; for example, better roads will create more jobs in rural storage and transportation/logistics jobs
  - Strengthening local social protection networks – more jobs in rural service providing sectors
- The government may also encourage the development of industrial, commercial and service sectors that support primary agriculture
  - In several East-European countries (Poland, Czech Republic, Hungary), their service sectors absorbed most of the workers displaced by modernization of agriculture
- Investors in agricultural expansion may also need to invest in related agricultural industries, such as dairy, other food processing, and livestock, which are more labor intensive and which also can be quite profitable.

### 2. Dealing with Soil Erosion and nutrient loss

- Ukraine is less vulnerable to water soil erosion thanks to the fact that its farm land is in flat terrains with few slopes (water causes 58% of soil erosion in the world)
- Still, erosion can be caused by high winds (which causes 28% of soil erosion in the world)
- Soil degradation can also be caused by nutrient loss, which requires expenditures for greater use of fertilizers and crop rotations
- Major expansion of agricultural production in Ukraine will require investments to implement different methods to reduce soil erosion
- Soil erosion might be reduced the following ways:
  - Crop residue left on the field after harvesting during all winter reduces erosion and soil fertility decline; but it encourages pests -- and heavier amounts of pesticides are required to eliminate the problem.
  - No-till (or minimum-till) farming enables both erosion control and cost reduction
    - Growing crops without disturbing too much the soil through tillage
    - Enhances soil quality by conserving organic nutrition and moisture, decreases water runoff, improves green gas retention by soils, reduces fuel, machinery and fertilizer costs, boosts yields
- Crop rotations take into account nutrient loss issues: high nitrogen generating crops, such as peas and chickpeas, are included in the rotation.