agribusiness **handbook**

Barley Malt Beer

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Barley
Malt
Beer

This handbook is part of a series of agribusiness manuals prepared by the FAO Investment Centre Division, in collaboration with FAO's Rural Infrastructure and Agro-Industries Division. It was prepared for the EBRD Agribusiness team, under the FAO/EBRD programme of cooperation. The production of the manuals was financed by FAO and by the EBRD multidonor Early Transition Countries Fund and the Western Balkans Fund. The purpose of this handbook is to help agribusiness bankers and potential investors in the Early Transition countries (ETCs) and the Western Balkan countries (WBCs) to acquire basic knowledge about the beer sector and to become acquainted with recent economic trends in the sector around the world, with a special focus on the ETCs and the WBCs. This volume was prepared by Inna Punda, FAO Agribusiness Expert, and reviewed by Dmitry Prikhodko, Economist, FAO Investment Centre Division, as well as by members of the EBRD Agribusiness team. Electronic copies can be downloaded from www.eastagri.org, where a database of agribusiness companies, including breweries in the ETCs and the WBCs, is also available. Please send comments and suggestions for a future edition of the manual to TCI-Eastagri@fao.org.

Design and page layout Alberto Pedro Di Santo

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INTRODUCTION

Beer is an ancient beverage. Clay tablets describing the beer brewing process and dating back more than 5,000 years have been found in Mesopotamia. According to these tablets, Sumerians used to prepare “beer bread” out of germinated barley seeds. By crumbling this bread into water, they obtained a liquid called “sikaru”, which was finally boiled and mixed with a few herbs, resulting in a drink free of harmful bacteria.

Over time, different types of starchy plants have been used for brewing, including maize (in South America), soy (in India and Persia), millet and sorghum (in Africa) and rice (in the Far East). Nowadays, beer production using barley malt is the most common brewing process worldwide.

1.1 Production of barley

1.1.1 Key production parameters

Barley is a short-season, early maturing crop that is among the most highly adapted grains and can grow in climates ranging from subarctic to subtropical areas. The main risk factors for winter varieties are freezing winter temperatures and over-heating during grain maturation. A temperate climate is ideal for barley. Barley adapts to a wide variety of soils and is, for example, less sensitive than wheat to dryness or poor land.

The planting period runs from mid-September to October for winter barley, while spring barley is generally planted in March to April. Crop density at the time of planting varies from 180 to 200/m², depending on prevailing farming practices and intended use of the crop. The growing season depends a lot on the variety and time of planting. Winter varieties complete their development cycle with a cumulative temperature of 1,900–2,000 °C, while spring varieties need only 1,500–1,700 °C. Harvesting usually takes place from the end of June to mid-July for winter barley and in August for spring barley.

According to FAOSTAT, worldwide yields averaged 2.4 tons/ha in 2007 (2.6 and 1.5 tons/ha for the Western Balkan countries (WBCs) and the Early Transition countries (ETCs), respectively). However, depending on climate, variety, technology, and other conditions, barley yields can range from 0.8 to 7.5 tons/ha. In dry regions, irrigation contributes to increased output.

1.1.2 Different types of barley

Domesticated barley is classified as either six-row (6R) or two-row (2R), depending on the physical arrangement of the kernels on the plant. Barley is also described as hulled or hull-less depending on the presence of beards or awns covering the kernels.

There are two types of barley: winter (2R or 6R) and spring (2R). The advantage of winter barley is that it can benefit from fall soil moisture, which ensures higher yields as compared with spring barley. 2R barley has a lower protein content than 6R barley and is therefore more suitable for malt production. High protein barley is best suited for animal feed.

Traditionally, spring malting barley was produced in regions with moderate temperatures and adequate rainfall throughout the growing season (650 mm per year). Winter malting barley was mostly grown in the milder arid and semi-arid regions of Europe. Due to its higher yield potential, winter malting barley is

now increasing in acreage in traditional spring barley regions. New varieties of winter malting barley could provide brewers with better quality, namely higher fine extract content, better malt modification, and lower malt protein content.

Barley is used commercially for animal feed, malt production (barley is one of the most important ingredients in beer production), and for human consumption. Each of these uses is best met with specific barley varieties. The main use of barley is fodder for livestock. Only 13% of the barley produced worldwide is processed into malt.

1.1.3 Malting barley specific parameters

Malt barley is one of the principal ingredients in the manufacture of beer. Brewers can either purchase malt barley to manufacture malt themselves or purchase malt from malting companies. In either case, malting quality barley must meet the special quality specifications shown below. Accepted malting barley varieties must allow malt production within parameters that meet brewers' specifications. The malting characteristics of barley also depend on growing conditions, harvesting conditions, and storage.

To be used in the brewing industry, barley must fulfill the following main criteria:

- high germination capacity
- purity (in the variety)
- graded grain
- low protein content

The detailed specifications[1] of these requirements are:

- Germination %: min. 97% after 3 days
- Germination index: min. 6.0
- Water content: 12.0%, max. 13.0%
- Protein content: > 9.0% and < 11.5%
- Grading: min. 90%, > 2.5 mm.
- B-glucan content: max. 4%
- Micro-organisms below a set level
- Pesticide residues according to national law
- Ochratoxin according to national law
- Aflatoxin according to national law
- Variety purity: min. 99%

The quality specifications for the physical characteristics of malting barley have tightened. This has been driven by the demand of maltsters to address specific quality parameters, as breweries themselves have become more stringent in their requirements.

[1] *Source: Carlsberg Research Centre.*

Currently, there is increased emphasis towards:

- high malt extract at low modification levels
- high diastatic (enzymatic) power levels
- low malt colour levels
- uniformity of grain size

1.1.4 Key production costs and average margins for producers

For an average yield of 5.25 tons per ha for spring (malting) barley obtained in the United Kingdom in good cropping conditions, with availability of all necessary good quality inputs, the variable costs per hectare are roughly as follows:

Production Level	Low	Average	High
Yield: (tons/ha)	4.4	5.25	6.1
Output, per 1 ha, USD[a]/ha	776	927	1,078
Variable costs, USD			
Seed		81	
Fertilizer		108	
Sprays		113	
(Herbicides 54%, fungicides 41%, other 5%)			
Total variable costs, USD		302	
Gross margin, usd/ha	475	626	777

[a] *UK pound sterling converted at the exchange rate of 1.56.*

Source: Farm Management Pocketbook. John Nix, 09/2007

In addition to these costs, operating costs for machinery (and its depreciation), fuel, salaries, etc. must be added. The calculation of producers' margin should also account for the income derived from straw, an important by-product, which is often collected after harvesting. Average straw output is approximately 2.75 tons per ha, valued at USD 20–80 per ton, which can increase producers' gross margin by USD 100 per ha on average.

1.2 World production and main suppliers of barley

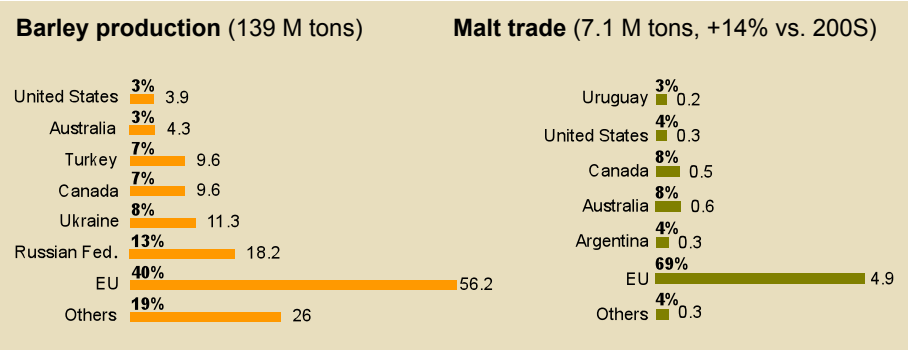
World barley production reached 136 million tons in 2007, up 3 million tons from the previous year's results. Barley is the second most important coarse grain[2] after maize (785 million tons in 2007) and outweighs by far sorghum (65 million tons). Three regions produce more than a half of the world's barley: the European Union (EU) (43%, mainly Spain, Germany and France with about an 8 %-share each), the Russian Federation (11%) and Canada (9%). Europe

[2] *Coarse grains generally refers to cereal grains other than wheat and rice. They include corn, barley, oats and sorghum.*

has long been a producer of malt barley. The use of subsidies to encourage production has resulted in the EU competing with Canada as the largest malt barley exporter. Presently, the Russian Federation is the largest country producer of this crop in the world, with production standing at 18.2 million tons (figures FAOSTAT, 2006) on 9.6 million planted ha, of which only 1.3 million tons were exported.

In 2006, 139 million tons of barley were produced globally, which is an average result for the last three years.

Figure 1: Global barley production and malt exports, 2006 (milion tons)



Source: FAOSTAT Database. © FAO 2009

Among the main barley producing countries, EU, Canada, United States, and Australia are also the largest malt exporters (see Figure 1).

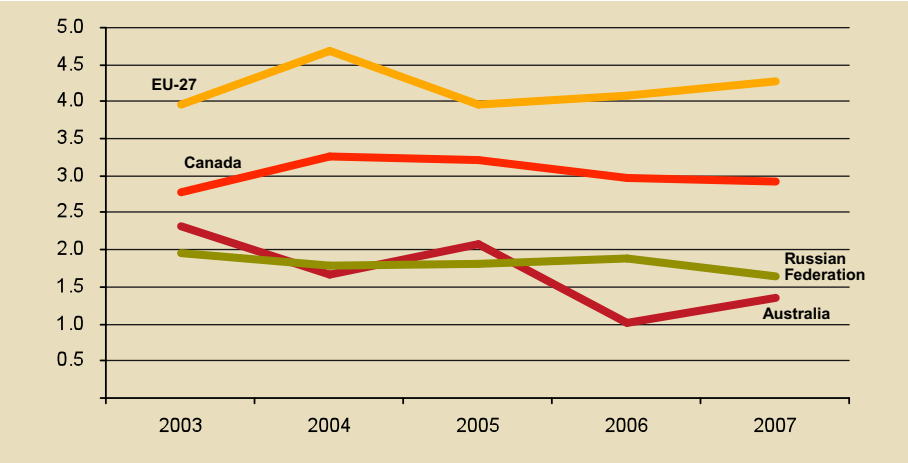
Table 1: World barley production and its recent evolution

	2003	2004	2005	2006	2007	2007/2006
Area harvested, M ha	57.7	57.6	55.7	56.6	56.6	+0.1%
Production quantity, M tons	142.1	153.9	138.9	139.1	136.2	-2%
Yield, tons/ha	2.5	2.7	2.5	2.5	2.4	-2%

Source: FAOSTAT Database. © FAO 2008

A slight decline in barley yields in 2007 is mainly due to unfavourable climatic conditions in the main producing countries, particularly in Australia (due to continuous drought).

Figure 2: The evolution of average barley yields in the main producing countries (tons/ha)



Source: FAOSTAT Database. © FAO 2009

Table 2: Area cultivated, production quantity and yield of barley[3] in the main producing countries, 2007

Country	Area harvested M ha	Production quantity M tons	Yield tons/ha
World total:	**56.6**	**136.2**	**2.4 (average)**
1 Russian Federation	9.6	15.7	1.6
2 Canada	4.1	11.8	2.9
3 Spain	3.2	11.7	3.6
4 Germany	1.9	11.0	5.7
5 France	1.7	9.5	5.6

Source: FAOSTAT Database. © FAO 2008

The share of world barley production of the WBCs and the ETCs is 0.5% and 1.4%, respectively. It is estimated at 0.4 million tons for the WBCs and 1.1 million tons for the ETCs. The biggest producers in the two regions are Azerbaijan, Serbia, Kyrgyzstan, the Republic of Moldova and Uzbekistan.

The world output of barley to increased significantly in 2008 by some 10%[4] to nearly 148 million tons. In Europe, the output is seen to rise sharply by

[3] *It is difficult to access regional malting barley data. We estimate that approximately 70% of the barley consumed in the region is used for animal feed.*
[4] *FAO Food Outlook/Global Market Analysis. June/2008.*

12%, reflecting increased plantings in several countries, but also a recovery of yields after adverse weather conditions in 2007.

As for malt quality barley, the 2006 crop had major shortages in Europe and Australia:

- Europe had a poor year starting with cold conditions and leading to a hot dry summer, resulting in a wet harvest rising to pre-sprout damage. This resulted in a shortage of 1 million tons of malting barley.
- Australia faced drought conditions resulting in a disastrous harvest. Instead of the typical 9 million tons, only 4 million tons were harvested.

Poor harvests in Europe and Australia have motivated Far Eastern brewers to favour North American maltsters, who are perceived to be a more reliable supply.

European barley yields and quality in 2007:

- Climate related poor yields were observed in Europe for the second year running. 58.5 million tons compared with 56.2 million tons in 2006.
- Highly unusual weather in Northern Europe dashed hopes of a recovery in barley stocks.
- Output was poor in Northern Europe and better than expected in Scandinavia.
- Low yields and the withholding of barley by growers propelled barley pricing to record highs.
- Higher proteins and lower plumps are expected.
- An average of EUR 280 per ton for 2008 crops is expected to attract seeding.

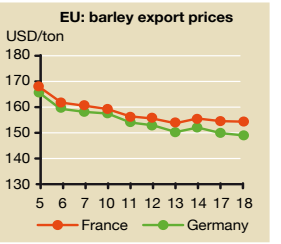
1.3 The sale price of barley

Barley prices have been highly volatile in recent years. For instance, in early 2008 feed barley prices increased by around 45%[5] compared with the previous year. This was due to drought weather conditions in major producing countries and export limitations imposed by some exporters in CIS. Increased production in 2008, coupled with concerns over economic slowdown in the near future, has put downward pressure on barley prices.

[5] *FAO. Food Outlook/Global Market Analysis. June 2008.*

Table 3: Feed and malting barley prices, 2008

Export prices (f.o.b., USD/ton)	18 Nov	11 Nov	Year ago
EU (France) feed	149	154	330
Australia (Adelaide) feed	134	142	278
Black Sea feed	130	140	n/a
EU (France) spring malting (Rouen)	193	n/a	n/a
Australia (Adelaide) malting	224	224	336
Canada (St. Lawrence) malting	273	279[a]	400



[a] – *10 Nov quotation.*

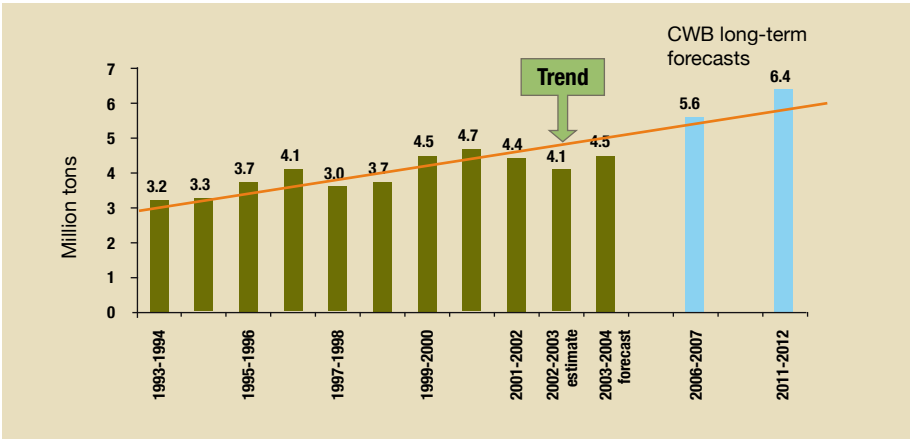
Source: International Grains Council Grain Market Indicators. November 2008

1.4 Barley trade

In 2008, the world barley trade is expected to increase to 16.5 million tons[6] – a nearly 3 million ton increase compared with 2007. The increase reflects larger export availabilities from Australia, the European Union, the Russian Federation, and Ukraine, which together are likely to more than offset reduced production in Canada and Kazakhstan.

The long-term world malting barley forecast suggests that global malting barley trade will increase from about 4.5 million tons (2006) to 6.4 million tons by 2011[7].

Figure 3: World malting barley trade (bulk)

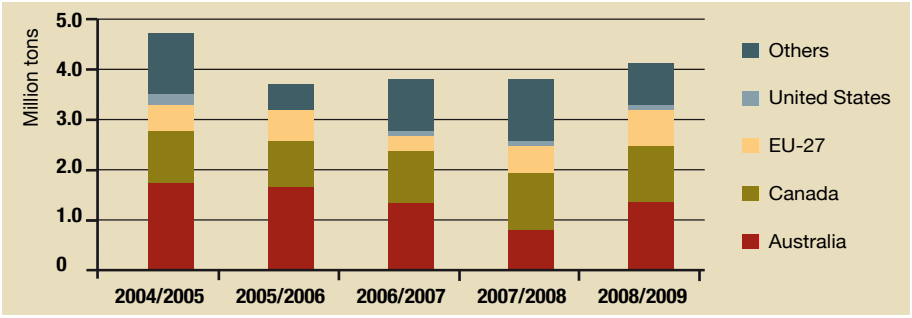


Source: Canadian Wheat Board

[6] *FAO. Food Outlook/Global Market Analysis. 06/2008.*
[7] *Canadian Wheat Board forecast.*

Europe, Australia and Canada are the key players in the price of malting barley (see Figure 4).

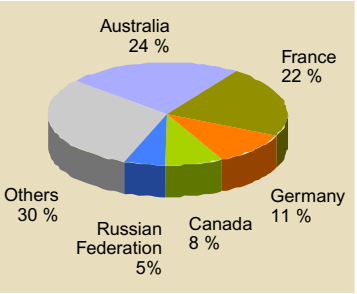
Figure 4: Malting barley exports



Source: ABB, 2008

Table 4: The world's top barley exporters and their world share (HS[8] 1003)

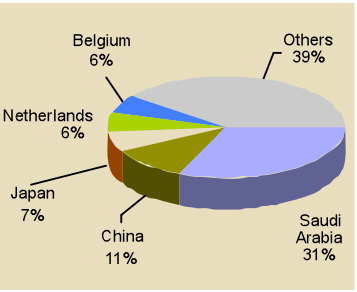
Country	Trade value, M USD		
	2006	2007	Trend 2007/2006
Australia	700	443	-37%
France	656	1,187	+81%
Germany	312	665	+113%
Canada	237	451	+90%
Russian Federation	158	416	+163%
Others	900	1,881	+109%
Total exports:	**2,964**	**5,044**	**+70%**



Source: Copyright © United Nations, 2008 – UN Comtrade Database

Table 5: The world's top barley importers and their world share

Country	Trade value, M USD		
	2006	2007	Trend 2007/2006
Saudi Arabia	1,214	2,142	+76%
China	406	267	-34%
Japan	261	414	+59%
Netherlands	234	314	+34%
Belgium	218	331	+52%
Others	1,530	2,366	+55%
Total imports:	**3,863**	**5,835**	**+51%**



Source: Copyright © United Nations, 2008 – UN Comtrade Database

[8] *The Harmonized Commodity Description and Coding System.*

1.5 Current trends: malting barley has a new competitor for acreage

- In terms of quality, maltsters continue to identify specific varieties that are able to show qualities of protein, extract, yield, low modification, germination etc. However, they then go on to choose other varieties that may be able to give them an overall combination of not only quality but also lowest cost from their purchase position. This at times drives the demand for specific varieties by maltsters.

  Future brewery quality requirements will focus on:

Filterability	Improved shelf life
Head retention	Haze and flavour

  The increased availability of good malting barley varieties and their successful production ensures the sufficient production of malt with required specifications.

- **Biofuels:** ethanol and biodiesel. Government programs in the EU and the United States continue to promote growth; as production of biofuels goes up, year-end stocks have gone down.
- **Feed grains**: increasing demand for meat adds to growth in demand for feed grains.

2.1 Processing barley into malt

Malting is the controlled germination of cereals, a natural process terminating with the application of heat. Further heat is then applied to "kiln"[9] the grain and produce the required flavour and colour. A basic rule is that, for malt to be made, the barley must be capable of germination, so maltsters source barley with a minimum germination of 98%.

Processing into malt is an essential step which allows the use of barley grains in the brewing process. In biochemical terms:

- the envelopes of the small nucleus containing starch chains are disintegrated; and
- enzymes (diastase, which will remain inside the germinated grains) are produced.

2.1.1 Process description

Incoming grain is received at moisture levels of between 10 and 12%. Every load is sampled, inspected, and tested at the intake point. Once tipped, the grain is cleaned through screeners to remove stones, foreign bodies, dust, and straw. Once cleaning and drying processes are complete, the grain is stored in silo.

There are five stages in the process of converting barley into malt:

- barley grading and cleaning
- steeping (24 hours)
- germination (96 hours)
- kilning (24 hours)
- malt cleaning and grading

The processing cycle is completed in approximately nine days.

2.1.2 Conversion factors from raw material

Approximately 120 to 130 kg of screened barley are necessary to obtain 100 kg of malt (depending on grain quality and purity). The average ratio used is 1.267.

2.1.3 Key processing costs

The economics of the malting industry critically depend upon the selection of barley varieties, their protein content, plumpness, and moisture content. The following economic considerations are for illustrative purposes only (European standard plant).

[9] *The kiln receives the modified green malt when the maltster considers that the process of germination should be terminated (UK Malt).*

Table 6: Illustrative operating costs for malt production*

Item	Ratio per ton of barley	Cost of barley USD/ton
Barley	1 ton	135.00
Fuel energy	750 kWh	22.50
Electricity	130 kWh	13.00
Water	7 m^3	7.70
Spare parts	Lumpsum	3.00
Miscellaneous, analysis	Lumpsum	1.00
Labour (50 people)	(USD 20,000/year)	12.50
Total direct operating costs		**194.70**

**Assumptions: 8,700 ha per year operation – annual processing capacity of 80,000 tons of barley.*
Source: Groupe Soufflet

Raw barley accounts for as much as 70% of total malt production costs.

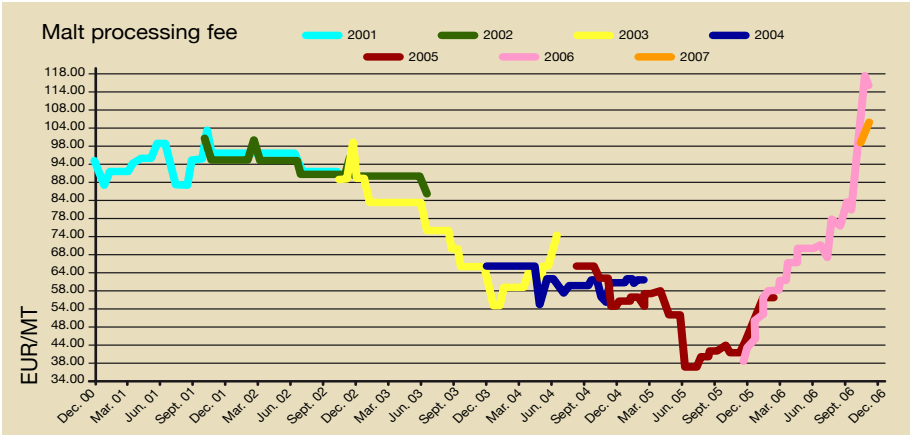
Table 7: Cost[10] of raw materials for the production of light malt from the Primorsky-98 variety of malting barley

Raw material	Unit price USD	Quantity needed per 0.415 kg	Cost of raw material USD
Barley, kg	0.26	0.02	0.13
Water, filtrated, litre	0.0047	0.46	0.06
Hydrogen peroxide, litre	1.24	0.00027	0.01
Cost of 0.415 kg of malt => Cost of 1 kg of malt			0.2 0.47

Source: Pacific State University of Economics, Russian Federation, 2008

[10] *Wholesale prices as of April 2008.*

Figure 5: Malt processing fee dynamics

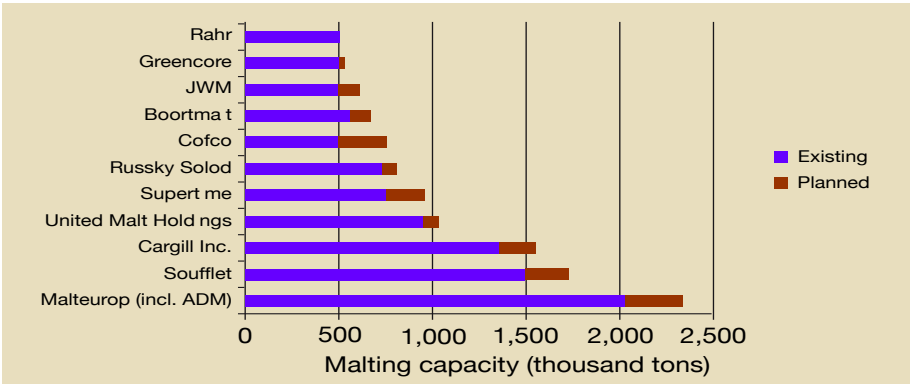


Source: SAB Miller, 2006

2.2 World production and main suppliers of malt

Worldwide, there are few malt processing companies. Recent trends have called for consolidation and mergers. For instance, Malteurop (France), the largest malting company in the world, with a current annual production capacity of more than 2.2 million tons, has recently taken over Lesaffre (France) and has made some other acquisitions in Eastern Europe. InBev (Belgium) has taken over the biggest US brewers Anheuser-Busch. The newly created Anheuser-Busch InBev is the leading global brewer and one of the world's top five consumer product companies. The top ten malting companies produce approximately 9.4 million tons or 44% of global malt production.

Figure 6: The world's largest malting companies



Source: ABB, 2008

The Malteurop Group is the world's leading malt producer, with a current annual production capacity of more than 2.2 million tons. The Group is present in 12 countries in Europe, North America, Oceania, and Asia, with 23 industrial sites and 700 employees. Founded in 1984, the Malteurop Group belongs to a group of cooperatives, including Champagne Céréales, one of the leading cereal/grain collectors in France[11].

Groupe Soufflet has 24 malt plants in France, Eastern Europe (Czech Republic, Poland, Hungary, Slovakia, Romania), the Russian Federation, and Kazakhstan. It produces a complete range of brewing products: malts from spring and winter barley, wheat malts, kiln dried (Pilsen, Munich, Vienna) or roasted (caramel, colorant), roasted cereals, and grits and maize flakes. In 2007, the company produced 1.47 million tons of malt[12].

Cargill Malt purchases and processes malting barley into quality malt that is supplied to the brewing industry worldwide. Headquartered in Minneapolis, Minnesota, Cargill Malt operates nine malting plants in Belgium, France, Spain, Holland, Germany, the United States, Canada, and Argentina. Cargill Malt runs two technical centers, one in Belgium and one in the United States. In 2007, Cargill Malt production reached 1.25 million tons[13].

United Malt Holdings, UMH. In 2006–2007, Castle Harlan, together with its affiliate CHAMP Private Equity, the Sydney-based private-equity investment firm, acquired Great Western Malting, Canada Malting Company, Barrett Burston Malting, and a 60% interest in Bairds Malt to create United Malt Holdings (UMH), one of the world's largest producers of malt for use in the brewing and distilling industries. The businesses were acquired from Conagra Foods Inc. of the United States and Tiger Brands of South Africa. The remaining 40% of Bairds Malt was acquired in 2007. UMH has approximately 1 million tons of annual malt production capacity from 14 plants in four countries. It is a major supplier to beer makers such as Foster's Group. The CHAMP and Castle Harlan private equity investors bought the businesses that make up UMH in 2006 from US-based ConAgra Foods Inc[14].

Global changes in malting capacity resulted in some 1.1 million tons of new malt capacities around the world, mainly in Eastern Europe (+1 million tons).

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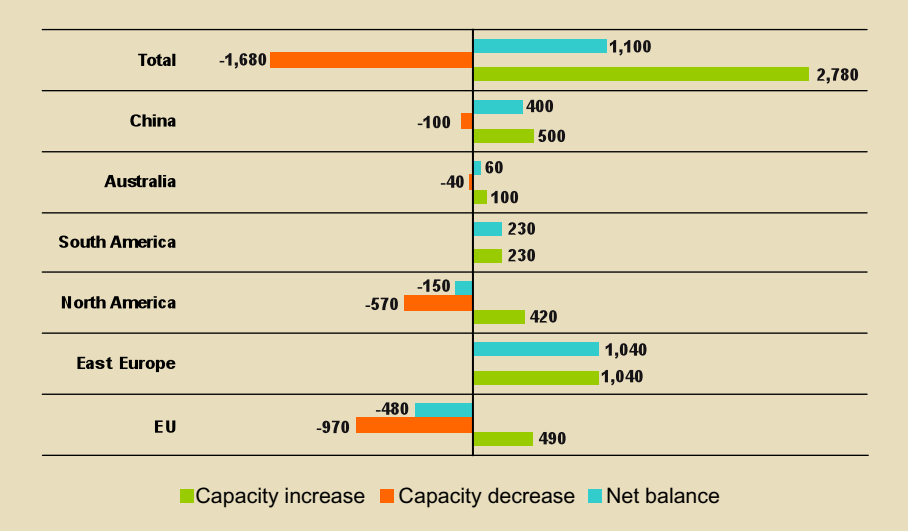
[11] See: www.malteurop.com

[12] Company's data.

[13] Company's data.

[14] Based on http://www.castleharlan.com/profiles/malt.html and http://www.reuters.com/article/rbssConsumerGoodsAndRetailNews/idUSSYD443220080312

Figure 7: Malt investments/divestments, 2003–2006 (thousand tons)



Source: Malteurop presentation, March 2007.

In 2006, beer production rose by 197 million hl and, consequently, malt demand by 2.2 million tons. This resulted in a capacity investment shortfall of 1.1 million tons of malt[15].

Based on 2007 figures, the world barley-for-malt picture looks as follows:

Barley production 148 M tons	→	Malting barley production 26 M tons	→	Malt production 21 M tons	→	Beer: 19.5 Whiskey: 0.9 Food: 0.6

Source: ABB, 2008

Malt production worldwide has been steadily increasing over recent years (see Table 9). This has been largely due to increasing demand for malt from fast growing regional beer markets, particularly China and the former Soviet Republics.

[15] *Malteurop presentation 12 March 2007.*

Table 8: Main malt producing countries and recent evolution (thousand tons)

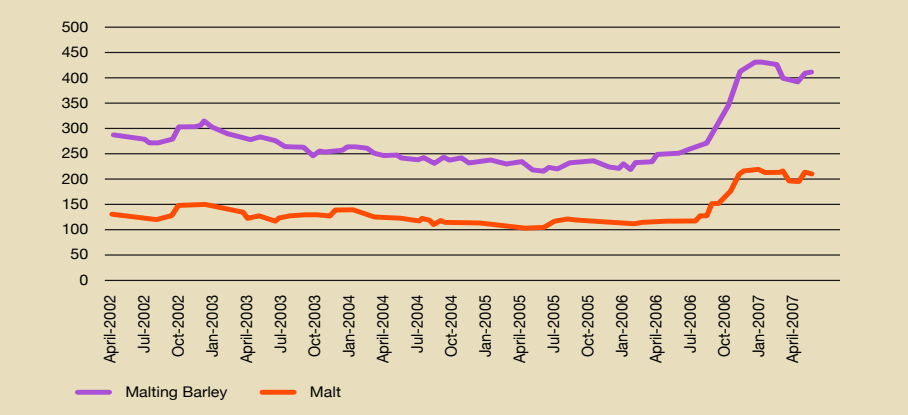
Country	2000	2001	2002	2003	2004	2005	Trend 2005/2004
World total	**17,820**	**18,487**	**18,296**	**18,640**	**19,140**	**19,704**	**+3%**
World leaders:							
■ 1 China	2,870	2,954	2,870	2,380	2,730	3,220	+18%
■ 2 United States	2,404	2,060	1,952	1,923	1,990	2,086	+5%
■ 3 Germany	1,635	2,000	2,000	2,072	1,797	1,436	-20%
■ 4 United Kingdom	1,452	1,490	1,477	1,501	1,425	1,332	-7%
■ 5 France	1,155	1,162	1,183	1,211	1,211	1,225	+1%

Source: FAOSTAT internal follow-up, 2008

2.3 Sale price of malt

Processing barley into malt is an energy-consuming process and, with the increase in energy prices, malt prices will continue to rise. Presently, crop 7[16] malt prices range from USD 583 – 649 per ton and crop 8 prices range from USD 520 – 600.

Figure 8: Malting barley and malt prices, 2002–2007 (EUR/ton)

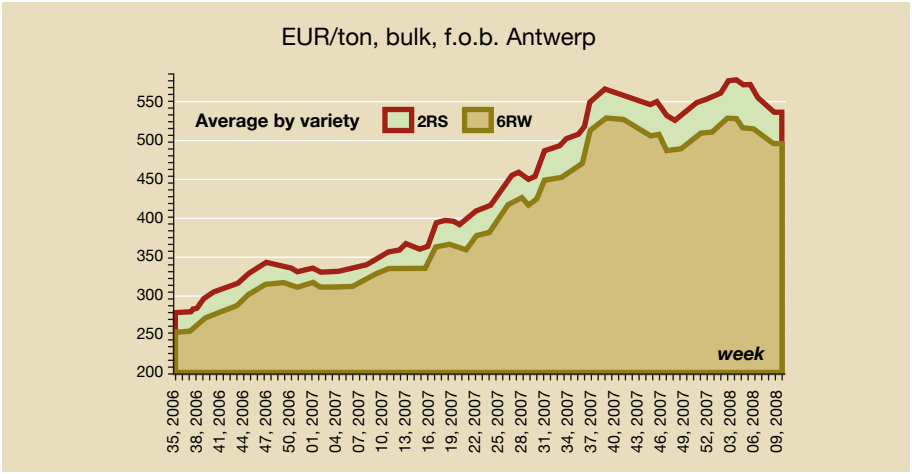


Source: Roger Martin, 2007

Malt production in the EU-27 from the 2007 harvest was slightly higher than it was in the previous year. However, the EU cannot satisfy the demand for malt exports at the moment and will probably export 250,000 – 300,000 tons less malt (after excluding exports from Romania and Bulgaria). An even higher demand for the EU malt is expected from the new harvest, so every bit of capacity will be needed to satisfy the demand.

[16] *Crop 2007 prices are prices from the 1 July 2007 to 30 June 2008.*

Figure 9: Malt market price evolution, crop 2007



Source: www.e-malt.com

2.4 Malt trade

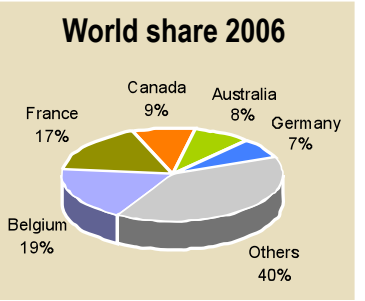
Major malt producers are integrated with the grain trading businesses, which reduces the risks related to the origination of malting barley from producers. Some maltsters offer specific contracts to farmers (contract farming) to secure their supplies.

In 2006–2007, the global trade of malting barley decreased to 5.5 million tons (in grain equivalent) – 0.2 million tons less than the previous year. This decrease was largely due to a reduced supply on the global market, high prices, and increasing local production. For instance, due to increased investments by sector leaders, barley producing countries such as the Russian Federation, Ukraine and Kazakhstan have rapidly reached the point of self-sufficiency in malt.

According to available information, Belgium was the major malt exporting country in 2007 and Brazil was the main importer (Tables 9 and 10).

Table 9: The world's top malt exporters, 2007 (HS 1107)

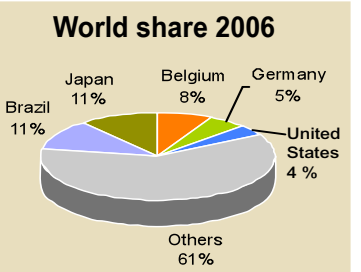
Country	Trade value, M USD		
	2006	2007	Trend 2007/2006
Belgium	375	573	+53%
France	347	408	+18%
Canada	180	262	+45%
Australia	171	229	+34%
Germany	142	192	+35%
Others	793	1,297	+64%
Total exports	**2,008**	**2,962**	**+48%**



Source: © United Nations, 2008 – UN Comtrade Database

Table 10: The world's top malt importers, 2007

Country	2006	2007	2007/2006
Brazil	218	280	+28%
Japan	204	248	+21%
Belgium	143	246	+72%
Germany	99	139	+41%
United States	81	130	+61%
Others	1,157	1,540	+33%
Total imports	**1,902**	**2,583**	**+36%**

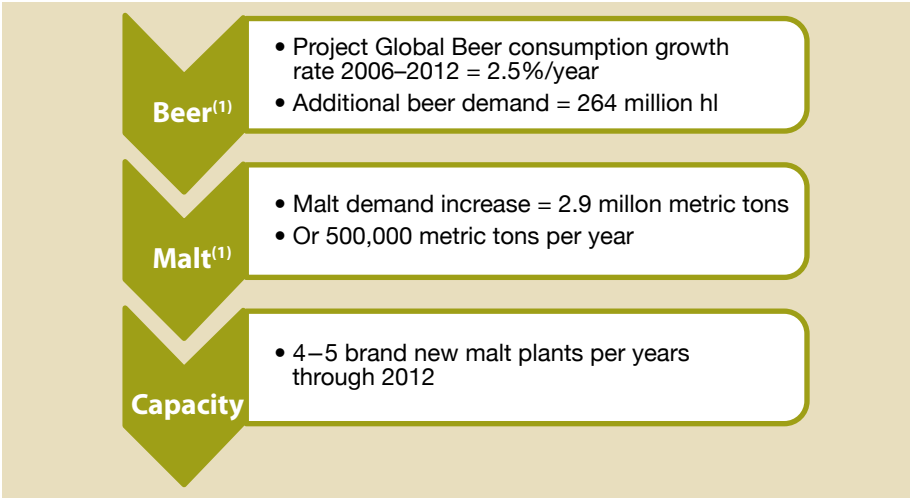


Source: © United Nations, 2008 – UN Comtrade Database

2.5 Global growth in malt demand

International maltsters are currently facing some challenges. Japanese malt demand has been declining due to economic conditions and lower sales of full malt beer. Other malt markets such as Brazil have been very competitive in recent years due to imports of lower quality and lower priced winter barley from the EU. New malting capacity in the EU, the Russian Federation, and Ukraine are also increasing competition in offshore malt markets.

Figure 10: Global growth in malt demand



Source: MaltEurop presentation, March 2007.

Most of the growth in demand for malting barley and malt during the next five years will be in countries with rapidly expanding beer production, e.g. China (18% growth), the Russian Federation and Eastern Europe (17% growth), South America (17% growth) and Africa (21% growth).

2.6 Reaching conclusions

- The cost of malt is up sharply from previous years.
- Poor global barley yields for two consecutive harvests have resulted in a shortage of barley.
- The poor return for growers has resulted in the discarding of malting barley in favour of alternative crops.
- The poor return for maltsters has led to a lack of investment in malt plants.
- Closer co-operation between brewers, maltsters, and growers is critical to provide fair value along the entire supply chain in order to safeguard the raw materials essential for brewing.

2.7 Other relevant information

- Barley malt is also used in the manufacturing of whisky, snacks, sauces, chocolate powders and other products.

Large brewing companies are usually not completely integrated in terms of malt sourcing. Some companies such as Anheuser-Busch InBev have their own malting facilities. However, they also purchase malt from independent maltsters. Maltsters sell malt to brewing companies, distilling companies (such as Jack Daniels, Jim Beam, and Seagrams) and food processing companies such as Kraft, Malt-O-Meal, and Kelloggs.

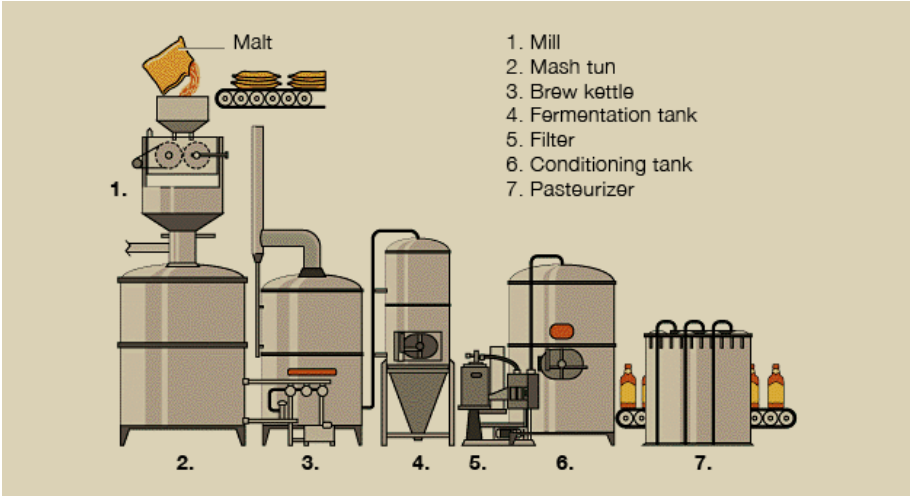
3.1 Brewing process

3.1.1 Process description

Industrial beer brewing (see Figure 8) begins with malted grain, which is passed through a milling machine (1) to crack the dried kernels and grind them into a coarse powder. The cracked malt is then steeped with hot water in a large, stainless steel vat called a mash tun (2), to produce a thick, sweet liquid called wort. The wort is boiled, or brewed for up to two hours in a large kettle (3). After it is cooled, the wort is then transferred to a fermentation tank (4) where yeasts slowly convert the grain sugar to alcohol. The liquid, now beer, may then be passed through a filter (5) to remove the yeast residue. The wort is pumped into a large conditioning tank to age (6), where it undergoes another fermentation. During aging, the beer becomes naturally carbonated. Some brewers elect to filter the beer again after aging. The finished beer is then mechanically bottled, and may be pasteurized (7) to kill any of the remaining yeast and any other micro-organisms.

Beer is a fermented beverage. The sugar needed for the fermentation process comes from the transformation of the starch contained in the grain through the effect of specific enzymes contained in the malt. The longer process – generally one to two weeks, depending on the temperature at which the bottles are kept – results from a “natural fermentation” or aging process that minimizes the use of additives. Some breweries pasteurize their beer to kill bacteria, some do not. These processes increase production costs, but also contribute to the production of a higher quality product.

Figure 11: Brewing process



Source: MSN Encarta

3.1.2 Conversion factors from raw material

To produce 10 hl of light beer, one would need[17]:

Malt	110 kg
Additional raw materials	34 kg
Hops	1.4 kg
Rice	7.5 m^3
Electricity	105 kWh
Fuel	38 x 104 kcal
BOD	12 kg

3.1.3 Main costs of processing

The following are the main costs associated with beer production (European standard plant, for illustrative purposes only).

[17] *Source: UNIDO.*

Table 11: Illustrative operating costs of beer production

Item	Ratio per hl beer produced	Cost USD/hl beer produced
Malt	18 kg	5.00
Hops (cones)	0.15 kg	0.50
Yeast (thick)	0.6 l	0
Fuel	150 MJ	0.70
Electricity	12 kWh	1.20
Water	0.7 m^3	0.30
Wastewater treatment	0.55 m^3	1.10
Spare parts	Lump sum	1.20
Miscellaneous, analysis	Lump sum	1.30
Labour (120 people)	USD 20,000/year	6.00
Total direct operating costs		**17.30**

Main assumptions: 6,200 ha of operation per year – annual processing capacity of 400,000 hl

3.1.4 Average margins for processors

Breakdown of mature brewer's costs:

Sales price	Total variable costs (=32)		Total fixed cost (=48)		Depreciation maintenance	Interests	Taxes	Net profit
	Raw material	Transport	SG&A[a]	Salaries				
100 %	28	4	24	24	8	2	4	**6**

[a] – *Selling, general and administrative expenses.*

Source: TheEBRD

In many countries, alcoholic beverages are subject to state taxes. There are significant differences from one market to another, for example beer taxes (as a percentage of retail price) are 5% in Argentina, while they are 52% in Canada (on average). This seriously affects the margins of brewers.

3.2 World production of beer

In 2007, beer output rose by 5.4%, or 91 million hl, year-on-year and was once again above average. The growth in output in 2006 was still 5.9%, which is above the long-term average of 3% (1997–2006).

China recorded by far the largest share in international year-on-year output growth in 2007, at 46%. Its share of world beer production is an impressive 22%. Growth in Europe, totaling 23.2 million hl, can be mainly attributed to the rising output in the Russian Federation (16.1 million hl) and Ukraine (4.8

million hl). The United Kingdom again had a negative effect on the figures, this time recording a minus of 3.3 million hl. In the Americas, output growth in Mexico (2.8 million hl), the United States (2.6 million hl), Brazil (2.4 million hl), and Venezuela (2.2 million hl) contributed to an increase of 13.6 million hl. Asia, and in particular China (+41.6 million hl) and Viet Nam (+2 million hl), recorded a total increase of 49 million hl. Beer output in Africa increased by 5.3 million hl, of which the country with the largest share by far was Nigeria (+2 million hl).

Table 12: Global beer production in selected regions

Region	2006 1,000 hl	2007 1,000 hl	2006 +/- % rel.	2007 +/- % rel.
EU	386,110	410,852	1.2 %	6.4 %
Rest of Europe	182,474	180,977	10.5 %	-0.8 %
Europe total	**586,474**	**591,829**	**4.0 %**	**4.1 %**
North America	254,797	257,669	0.3 %	1.1 %
Central America/Caribbean	93,691	97,239	6.7 %	3.8 %
South America	171,091	178,260	5.0 %	4.2 %
America total	**519,579**	**533,168**	**2.9 %**	**2.6 %**
Asia total	**506,549**	**555.561**	**11.0 %**	**9.7 %**
Africa total	**79,747**	**85,061**	**9.0 %**	**6.7 %**
Australia/Oceania total	**22,000**	**21,796**	**4.3 %**	**-0.9 %**
World total	**1,696,459**	**1,787,415**	**5.9 %**	**5.4 %**

Note: As of 1 January 2007 Romania and Bulgaria are members of the EU.
Source: Barth Haas Group, Hops 2007/2008 Report.

Global players continue to increase their ability to influence the world beer market by means of brewery purchases, equity investments, and takeovers. The top 10 breweries account for 1,099 million hl, or 61.5% of world beer production. In 2004, they accounted for 865 million hl, or 55.7%.

In 2007, the increase in the share of the world market controlled by the 40 largest brewing groups was disproportionately greater than the increase in beer output. This resulted from a combination of good beer sales volume and industry consolidation.

Table 13:The ten largest brewery groups worldwide at 31 December 2007

Rank	Brewery	Country	Production volumes 2007 in M hl	% of world beer production
1	SAB Miller	United Kingdom	239.0	13.4
2 & 3[a]	InBev [b] + Anheuser-Busch [c]	Belgium/United States	422.2	23.6
4	Heineken	Netherlands	139.2	7.8
5	Baltic Beverages Holding (BBH) [d]	Russian Federation	55.3	3.1
6	Carlsberg (without BBH)	Denmark	52.9	3.0
7	Grupo Modelo	Mexico	51.0	2.9
8	Tsingtao Brewery Group	China	50.6	2.8
9	Molson-Coors	United States/Canada	49.2	2.8
10	Yanjing	China	40.1	2.2

[a] – *In 2008 InBev bought Anheuser-Busch and has as a result ended up controlling 25% of the world market.*

[b] – *Including proportional stake in Pearl River, China.*

[c] – *Including proportional volume from stakes in Grupo Modelo, Mexico, and Tsingtao Brewery Group, China.*

[d] – *Carlsberg and Scottish & Newcastle each with 50 % stake in BBH. As of 2008, 100% held by Carlsberg.*

Source: The Barth-Haas Group. The data was extracted from the brewers' own annual reports. In other cases, the production volume had to be estimated after different sources reported differing or no figures.

3.3 Beer trade

In 2007, global beer exports grew by 10% from the previous year, reaching USD 10,051 million. Main contributors to this result were (2006 figures): Mexico (20% of total exports), the Netherlands (20%), Germany (12%), Belgium (8%) and the United Kingdom (8%).

Table 14: The world's top beer exporters, 2007

Country	Trade value, M USD		
	2006	2007	Trend 2007/2006
Netherlands	1,813	1,929	+6%
Mexico	1,823	1,789	-2%
Germany	1,081	1,237	+14%
Belgium	747	894	+20%
United Kingdom	730	760	+4%
Others	2,969	3,443	+16%
Total exports	**9,164**	**10,051**	**+10%**

Source: Copyright © United Nations, 2008 – UN Comtrade Database

On the imports side, the trend was also positive (+10%), with total imports reaching USD 9,772 million in 2007. The main importing countries were: the United States (44%), the United Kingdom (7%), Italy (6%), France (5%) and Canada (5%).

Table 15: The world's top beer importers, 2007

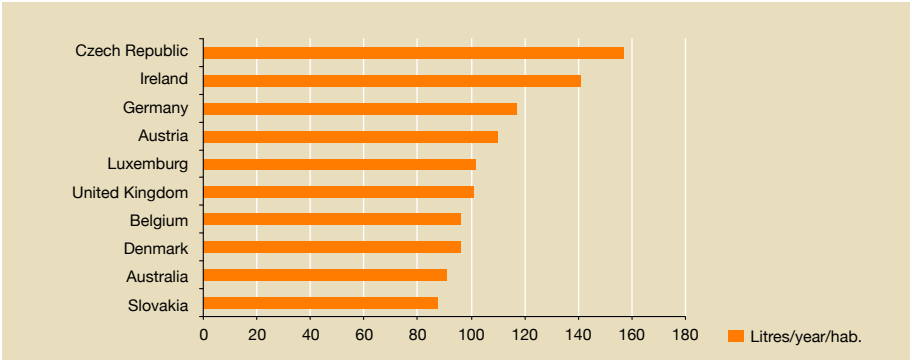
Country	Trade value, M USD		
	2006	2007	Trend 2007/06
United States	3,880	3,928	+1%
United Kingdom	668	728	+9%
Italy	509	599	+18%
France	464	536	+15%
Canada	418	506	+21%
Others	2,965	3,476	+17%
Total imports	**8,904**	**9,772**	**+10%**

Source: Copyright © United Nations, 2008 – UN Comtrade Database

3.4 Consumption

Between 1970 and 2004, world beer consumption has more than doubled from around 600 millions hl to over 1.2 billion hl. It is expected to continue to grow by around 1.2% per annum in the next several years.

Figure 13: Top ten beer consuming countries ranked by annual per capita consumption



Source: World Drink Trends 2005. © Institute of Alcohol Studies, 2007

3.5 Other relevant information

- Apart from malt, beer production largely depends on the availability of good quality hops. Hops contain alpha acids that give beer its bitterness and aroma. Hops are also famous for their antiseptic qualities and are important in maintaining the biological purity of beer.
- The information provided in the above section should be treated with caution. For instance, a barrel of pale ale brewed by a mini-brewery may require twice as much malt and five times more hops than a beer from a main international brand.
- The colour of beer (white, blond or pils, amber, brown or lager) depends on the level of roasting of the malt. The more the malt is roasted, the darker the beer.
- There is increasing worldwide concern in the food industry over both pesticide residues in raw materials and their effect on the processing of food and the quality of end products. In the malting and brewing industry, chemical residues may affect both the processing performance and the quality of malt and beer. To guarantee final product quality, in some countries official testing of chemical residues is required.

4.1 The supply of raw materials: the Achilles' heel of the local beer industry

The availability of quality locally-produced raw materials for the beer industry is limited in the countries of the two regions concerned. One critical requirement for the industry is the production of quality malting barley. Even state-of-the art malting facilities cannot produce quality malts from poor malting barley. In many respects, low yields and poor barley quality are an inheritance of the command economy system, when the quantity of grain outweighed quality in decision-making/planning processes. Significant underfinancing of both basic agricultural production inputs (farm machinery, pest control, etc.) and plant breeding also contribute to barley quality problems for maltsters in the regions. Key issues related to barley quality are:

- limited number of malting barley varieties
- lack of high quality seeds
- inadequate barley growing techniques
- non-compliance with standards/specification and storage requirements

Table 16: Area cultivated, yield and production of barley[18], 2007

Country	Area harvested, ha	Production quantity, tons	Yield, tons/ha
WBCs:			
Albania	1,400	3,500	2.5
Bosnia & Herzegovina	20,701	60,748	2.9
FYR Macedonia	39,600	83,200	2.1
Montenegro	800	2,000	2.5
Serbia	93,844	258,998	2.8
WBC regional markets:			
Hungary	324,347	1,041,434	3.2
Slovakia	210,697	695,042	3.3
Slovenia	18,532	67,904	3.7
ETCs:			
Armenia	57,600	96,000	1.7
Azerbaijan	203,947	479,130	2.3

[18] *It is difficult to access regional malting barley data. We estimate that approximately 70% of the barley crop consumed in the region is used for animal feed.*

Country	Area harvested, ha	Production quantity, tons	Yield, tons/ha
Georgia	37,400	45,046	1.2
Kyrgyzstan	125,500	227,200	1.8
Republic of Moldova	87,780	115,000	1.3
Mongolia	3,630	3,720	1.0
Tajikistan	47,000	62,500	1.3
Uzbekistan	73,000	110,000	1.5
ETC regional markets:			
Kazakhstan	1,866,000	2,600,000	1.4
Ukraine	4,100,000	6,000,000	1.5

Source: FAOSTAT Database. © FAO 2008

The information on barley and malt supply and sourcing regions is summarized in the table below. The dominant role of the three major regional suppliers – the Russian Federation, Ukraine and Kazakhstan – is obvious.

Table 17: The sourcing of barley for beer production in the regions, 2007 (tons)

Country	Barley			
	Production	Export	Import	Country of origin
Albania	3,500	n/a	111	Serbia, Croatia
Armenia	96,000	n/a	6,263	Russian Federation, Ukraine
Azerbaijan	479,130	n/a	3,865	Kazakhstan
Bosnia & Herzegovina	60,748	n/a	22,833	Hungary, Serbia, Croatia
Georgia	45,046	1,019	3,415	Kazakhstan
Hungary	1,041,434	361,091	61,547	Germany, Romania, Slovakia
Kazakhstan	2.600,000	647,331	65,051	Russian Federation
Kyrgyzstan	227,200	n/a	5,757	Kazakhstan
Mongolia	3,720	n/a	121	Kazakhstan, China
Montenegro	2,000	n/a	n/a	n/a
Republic of Moldova	115,000	13,900	790	Ukraine
Russian Federation	15,663,110	1,872,762	272,611	Finland, France, Uruguay, Sweden, Denmark
Serbia	258,998	7,571	24,153	Slovakia, Hungary, Romania
Slovakia	695,042	81,927	71,274	France, Czech Republic, Germany
Slovenia	67,904	863	36,189	Hungary
Tajikistan	62,500	n/a	n/a	n/a
FYR Macedonia	83,200	n/a	605	Serbia, Croatia
Uzbekistan	110,000	n/a	n/a	n/a

Source: FAOSTAT Database, © FAO 2009 (production), UN Data (trade)

Table 18: The sourcing of malt for beer production in the regions, 2007 (tons)

Country	Malt			
	Production	Export	Import	Country of origin
Albania	n/a	n/a	6,148	Croatia
Armenia	4,800	40	3,768	Russian Federation, Ukraine, Slovakia, Czech Republic
Azerbaijan	25,949	480	15,236	Kazakhstan, Ukraine, Hungary
Bosnia & Herzegovina	4,380	n/a	10,818	Croatia, Serbia, Slovakia
Georgia	n/a	342	16,641	Ukraine, Germany, Czech Republic
Hungary	43,000	59,060	23,823	Slovakia, Czech Republic, Austria
Kazakhstan	38,500	20,505	29,892	Finland, Russian Federation, Ukraine, Germany
Kyrgyzstan	5,390	n/a	1,617	Kazakhstan, Ukraine
Mongolia	400	n/a	4,729	China
Montenegro	n/a	n/a	n/a	n/a
Republic of Moldova	3,080	n/a	17,529	Czech Republic, Turkey
Russian Federation	1,039,500	59,938	147,346	Finland, China, Germany, Sweden
Serbia	55,000	12,992	12,039	Croatia, Hungary
Slovakia	242,000	178,559	2,748	Czech Republic
Slovenia	7,000	7	24,861	France, Germany, Czech Republic
Tajikistan	770	n/a	n/a	n/a
FYR Macedonia	5,000	n/a	7,709	Slovakia, Bulgaria
Uzbekistan	12,320	n/a	n/a	n/a

Note: Malt production figures only available for 2005.
Source: FAOSTAT Database. © FAO 2009 (production), UN data (trade)

The situation with malt supply in the regions has improved in the countries where international beer producers have launched or expanded their production facilities (see Section 4.2).

Table 19: Evolution of malt production in the regions, 2000–2005 (thousand tons)(HS 1107)

Country	2000	2001	2002	2003	2004	2005	Trend 2005/2004
World total	**17,820**	**18,487**	**18,296**	**18,640**	**19,140**	**19,704**	**+3%**
WBCs:							
Bosnia & Herzegovina	9	9	5	4	5	4	-8%
FYR Macedonia	3	4	3	2	2	5	+108%
Serbia & Montenegro	100	88	83	83	58	55	-5%
Hungary	66	95	74	59	126	43	34%
Slovakia	188	188	227	276	220	242	+10%
Slovenia	14	0	0	0	6	7	+27%
ETCs:							
Armenia	3	3	4	4	4	5	+20%
Azerbaijan	15	22	21	24	25	26	+2%
Kyrgyzstan	5	5	5	5	5	5	n/a
Republic of Moldova	4	4	3	4	4	3	-20%
Mongolia	0	1	0.5	0.4	0.4	0.4	n/a
Uzbekistan	12	10	13	12	12	12	n/a
Tajikistan	0.4	0	1	1	1	1	n/a
Russian Federation	231	447	481	590	701	1,040	+48%
Kazakhstan	21	19	23	25	31	39	+25%
Ukraine	117	159	189	231	259	349	+35%

Source: FAOSTAT internal follow-up

Investment opportunities in the malt sector in the ETCs should be carefully examined, considering the significant investments in new malt production facilities that are taking place in three large neighbouring barley producing countries (namely the Russian Federation, Ukraine, and Kazakhstan) with which ETCs have signed free trade agreements. The domestic production of malt in the Russian Federation, the Ukraine and Kazakhstan is likely to continue to increase, which will create more competition for local producers in neighbouring ETCs markets.

4.1.1 Influence of neighbouring markets

The Russian malt market recently has developed very steadily. In the past eight years, the Russian Federation has been successful in recapturing its own market share and supplying malt to its local beer industry. Between 2000 and 2007, the production of malt increased almost seven-fold from

0.2 million tons to 1.5 million tons. Large brewing companies were at the root of these changes, as they launched their own malting facilities. Nowadays, there are around 90 malt production units of various capacities in the Russian Federation. The increasing demand for malt from the brewing industry has also led to an increased production of malting barley and imports of high-quality seeds from the Czech Republic, Slovakia, Germany and France. The utilization of barley for malting purposes has exceeded 300,000 tons, but still accounts for only 5% of total barley consumption, the rest being used for animal feed and other purposes.

A number of producers have invested in malting barley breeding programmes. Only a few years ago, even in a country such as Russia, the world's largest barley producer, almost one-quarter of the malting barley and half of the malt sourced by local brewers was imported. Today, 85% of the demand in malting barley of the local beer industry is covered by domestic production, compared with only 23% in 2001.

Table 20: Evolution of malt and barley supply in the Russian Federation

	2001	2007	2007/2001
Total beer production, tons	**6,380,000**	**11,806,000**	**185%**
Demand for malt, tons	**1,004,000**	**1,200,000**	**120%**
Local malt, tons	494,000	1,020,000	206%
Local malt, %	49%	85%	n/a
Imported malt, tons	510,000	180,000	35%
Imported malt, %	51%	15%	n/a
Demand for barley, tons	**711,000**	**1,200,000**	**169%**
Local barley, tons	545,000	n/a	n/a
Local barley, %	77%	n/a	n/a
Imported barley, tons	166,000	n/a	n/a
Imported barley, %	23%	n/a	n/a

Source: Agriconsult, 2002, FAOSTAT Database. © FAO 2008.

Poor barley quality is also an issue in Ukraine. For instance, in 2007, due to specific weather conditions at harvest time, the protein content of malting barley exceeded standard requirements (12.5–13.5% instead of a maximum of 11.5%), which pushes production costs up as it induces more product loss and requires more boiling and consequently higher energy costs. The increasing demand for malt from the brewing industry has led to a sharp increase in malting barley production and the import of high-quality planting seeds from the Czech Republic, Slovakia, Germany and France. In 2007, the utilization of barley for malting purposes exceeded 600,000 tons, but still accounted for only 5% of total barley consumption.

The international maltsters have played a more important role in the Ukrainian market. In 2007, local malting facilities produced about 450,000 tons of malt[19] with the Slavutsky Malting Plant (Soufflet), MaltEurop, Obolon and Sarmat Group being the major producers.

In **Kazakhstan**, the main producer of malt is the Altyn Biday Plant (Soufflet) based in Tekeli (300 km away from Almaty). This malting facility was built in 1991 to supply Kazakhstan but also all Central Asia and Eastern Siberia, with an annual capacity of 80,000 tons.

In **Kyrgyzstan**, the main supplies of malt of the large brewers originate from the Kazakhstan-based Tikeliysky Malting Plant. Malt is also imported from the Czech Republic and Germany (with high transportation costs). Hops are also imported from China, Austria, and Poland. As a consequence of the above, 40–50% of the final price of Kyrgyz beer is brought about by the costs of raw materials.

In **Uzbekistan**, there are six malt producers[20]. All of them are integrated with breweries. The key maltsters are Kibray, Ferghana and Samarkand. The largest malting facility is an old Russian-style facility called Uzdonmahsulot, which has a total capacity of 5.5 tons of malt per day (or 7.5–8 tons of barley per day). This state-owned company supplies most of the local malting barley. Indicatively, the price of local malting barley is UZS 60/kg (USD 0.04/kg)[21]. Still, local malting barley is of poor quality and creates turbidity in the beer. For high-quality beers, all raw materials are imported (malt or barley, hops, wheat, and rice), mainly from Kazakhstan and Germany. Yeast is imported from various European countries. According to official figures, import of hops and malt were, respectively, 63 and 10,233 tons in 2005. There have been a few investment projects aimed at addressing quality issues in the Uzbek malting barley industry, for example, the

[19] *Ukrainian Beer Group, December 2007.*

[20] *FAO. Uzbekistan. Investment Opportunities in the Agribusiness Sector.* August 2003.

[21] *FAO internal data.*

co-operation project between Demet Farm (Demir Group) and the French Professional Seed Association (GNIS). Under this project, five new varieties of malting barley were tested for registration by the local authorities.

► Hops: an essential and costly ingredient

The sourcing of hop is problematic in all countries of the region. In Ukraine, which used to be one of the main suppliers of hops to the former Soviet Union, local brewers need 3,400 – 4,500 thousand tons of hops. However, to date, only 5–20% is procured locally. The import of hops has a serious impact on the price of locally produced beer. The current average price of hops is USD 270 per 1 kg of alpha acid[22]. In addition to the scarcity of local hops, large brewers do not use hop cones but granulated products or extracts. The associated technologies are not yet known to the local industry.

During the last few years, hops prices have increased steadily. For example, during the course of 2008, hops prices increased five-fold to reach USD 102/kg (compared with only USD 19/kg in 2007). The import of hops has a serious impact on the price of locally-produced beer. The current average price of hops is USD 270/kg of alpha acid.

Table 21: Hop production and imports in the regions (HS 1210)

Country	Production, kg			Import, kg		
	2006	2007	2007/2006	2006	2007	2007/2006
WBCs:						
Albania	1,000,000	1,000,000	n/a	45,140	27,198	60%
Bosnia & Herzegovina	n/a	n/a	n/a	51,050	128,252	251%
FYR Macedonia	n/a	n/a	n/a	49,115	87,181	178%
Serbia	82,000	82,000	n/a	338,540	357,717	106%
Slovakia	314,000	300,000	n/a	110,361	154,088	140%
Slovenia	1,916,000	2,157,000	113%	182,150	243,863	134%
ETCs:						
Armenia	n/a	n/a	n/a	32,350	32,210	100%
Azerbaijan	n/a	n/a	n/a	48,165	29,100	60%
Georgia	n/a	n/a	n/a	32,035	19,149	60%
Kyrgyzstan	n/a	n/a	n/a	23,760	17,940	76%
Republic of Moldova	n/a	n/a	n/a	29,659	86,729	292%
Mongolia	n/a	n/a	n/a	17,917	21,977	123%

[22] *Alpha Acid Unit (also called AAU) is a measurement of potential bitterness in hops. Alpha acids are responsible for the bitter taste in beer.*

Country	Production, kg			Import, kg		
	2006	2007	2007/2006	2006	2007	2007/2006
Tajikistan	n/a	n/a	n/a	n/a	n/a	n/a
Uzbekistan	n/a	n/a	n/a	n/a	n/a	n/a
Neighbouring countries						
Russian Federation	350,000	300,000	n/a	3,548,058	3,937,848	111%
Kazakhstan	n/a	n/a	n/a	179,836	172,214	96%
Ukraine	670,000	650,000	n/a	n/a	n/a	n/a

Source: FAOSTAT Database. © FAO 2008 (production), UN Data (trade)

4.1.2 Recent investments in the WBCs and the ETCs

The international brewing and malt industries continue to expand into new markets. This has been facilitated by improved trade and investment conditions and the opening of new markets. The following table summarizes recent maltsters' investment activities in the regions and neighbouring countries. Malting capacity continues to increase with the construction of large and cost-efficient plants. In recent years, a number of projects have been successfully implemented by JV Group Soufflet & Baltika, MaltEurope/Champagne Céréales, and other companies.

These new malting facilities have increased competition in the local markets. It is believed by industry sources that the minimum production capacity for new facilities in the regions is 80,000 tons per year and that smaller-scale malting facilities are not profitable. The gross margin for the most recent investments is estimated at 50% and the payback period at 7–8 years.

A non-exhaustive list of investment projects in malting production in the WBCs, the ETCs and the neighbouring countries

Investing company	Location	Project details
JV Group Soufflet & Baltika	Russian Fereration, St. Petersburg	2000: JV Group Soufflet & Baltika (70%/30%) Plant capacity: 130,000 tons of barley into 112,000 tons of malt annually. Total cost of the project: EUR 35 million (of which EUR 14 million was brought by the EBRD). Along with malt production, the JV Group develops local malting barley varieties to substitute the imports.
	Romania, Buzau	2007: The EBRD invested EUR 20 million to finance the construction of a greenfield malt plant in the city of Buzau in south-eastern Romania, which is being built by Soufflet Malt Romania S.A. The investment is expected to provide substantial support to the local farming community and expand the volumes of malting barley available to local breweries. Annual capacity: 105,000 tons of malt. The plant was scheduled to start operation in September 2008.
	Ukraine	Soufflet's Slavutskiy Solodoviy Zavod is part of a EUR 65 million financing programme to help the company expand its malting, milling and barley procurement across Central and Eastern Europe. The EBRD has acquired a 24% stake in the Ukrainian malt house, which will increase its production capacity to 150,000 tons of malt per year.
	Serbia, Belgrade	2004: The company acquired the Serbian malt mill, Maltinex, situated 100 km northwest of Belgrade and with an annual capacity of 50,000 tons.
Champagnes Céréales	Ukraine	The EBRD is providing a loan of up to USD 30 million to Desnagrain, a Ukrainian agribusiness company, in a move that will finance the provision to farms of essential farming inputs such as seeds and fertilizers and will allow the purchase of malting barley and other grains and oilseeds from the same farmers at harvest.
MaltEurope (A subsidiary of Champagne Céréales)	Ukraine, Chernigov	MaltEurope in Ukraine is planning to invest in a new malt factory in the Vinnitsya area. The company is considering investing EUR 30 million in the facility. The funds would also be used to build a barley elevator. Once completed, the plant would have the capacity to produce 100,000 tons of malt per year. Established in 1999, MaltEurope is the largest malting company in the Ukraine with an annual production capacity of 160,000 tons. More than 80% of its production goes to the domestic market, while the remaining 20% is exported to CIS countries. The company has two malt factories in Chernigov and Kharkov, with an annual capacity of 50,000 and 110,000 tons of malt, respectively.

Source: Press releases of the above mentioned companies

4.1.3 Persisting commodity cost pressures

There have been unprecedented price increases in key inputs including:

- brewing materials up by more than 20%/hl
- packaging materials up by approximately 12%/hl

Risk mitigation measures have been put in place:

- long-term agreements with key suppliers
- investment in malting capacity
- aluminum hedging policy
- new supply partners

4.2 Development of the local beer industry: a driving force for maltsters

4.2.1 Consumption growth

The region is characterized by a long tradition of alcohol consumption, strong domestic brands, rapidly modernizing distribution systems, and increasing disposable income. The emergence of an aspiring middle class looking to differentiate itself from prior generations that consumed low quality, high-alcohol-content spirits has also had a positive effect on beer consumption, not least in the premium and licensed segments.

The production of beer is one of the most profitable agribusinesses in the region, sometimes even more so than the production of tobacco. The demand for beer is steadily growing, with high potential on both local and foreign markets. Even in the Caucasus, traditionally a wine-drinking region, beer consumption has been increasing. The annual growth in the demand for beer in these regional markets has been approximately 10% per annum (see Table 21).

The rising consumption of beer is attributed to the increasing purchasing power of local consumers and changes in government taxation, favouring beer over hard liquors. The consumption of beer worldwide is expected to grow 1–2% per annum, which will most likely lead to the creation of joint ventures and acquisitions of local companies in the WBCs, the ETCs, and other promising markets. The sale of malt to the domestic brewing industry will continue to increase due to the growth in regional beer consumption.

Table 22: The evolution of beer consumption in the regions (kg/capita/yr)

Country	1999	2000	2001	2002	2003
WBCs:					
Albania	11	13	15	13	12
Bosnia and Herzegovina	34	28	31	36	38
FYR Macedonia	29	27	24	26	30
Serbia & Montenegro	65	62	55	54	58
ETCs:					
Armenia	2	2	1	1	1
Azerbaijan	8	8	14	15	15
Georgia	2	4	4	5	5
Kyrgyzstan	2	3	3	3	4
Mongolia	4	7	5	6	7
Tajikistan	0	0	0	0	0
Kazakhstan	5	8	11	14	17
Russian Federation	30	35	44	48	52
Ukraine	16	20	24	28	32

Source: FAOSTAT Database. © FAO 2008

The expansion of the local beer industry and the resulting growing demand for high-quality malting barley have encouraged local agribusinesses to invest in the production of high quality raw materials (malting barley and malt). The sale of premium beer continues to grow in the WBCs and in the ETCs, as the local brewing industry consolidates and large brewing companies increase their market share. Local breweries are likely to demand more high-quality malting barley.

The situation with local beer production and sourcing of raw materials is summarized in Table 23:

Table 23: Sourcing of raw materials for beer production in the regions, 2007 (tons)

Country	Production	Export	Import	Country of origin
Albania	30,000	577	29,487	Greece, Italy, FYR Macedonia, Germany
Armenia	12,000	2,405	7,960	Ukraine, Russian Federation
Azerbaijan	320,000	n/a	3,388	Russian Federation, Turkey
Bosnia & Herzegovina	72,600	5,784	140,460	Serbia, Croatia, Netherlands, Slovenia

Country	Production	Export	Import	Country of origin
Georgia	50,000	157	12,400	Russian Federation, Ukraine, Netherlands, Czech Republic
Hungary	483,000	51,317	47,794	Germany, Austria, Poland
Kazakhstan	409,100	9,547	200,325	Russian Federation, Belgium, Germany, Mexico
Kyrgyzstan	14,052	7	40,067	Russian Federation, Kazakhstan
Mongolia	7,250	16	14,504	Republic of Korea, Singapore
Montenegro	n/a	n/a	n/a	n/a
Republic of Moldova	39,100	396	37,374	Russian Federation, Ukraine
Russian Federation	11,806,000	309,126	360,538	Ukraine, Czech Republic, Germany, Finland
Serbia	650,000	112,409	16,954	Montenegro, Netherlands
Slovakia	390,000	10,027	93,984	Czech Republic, Hungary
Slovenia	215,000	40,180	25,303	Austria, Germany, Netherlands
Tajikistan	1,200	n/a	n/a	n/a
FYR Macedonia	70,000	6,906	5,385	Greece, Bulgaria, Slovenia
Uzbekistan	80,200	n/a	n/a	n/a

Source: FAOSTAT Database. © FAO 2009 (production), UN data (trade)

4.2.1 Fast growing beer markets

Key and fast-growing emerging markets for beer in CIS, SEE, and Central Asia include the Russian Federation, with a 75 million hl or 9% per capita consumption growth (2003–2008 estimate), and Kazakhstan, with a 2.5 million hl or 6% per capita consumption growth (2003–2008 estimate). The beer markets in these regions are still expected to show positive growth rates as an average trend in the coming years.

► RUSSIAN FEDERATION

Trends in per capita consumption	Trends in population growth
64.1 litres in 2005	143.5 M people in 2005
66.6 litres in 2006	142.8 M people in 2006
71.3 litres in 2007	142.2 M people in 2007
82.1 litres in 2011 (forecast)	140.4 M people in 2011 (forecast)

The Russian Federation is the third largest beer market in the world, with a total annual consumption of 95.7 million hl at the end of 2006. The Russian beer market has undergone a process of rapid consolidation, owing to its 15% CAGR growth in the last ten years, which has led to an increased appetite of

the world's leading brewers to have a share of this growth. More than 85% of the Russian beer market was held by foreign players at the end of 2006.

Growth is expected to continue, fueled by consumers' increasing purchasing power as well as their changing drinking habits. Young and middle-aged Russians are shifting away from vodka – the traditional national drink – towards more western-style beverages like beer.

Despite its rapid growth, the Russian per capita consumption of 65 litres of beer is below comparable averages (e.g. 74 litres in Western Europe), which suggests the potential for growth of the market. This potential is supported by the increase in the disposable income per capita and the tendency for consumer demand to shift from hard liquors to low alcohol beverages in the Russian Federation.

The Russian Federation's beer production fell in 2008, however. This represented the first decrease in production in the last 12 years[25]. The production decreased by 0.6% to 114 million hl last year. The reasons were not only shrinking purchasing power and damaged consumer confidence as a result of the economic crisis, but also unfavourable weather conditions (especially cold summer weather), an increase in the country's beer excise taxes in 2008, higher energy prices, and increased production costs. Experts predict a small volume growth of the beer market in 2009.

The Russian Federation has strict legislation on alcohol advertising, and is set to introduce a ban on drinking alcohol in public places.

The recent advertising law:

- limits the hours during which beer advertisements are permitted on television and radio (prohibited between 07:00 and 22:00);
- does not allow people and animals to appear in beer advertisements;
- has had a substantial impact on potential new market entrants and on the launch of new brands.

A draft bill on consumption of beer in public:

- does not allow beer sales on public transport or in children's, medical, or educational organizations or their surrounding areas;
- does not allow sales in sports and cultural organizations but does allow sales in hotels, restaurants and cafeterias at draught points of sale (horeca);
- allows sales only to adults of 18 years and above.

Beer consumption is not allowed on the street, in stadiums or parks, on public transport, or in other public places, except at draught points of sale (horeca).

At the beginning of 2008, the Russian authorities introduced a 32.4% rise in excise duty on beer in the country, while upping strong alcohol duty by only 7%.

Main market players are as follows:

- Carlsberg is number one in the market, with a 38.2% market share.
- SUN InBev is number two. Competitive brands include Baltika, Arsenalnoye, Okhota and Yarpivo.
- Heineken is number three in the market, with a share of 13.2%, Efes Breweries International (EBI) is number four with 8.8%, and SAB Miller is number five with 6%.

► UKRAINE

Trends in per capita consumption	Trends in population growth
21.7 litres in 2000 43.8 litres in 2005 48.6 litres in 2006 58.0 litres in 2010 (forecast)	49.54 M peope in 2005 49.55 M people in 2006 49.6 M people in 2010 (forecast)

The Ukrainian beer market is the second largest in the CIS, the former Soviet Union, and still has a great deal of undeveloped potential. From 1998 to 2004 the Ukrainian beer market grew by a total of 17%.

Since 1998, the consumption of beer per capita has also been increasing, and in 2007 it reached 61 litres. Compared with neighbouring countries, this is a relatively small figure and considerable further increase is still expected.

In 2007, the beer market increased by 19.4%. At the same time, sales rose by 37% and market share increased by 20.4%.

The main peculiarity of the Ukrainian beer market in the country itself is the high market share of beer sold in plastic bottles, which testifies to the low purchasing power of Ukrainian consumers. During the last few years, beer in plastic bottles has become so popular in the country that sales came close to the volume of sales of beer in glass bottles. In 2007, 52% of the total volume of beer sold was bottled in glass bottles and 42% in plastic bottles.

Main market players are as follows:

- The number three player is The Carlsberg Group, with a 20.4% market share (in 2007). Competitive brands on the Ukrainian market include Obolon Light.

► KAZAKHSTAN

Per capita consumption	Population
Approximately 20 litres in 2006	15 M people

Kazakhstan is one of the fastest-growing economies among the former Soviet Republics. The beer market has experienced a 100% growth since 1999 and it offers strong growth and profit potential.

The Kazakh beer market, with total consumption of 4.7 million hl in 2006, has been growing with a CAGR of 18% since 1996. In line with the strong consecutive economic growth of the country and an improvement in living standards, per capita beer consumption rose from 26 litres in 2005 to 31 litres in 2006.

Notwithstanding the historical growth of the market, per capita consumption in the market is still well below comparable averages. As a result, there is evidence of further growth potential, combined with favourable demographics and macroeconomic factors as evidenced by the expected 12% CAGR in the Kazakh Beer market between 2006 and 2011.

Despite a slowdown in economic activity, the Kazakhstan food and drink sector is still showing strong signs of growth. Although tighter credit conditions are already restricting domestic economic activity, Kazakhstan's beer market is still continuing to perform positively. Beer is the most popular alcoholic beverage in Kazakhstan. As per BMI, the beer market has experienced the strongest growth within the alcoholic drinks subsector in recent years.

Per capita spending on alcoholic drinks will rise significantly by 97% to reach USD 102 in 2013, as disposable incomes rise and alcohol becomes more widely available, with consumers switching over to higher-value drinks. Young consumers in particular show a preference for drinks with lower alcohol content, which is reflected in beer's rising popularity at the expense of more traditional spirits. Another factor behind this growth has been the government's recent acknowledgment that there is a need to diversify its economy to reduce dependency on energy exports, which provides opportunities for investors in other industries, such as alcoholic drinks.

Main market players are as follows:

- In 2006, EBI was the second largest brewer in Kazakhstan with market share by sales volume of 19%.

► UZBEKISTAN

Per capita consumption	Population
Approximately 10 litres in 2006	27 M people

Uzbekistan has a growing economy and an increasing level of beer consumption. The domestic beer market has developed positively over the past few years and we believe it has the potential to grow strongly in the future.

► REPUBLIC OF MOLDOVA

The Moldovan beer industry realized a solid CAGR of 14% between 1996 and 2006, reaching a 1.1 million hl annual beer consumption level in 2006. Yet the low average per capita consumption level in the market makes it an attractive beer market with an expected growth of 10% annually between 2006 and 2011.

► SERBIA

Trends in per capita consumption	Trends in population growth
75.3 litres in 2004 81.3 litres in 2006 75.6 litres in 2007 Approximately 80.0 litres in 2010 (forecast)	7.5 M people in 2005 7.5 M people in 2010 (forecast)

The Serbian beer market has a significant future growth potential due to its strategic location in Europe. The market is still in a transition stage, however, as evidenced by a CAGR 1% contraction of the total consumption between 1996 and 2006. A higher share of international operators can be seen in the market, standing at above 70%. The market is estimated to grow at a CAGR of 4% between 2006 and 2011.

Main market players are as follows:

- Anheuser-Busch InBev (Apatin) is number one in the market, with a market share of 51%.
- Carlsberg is number two in the market, with a 21% market share. Competitive brands include Lav, Tuborg and Holsten.

In response to ten straight years of economic growth in the regions, the world's largest brewing companies such as Efes Breweries International, The Carlsberg Group, SABMiller Plc, and Anheuser-Busch InBev have

strengthened their presence in the ETCs and the WBCs. However, the level of penetration of these international groups in the ETCs remains low as compared with the Russian Federation Ukraine, and Kazakhstan.

Please find below the major breweries active in the regions. More information on breweries in the ETCs and the WBCs can be found at: www.eastagri.org/agribusinesses

Efes Breweries International N.V. (EBI)	
	EBI, registered in the Netherlands, is a leading brewing group in the countries in which it operates across the CIS, southeastern Europe and Central Asia. It is a majority-owned subsidiary of Anadolu Efes (which, together with its direct and indirect subsidiary and affiliates, produces and markets beer, mal and soft drinks across a geographic area including Turkey, the Russian Federation, the CIS, southeastern Europe and the Middle East). EBI is a 70.2% subsidiary of Anadolu Efes and operates ten breweries and four malteries in the Russian Federation (Moscow, Ufa, Rostov, Kazan and Novosibirsk), Kazakhstan (Karaganda, Almaty), the Republic of Moldova and Serbia and Montenegro (Pancevo and Zajecar). It is one of the major brewers in the region with a total annual production capacity of around 23 million hl and a malt production capacity of 139,000 tons.
Operating Summary	FY2005; YTD 3Q2005; YTD 3Q2006 Sales volume (M hl): 8.91; 7.00; 9.15 Net sales revenue (M USD): 481.2; 375.7; 496.1 Profit from operations (M USD): 49.7; 45.9; 54.4 EBITDA (M USD): 95.1; 76.5; 97.4 Net profit (M USD): 20.1; 15.3; 24.8
Brands	The product portfolio includes a combination of strong local brands (many of which are market leaders in their respective market segments) and the Efes Pilsener international brand, which is currently sold in more than 50 countries. Local brands currently contributing to EBI's international success include: Stary Melnik, Beliy Medved, Sokol, Krasny Vostok, Solodov, Zhigulevskoe, Vostochnaya, Ershistoe, Gold Beer, Polniy Nokaut, Sib-Beer, Yantarnoe, Barkhatnoe, Bogemskoe svetloe, Ak Bars, Green Beer and Kvas in the Russian Federation; Karagandinskoe in Kazakhstan; Chisinau, Vitanta Premium Classic, Vitanta Premium Extra in the Republic of Moldova; and Weifert, Weifert Belo, Pils Plus, and Zajecarsko Pivo and Standard in Serbia and Montenegro. EBI also produces German Warsteiner, Dutch Bavaria Premium and Amsterdam Navigator, Czech Zlatopramen and Mexican Sol under license in the Russian Federation.

RUSSIAN FEDERATION	Major subsidiaries: Krasny Vostok Brewery Group (the Russian Federation) 92.9%. Moscow Efes Brewery (the Russian Federation) 90.9%. Country contribution (YTD 3Q2006): 72% on volume/78% on revenue. In the Russian Federation, which makes 78% of the company's consolidated sales volume, sales volume in 2008 reached 11.1 million hl, a growth of 6.8% over the previous year. EBI succeeded in becoming one of the leading brewers in the Russian Federation by outperforming market growth since it started commercial production in the Russian Federation in 1999. The acquisition of the KV Group, which was completed in February 2006, fortified EBI's strong presence in the Russian Federation, in addition to providing efficient access to the eastern and far eastern regions where faster future growth is expected. Currently, EBI has 20.2 million hl of brewing capacity in five breweries (Moscow, Rostov, Ufa, Kazan and Novosibirsk), and 139,000 tons of malt production capacity in four malteries. The vicinity of the malteries in Moscow and Kazan to the breweries has the important strategic advantage of supplying the key raw material used in beer production. Furthermore, the pre-form production capacity of 1.3 million bottles per day plays a significant role in controlling the costs with respect to meeting the high PET package demand on the Russian market. EBI's sales volume in the Russian Federation, which accounted for 73% of total international beer sales volumes in 2006, has increased 44% and reached 8.7 million hl. Excluding KV Group brands, EBI's organic sales volume growth in the Russian Federation in 2006 was 10%.
KAZAKHSTAN	Major subsidiaries: Efes Karaganda Brewery (Kazakhstan) 100%. Country contribution (YTD 3Q2006): 8% on volume/9% on revenue. In Kazakhstan sales volume grew by 4.6% in 2008, despite cycling a very strong base effect in 2007, when sales volume grew by 45.8%. Market growth slowed down significantly, especially in the third and fourth quarters of the year, while EBI managed to outperform market growth.

KAZAKHSTAN	EBI commenced its operations in Kazakhstan with the Karaganda Brewery, which was acquired in 1996. Later, in order to meet the increasing demand in the market, the Almaty Brewery was built and production commenced in 2003. Currently, EBI operates two breweries in Kazakhstan with a total brewing capacity of 2.1 million hl per year, up from 1.3 million hl a year earlier in order to meet the high demand. EBI was the second largest brewer in Kazakhstan with a market share by sales volume of 19% in 2006. EBI's brand portfolio currently consists of seven brands appealing to different market segments: Karagandinskoe is sold as a middle-priced local brand, Stary Melnik, Sokol and Beliy Medved are sold as local premium brands, while Efes, Warsteiner and Bavaria Premium are sold as super premium brands. Karagandinskoe, which accounted for 79% of Efes Kazakhstan's sales volume in 2006, is the second most consumed brand on the beer market. In 2006, EBI's sales volume in Kazakhstan increased by 17% over the previous year, reaching 0.9 million hl.
REPUBLIC OF MOLDOVA	Major subsidiaries: Efes Vitanta Brewery (Republic of Moldova) 96.5%. Country contribution (YTD 3Q2006): 7% on volume/10% on revenue. The challenging economic conditions in the Republic of Moldova continued to have a negative impact on EBI's sales volume in the fourth quarter of 2008, but at a slower rate. Total sales volume in the Republic of Moldova was down by 27.7% in 2008, while the beer-only volume (excluding the two-month sales volume of the soft drink brands "Viva" and "Real", which were sold to the Coca-Cola Company in February 2007) declined by 11.4% year-to-year. Efes Moldova operates a brewery in Chisinau, with a current brewing capacity of 0.9 million hl and is the leading brewer in the country with a market share of 66%. Efes Moldova currently produces and sells six brands of beer appealing to different market segments: Chisinau is sold as a mainstream local brand and Vitanta, Vitanta Extra and Sokol are sold as local premium brands; and Efes, Stary Melnik and Warsteiner are sold as imported premium brands. Chisinau was the number one brand in the Republic of Moldova in 2006, with 57% market share by volume.

REPUBLIC OF MOLDOVA	In 2006, EBI's sales volume in the Republic of Moldova increased by 12% over the previous year, reaching 1.2 million hl, including the sales volume of Viva soft drink and Real bottled water brands, which were sold to the Coca Cola Company in February 2007. These brands were acquired by EBI in 2003 through the acquisition of Efes Moldova. In 2006, soft drink sales in the Republic of Moldova accounted for approximately 3% and 1% of EBI's sales volume and consolidated revenue, respectively. Beer-only sales volume in the Republic of Moldova was up 17% in 2006 compared with the previous year.
GEORGIA	EBI entered the Georgian beer market through the acquisition of the leading brewer in the market JSC Lomisi in February 2008 and included this operation in its financial statements starting 1 March 2008. EBI was able to generate 0.6 million hl sales volume in Georgia between March and December 2008, despite the negative impact of the military conflict in Georgia in August. Lomisi had 42% market share at the end of 2007. EBI is also considering the purchase of JSC Kazbegi (the number two in the market, with a 39% estimated market share).
SERBIA	Major subsidiaries: Efes Weifert Brewery (Serbia & Montenegro) 83.5%. Efes Zajecar Brewery (Serbia & Montenegro) 73%. Country contribution (YTD 3Q2006): 4% on volume/3% on revenue. EBI started its operations in Serbia in 2003 by acquiring the Pancevo Brewery on the outskirts of Belgrade. The name Pancevo was later changed to Efes Weifert. In 2004, EBI acquired a second brewery in Zajecar, with an annual capacity of 1.0 million hl, thereby increasing its total capacity in the market to 1.4 million hl per annum. Efes Serbia produces and sells five different brands of beer: Efes, which is positioned in the international premium segment, Weifert in the mainstream segment and Pils Plus, Standard and Zajecarsko in the economy segment. In addition, Efes Serbia also sells Miller Genuine Draft, positioned in the imported premium segment. In 2006, EBI was the fourth largest brewer in Serbia, with a market share of 13%. EBI sales volume in 2006 posted a decline of 10% compared with 2005. In order to effectively capitalize on the future potential of the Serbian beer market, EBI currently focuses on the continuous development of branding and infrastructure of its operations in Serbia.

Anheuser-Busch InBev	
	Anheuser-Busch InBev is the leading global brewer and one of the world's top five consumer product companies. On a proforma basis for 2007, the combined company would have generated revenues of EUR 26.4 billion. With a vision to become "The Best Beer Company in a Better World", the company has a strong, balanced portfolio, holding the number one or number two position in over 20 key markets. It has a key presence in both developed and developing markets. Headquartered in Leuven, Belgium, Anheuser-Busch InBev leverages the collective strength of about 120,000 people in over 30 countries worldwide. The company was founded in 1999 after two important players on the the Russian and Ukrainian beer markets – Interbrew and SUN Brewing – united their brewing facilities in the Russian Federation and Ukraine. Currently, SUN InBev owns nine breweries in the Russian Federation (plus one under construction). SUN InBev is the second largest brewing company in the Russian Federation.
Operating summary	2007 Volume of products sold: 270.6 M hl. Revenue: EUR 14,430 M. EBITDA: EUR 5,324 M.
Brands	InBev manages a portfolio of over 200 brands that includes global flagship brands Budweiser, Stella Artois and Beck's, and fast growing multicountry brands such as Leffe and Hoegaarden, and strong "local jewels" such as Bud Light, Skol, Brahma, Quilmes, Michelob, Harbin, Sedrin, Cass, Klinskoye, Sibirskaya Korona, Chernigivske and Jupiler, among others. In addition, the company owns a 50% share in Grupo Modelo, Mexico's leading brewer and owner of the global Corona brand, and a 27% share in China brewer Tsingtao, whose namesake beer brand is the country's best-selling premium beer.
RUSSIAN FEDERATION	Volume of products sold in 2007: 21.2 M hl. Number two in the market with 19.3% market share. Beverage plants: Klin, Omsk, Saransk, Povolzhie, Ivanovo, Perm, Kursk, Novocheboksarsk and St. Petersburg. A new site in Angarsk is under construction. Number of employees: approximately 9,900. SUN InBev. www.suninbev.ru

Brands in the Russian Federation:	Main global: Beck's and Stella Artois. Multicountry: Brahma, Löwenbräu, Hoegaarden and Staropramen. Main local: Bagbier, Klinskoye, Pikur, Premier, Rifey, Sibirskaya Korona, T. Tinkoff, Tolstiak and Volzhanin. Brand exports: 0.5 M hl (2.3% of total volume) mainly to Kazakhstan, Belarus and former CIS countries.
UKRAINE	SUN InBev. Volume of products sold in 2007: 10.9 M hl. Number one in the market, 38% market share. Chernigiv branch, Nikolayv branch, Kharkiv branch. Number of employees: approximately 2,750. Since 2000, SUN InBev Ukraine has been part of InBev and occupies the leading position with 38% of the national beer market. The Chernigiv brewery "Desna" was the first to be part of Interbrew since 1996, followed by Mykolaiv "Yantar" in 1999. The last phase of SUN Interbrew Ukraine organization was in 2000 when Kharkiv brewery Rogan became part of the company. In 2006, SUN InBev Ukraine OJSC merged with Chernigiv Desna Brewery CJSC, Rogan Brewery OJSC, and Yantar Brewery OJSC to form a single legal entity. These breweries have been restructured into balance-free affiliates of SUN InBev Ukraine OJSC. SUN InBev Ukraine's brand portfolio consists of 11 brands: two global InBev brands (Stella Artois and Beck's), five multicountry brands (Brahma, Leffe, Staropramen, Hoegaarden and Lowenbrau) and four Ukrainian brands (Chernigivske, Rogan, Yantar and Bile). Stella Artois has been brewed in the Ukraine (at the Chernigiv branch, SIU) since 2001, Brahma since 2005, Beck's since 2003 and Staropramen since 2004. All local brands (Chernigivske, Rogan and Yantar) are dynamic brands with a strong platform and consumers' preference.
Brands in Ukraine	Global: Beck's and Stella Artois. Multicountry: Brahma, Leffe, Staropramen. Local: Chernigivske, Rogan, Bile, Yantar. Competing with competitive brands on the Ukrainian market, including Obolon Light.

SERBIA	One plant in the north of Serbia (200 km from Belgrade), called Apatin Brewery. The plant produces 2.9 M hl per annum. Number of employees: approximately 1,000. 2006 marked the 250th anniversary of the Apatinska Pivara Apatin brewery in Serbia. The brewery became part of InBev in December 2003. www.jelenpivo.com
Brands in Serbia	Beck's, Stella Artois. Löwenbräu. Apatinsko Pivo, Jelen Pivo, Pils Light, Niksicko Pivo. Brand exports: Jelen Pivo to Bosnia and Herzegovina, and Montenegro.
SAB Miller	
	One of the world's largest brewers, SAB Miller has brewing interests and distribution agreements across six continents. Its portfolio of brands includes premium international beers such as Pilsner Urquell, Peroni Nastro Azzurro, Miller Genuine Draft and Grolsch along with market-leading local brands such as Aguila, Castle, Miller Lite, Snow and Tyskie. Six of the brands are among the top 50 in the world. SAB Miller is also one of the world's largest bottlers of Coca-Cola products.
Operating summary	Revenue in 2008: USD 21,410 M, +15%. EBITA: USD 4,141 M, +15%. Profit before tax: USD 3,264 M, +16%. Total volume of lager sold: 239 M hl. Europe contribution to group EBITA: 23% in 2008. Total number of breweries: 21.
SAB Miller Europe	Primary brewing operations cover nine countries. These are the Canary Islands (Spain), Czech Republic, Hungary, Italy, Poland, Romania, the Russian Federation, Slovakia and the Netherlands. In the majority of these countries it is the number one or two brewer. Total average number of employees: 12,921.

SAB Miller Europe	Europe delivered another excellent result with total lager volume growth of 9% (organic 8%) within which premium volumes grew 11%. Volumes were particularly strong in Poland, Romania and the Russian Federation and were assisted by warm weather in the earlier months, but cycled an exceptionally mild winter in the second half of the previous year. Brewing raw material and packaging costs increased significantly. However, the pricing environment has shown some signs of improvement and with positive brand mix has resulted in constant currency revenue per hl growing by 4%. This, together with productivity improvements, has more than offset higher input costs and the EBITA margin was up 10 basis points. Marketing expenditure has increased but has benefited from scale economies. Reported EBITA growth of 30% was impacted by currency exchange gains and also included Royal Grolsch from mid-February 2008. On an organic constant currency basis, EBITA growth was 15%.
Brands in Europe	Key local lager brands include: Arany Aszok, Débowe Mocne, Dorada, Dreher, Gambrinus, Grolsch, Kozel, Lech, Nastro Azzurro, Pilsner Urquell, Peroni, Šariš, Radegast, Timisoreana Lux, Topvar, Tropical, Tyskie, Ursus, Zolotaya Bochka and Zubr.
RUSSIAN FEDERATION	SAB Miller RUS LLC www.sabmillerrus.ru Leading premium portfolio – three of the top five international brands. Ranked number by volume and value on the Moscow market SABM with a volume of 5.7 M hl. Market share: 5%. Main brands: Miller Genuine Draft, Redd's, Kozel, Zolotaya Bochka. Number of breweries: 2. Brewing capacity: 7 M hl. Total size of beer market: 106 M hl. SAB Ltd entered the Russian Federation in 1998 by establishing a greenfield brewery in Kaluga, close to Moscow. In 2008, SAB Miller RUS purchased the Vladpivo brewery in Vladivostock. SAB Miller RUS has an unrivalled portfolio of local and international premium brands, allowing it to capture a disproportionately large share of the profit pool. Its strategy to focus only on the premium category means that its market share is the strongest in Moscow and St. Petersburg. In 2009, a new greenfield brewery was to be fully operational in Ulyanovsk, in the Volga region, with a capacity of 3 million hl.

RUSSIAN FEDERATION	SABM volumes went up 14% as the company's market share increased. The largest selling brand, Zolotaya Bochka, grew by 16% with strong marketing support. Miller Genuine Draft was up 9% to almost 1 million hl, driven by expanding distribution of the new half-litre bottle, and Kozel grew 13%. Redd's has new primary and secondary packaging, including a new can, and grew by 22%. The second production site at Ulyanovsk was on track for commissioning in May 2009 and its initial capacity was increased to 4 million hl. Until then, with existing operations at full capacity, contract brewing arrangements were put in place over the summer period.
UKRAINE	Sarmat JSC Year of investment: 2008. Number of breweries: 1. Brewing capacity: 1.8 M hl. Brands: Sarmat, Dnipro, Drive Max.
The Carlsberg Group	
	More than 45,000 people work for the Carlsberg Group, and the products are sold on more than 150 markets. In 2008, the Group sold more than 120 million hl of beer, which is about 100 million bottles of beer a day. The Carlsberg Group's broad portfolio of beer brands includes Carlsberg and strong regional brands such as Tuborg, Baltika and Kronenbourg as well as a wide range of leading brands in local markets.
Carlsberg Eastern Europe	The Eastern Europe region covers the growth markets of the Russian Federation and Ukraine and the emerging beer markets of Kazakhstan, Uzbekistan, Belarus and Azerbaijan. Carlsberg's Russian brewery, Baltika, is a strong market leader in the Russian Federation and in Ukraine Carlsberg holds a number three position. In both countries, the competition comes primarily from international brewers. The full ownership of Carlsberg's Eastern European activities following the partial acquisition of Scottish & Newcastle has further increased the importance of this region in Carlsberg's business portfolio and the region now accounts for 32% of Group revenue and approximately 48% of operating profit (before not allocated expenses). The Russian Federation is, and will remain, the largest and most important market in the region, accounting for 82% of regional sales volume and 85% of net revenue. However, a determined effort is being made to ensure that other countries in the region come to play a more important role, thus adding a geographic angle to the pipeline of future growth opportunities. In Ukraine, for example, a turnaround plan with the aim of accelerating growth and strengthening the position in the mainstream segment has been successfully implemented, and the market share increased to 23.8% in 2008. Carlsberg Uzbekistan has achieved a number one market position after just 18 months of operation.

RUSSIAN FEDERATION	www.baltika.ru Commercial beer production only officially began in the Russian Federation in 1796, when Catherine the Great signed a decree for the development of brewing. According to the The Russian Federationn Brewers' Union, there are now more than 300 breweries in the country. Baltika Brewery was established in 1990 in St. Petersburg, and in 1992 became part of a joint venture (named BBH) 50% owned by Carlsberg. Since 2008, it has been 100% owned by Carlsberg. Since its foundation, Baltika has expanded rapidly and today is the largest brewery in the Russian Federation and Eastern Europe. Holsten The Holsten Brauerei, which has been part of the Carlsberg Group since 2004, is also active in the Russian Federation. Holsten Premium Beer was launched in the Russian Federation in the early 1990s and today is the fourth largest licensed brand and the leading German beer brand in the market. Initially, the beer was exported, but since 1999 it has been brewed under license. Carlsberg operates ten production sites in the Russian Federation.
Local brands in the Russian Federation	Baltika, Arsenalnoye, Yarpivo, Nevskoye, Volga, Don, Medovoye, Kupecheskoye, Uralsky Master, Slavonoye Voronezhkoye, Holsten, Carlsberg and Tuborg.
KAZAKHSTAN	In November 2002, Carlsberg acquired (through the joint venture BBH) a 76% share in the Irbis brewery, situated in Almaty, Kazakhstan. In May 2003, the Ak-Nar brewery in Almaty was also acquired. This brewery is now called Derbes – meaning "Independent – after its main brand. It is a relatively new brewery with a capacity of 0.6 million hl and the potential for further expansion. Ownership: 76% Irbis Brewery and 100% Ak-Nar Brewery. The Irbis and Derbes brands both hold strong positions in Kazakhstan. Irbis is a leading premium brand, while Derbes leads the standard segment in the Almaty region and is well known nationwide.
Local brands in Kazakhstan:	Irbis, Derbes, Baltika.
UKRAINE	Kiev «Slavutich» Brewery www.group.slavutich.ua Zaporozhye «Slavutich» Brewery Lviv «Lvivska Brewery»

UKRAINE	www.lvivske.com In Ukraine, Carlsberg has more than 2,000 employees in the Slavutich Breweries (in Kiev and Zaporizhiya) and the Lvivska Brewery in Lviv. The Kiev brewery was started as a greenfield project and opened in 2004. The brewery was acquired in 1996 and the Lvivska Brewery was acquired in 1998. In the premium segment, Carlsberg Group brands Tuborg and Baltika have taken the number one and two positions. After the successful re-launch in 2007 of the main local brand Slavutich, sales increased by more than 125% and Slavutich became brand number four by volume on the Ukrainian market. In 2008, Carlsberg became the 100% owner of the BBH Group Ukraine.
Local brands in Ukraine	Slavutich, Slavutich ICE, Lvivske, Tuborg, Holsten, Carlsberg, Baltika, Arsenal, Khmilne.
UZBEKISTAN	Carlsberg Uzbekistan (UzCarlsberg JV), Tashkent www.carlsberguzbekistan.uz In June 2006, Carlsberg invested in a new brewery in Tashkent, Uzbekistan, together with the local partner Sarbast Plus. In July 2007, the brewery started shipments of its first local brand, “Sarbast”, meaning “free” or “independent” in ancient Uzbek. The initial planned capacity of the plant is 1 million hl per annum, with the potential to double the capacity by the end of 2008. Carlsberg ownership: 75.1%.
SERBIA	Carlsberg Srbija d.o.o. www.tuborg.rs Pivara Celarevo was founded in 1892 and became part of the Carlsberg Group in 2003. It is situated in the city of Celarevo, 130 km north of Belgrade. The plant employs 555 people and since 2004 Carlsberg has owned 99.9% of the company. Now called Carlsberg Srbija, it is one of the most successful privatizations and foreign investments in Serbia. Having a clear and active social responsibility policy, it is an esteemed employer that continuously creates new jobs all over the country. A relaunch of the local LAV brand and a successful launch of Tuborg – the first international brand produced in Serbia and Montenegro – helped the company to grow by 65% and take second place in the Serbian beer market in 2005.

SERBIA	The brands have been closely associated with some major national events. LAV is the official sponsor of the Serbian National Football Cup, now named the LAV CUP, while the music-focused Tuborg Green sponsors EXIT, the largest music festival in southeastern Europe. Number of employees: 555. Carlsberg ownership: 99.9% (since 2004).
Local brands in Serbia	Lav, LAV 7, Tuborg, Tuborg Xmas Brew, Tuborg Lemon, Carlsberg, Holsten, Battery.

4.3 The EBRD experience in the WBCs and the ETCs

Investment in breweries is a typical first phase investment in high risk emerging markets. With 12 successful projects, the EBRD has relevant experience in the beer sector and has been able to create a long-term partnership with the world's leading companies. These investments in the beer sector had a strong transition impact on the local economies, resulting in substantial backward investments in local production of malt (the world's leading maltsters such as Soufflet are clients) and bottling (e.g. the EBRD financed a USD 75 million glass bottle plant in Ukraine with Vetropack Gostomel). The EBRD investments in the beer sector illustrate its vertical approach along the entire food chain.

EBRD investments in beer projects:

Year	Name	Country	Product	Project M EUR	EBRD M EUR
1995/1996/ 1998/1999/ 2002/2007	Vena St. Petersburg/ Baltika/Carlsberg)	Russian Federation/Croatia/ Romania/Lithuania/Ukraine/ Kazakhstan	Equity/Debt	251	91
1997/2000	Obolon	Ukraine	Debt	52	28
1997/2008	Efes	Russian Federation/Kazakhstan/ Republic of Moldova	Equity/Debt	197	107
1997	Sarajevska Pivara	Bosnia and Herzegovina	Debt	11	3
2000	Pivara Tuzla	Bosnia and Herzegovina	Debt	10	6
2003	KICB Abdysh-Ate	Kyrgyz Republic	Debt	1	0.5
2005	Mekhnat Pivo	Uzbekistan	Debt	11	11
2005/2006	Lomisi	Georgia	Equity/Debt	9	6
2006	BIH/Castel	Armenia/Georgia	Debt	11	11
2008	Altyn Aylag	Turkmenistan	Equity	5	2

► Select local investments in the beer sector

A EUR 11 million loan to the Uzbek brewery Mekhnat Pivo was signed in 2005 under the Direct Lending Facility (ETC Initiative). The loan was used to finance the purchase of production equipment and working capital. The EBRD has raised donor money to finance necessary legal expense and market studies. Given the early stage of development of the financial sector in Uzbekistan, as well as the level of political risk surrounding the country, the relevance of the bank to this project was high.

A EUR 3 million minority equity investment was made in Lomisi, the second largest beer producer in Georgia. The equity investment, signed in 2005, was followed by a EUR 3 million loan in 2006. The investment funded permanent working capital and contributed to improving the production and distribution system as well as marketing development investments in the company's recently completed second brewery.

► Select western sponsored investments in the beer sector

Efes Breweries is one of the largest breweries in the Eurasia region and a long-standing client of the EBRD, with total financing commitments of more than EUR 100 million to date. In 1997, the EBRD financed Efes' initial entry into Russia and still maintains an 8.9% stake in the Efes Moscow Brewery. In 2002, the bank financed a greenfield brewery in Almaty with a EUR 6.1 million loan, followed by a EUR 5.2 billion loan in Kazakh tenge (EUR 27.6 million) in 2007. In 2008, Efes acquired 100% of the shares of the abovementioned Lomisi Brewery in Georgia, where the bank sold its stake.

Since 1996, the EBRD has had a multiproject framework agreement in place with Carlsberg, one of the largest breweries worldwide, comprising of EBRD debt and equity financing for the modernization of existing breweries and new greenfield operations. Under this framework, the bank already financed Carlsberg's investments in Lithuania (Svyturus), in the Ukraine (Slavutich) and in Kazakhstan (Derbes). The project enabled restructuring, modernization, and expansion of the regional beer brewing and distribution chain.

A EUR 29 million loan was made to the Russian Baltika Brewery (owned by Carlsberg), the leading brewery in the bank's countries of operations. The loan, signed in 1999, enabled Baltika to expand its production capacity and develop its distribution network across the Russian Federation. Today, Baltika has a market share of more than 38% and operates 11 breweries in the Russian Federation and one in Azerbaijan.

5. FURTHER READING AND INFORMATION

EastAgri, Barley/Malt/Beer: http://www.eastagri.org/sector_detail.asp?id=44

Barley farming in the UK: http://www.ukagriculture.com/crops/barley_uk.cfm

The UK Malting Industry: http://www.ukmalt.com/

The Brewers of Europe: http://www.brewersofeurope.org/

Euromonitor: http://www.euromonitor.com/Beer

European Bank
for Reconstruction and Development

Food and Agriculture
Organization of
the United Nations