agribusiness handbook

Wheat Flour

agribusiness handbook

Wheat Flour

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 technical features of wheat processing 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 Dmitry Prikhodko, Economist, FAO Investment Centre Division, and Rodion Rybchynsky, Chief Editor of the magazine *Khrananie i pererabotka zerna* (Rus. Grain Storage and Processing Magazine), as well as from members of the EBRD Agribusiness team. Electronic copies can be downloaded from www.eastagri.org, where a database of agribusiness companies, including wheat processing companies that operate 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

TABLE OF CONTENTS

INTRODUCTION

Wheat is grown in most parts of the world, from near-arctic to near-equatorial latitudes. It is the most important crop among the cereals by area planted and is followed in importance by corn, barley and sorghum. The amount of wheat traded internationally exceeds that of all other grains. Furthermore, the protein and caloric content of wheat is greater than that of any other food crop. Most wheat is consumed in the form of baked goods, mainly bread; therefore, wheat grains must be milled to produce flour prior to consumption. Wheat is also used as an ingredient in compound feedstuffs, starch production and as a feed stock in ethanol production.

1.1 Key parameters for wheat production

- The main wheat types represent all possible combinations of hard and soft, red and white, and spring and winter categories. All types belong to the genus Triticum aestivum, subspecies vulgare. In addition, three other species are cultivated and traded: the Triticum durum, compactum and spelta. Because of its quality, durum wheat is used by the pasta industry, and non-durum is used by either the milling, livestock feed or ethanol industries.
- Although grown in various areas, wheat is best acclimated in latitudes between 30 to 60° North and 27 to 40° South, while high-yield varieties respond best in moderate climates.
- Wheat can be cultivated at elevations ranging from sea level to 3,000 m. Although well-drained silt and clay loam soils are optimal, wheat will grow on a wide range of soils. Neutral to slightly acid soils (5.5 to 6.5 pH) are most suitable for wheat production. An average growing season temperature of 25 °C is optimal, although a range of 3.3 to 32 °C is acceptable for spring wheat varieties.
- All wheats are annual plants. Spring wheats are planted in the spring, have a short growing season, less than 100 days, and are harvested in the fall. In contrast, winter wheats are planted in the fall, in areas with no excessive freezing. Following germination and development of an extensive root system, growth is halted in winter and revived in the spring. Harvest takes place in early summer.

Although wheat output has been steadily increasing, a further production increase faces a number of constraints: limited arable land and competition between grains and oilseeds for that land; yields in developed countries are believed to be close to their biological potential and; farmers in developing countries experience problems with access to capital and support infrastructure, etc. The countries of the former Soviet Union have significant production potential as their yields are much below biological production potential.

1.2 Climate change and its effect on wheat production

Climate change also brings uncertainties to the prospects of growth of wheat production. According to the International Maize and Wheat Improvement Center (CIMMYT), climate change may affect wheat production through the direct effects on yield via physiological processes, through changes in

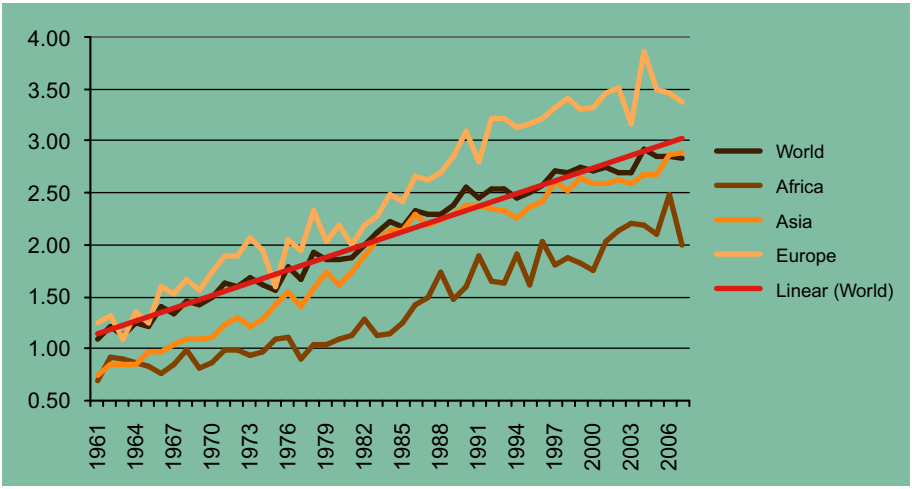
sowing dates or increased rainfall, and through changes in the areas under production, as regions become more or less suitable for wheat. Increased CO_2 concentrations have the potential to increase plant growth and yield, primarily through increased photosynthesis. Warmer winters can lead to higher yields through reduced winter kill. However, increased temperatures may make some regions unsuitable for wheat production.

The effects of climate change will differ depending on the region and production environment. The overall picture presented by the Intergovernmental Panel on Climate Change (IPCC FAR, 2007) shows that decreasing wheat yields at lower latitudes will likely be offset by increasing yields at mid to high latitudes under moderate warming.

1.3 World production of wheat

Wheat production in the world has been increasing largely due to plant breeding research and improved production technologies since the 1960s. World average wheat yields more than doubled from just 1.1 ton/ha in 1961 to 2.83 ton/ha in 2007 (Figure 1). The European countries achieve highest yields, while the countries in Asia tend to obtain yields slightly below the world average.

Figure 1: Average wheat yields, 1961–2006 (ton/ha)



Source: FAOSTAT

The apparent differences in wheat yields in Table 1 are explained by various weather conditions (precipitation levels and timing, and temperatures), the different types of wheat planted (higher yielding winter wheat versus lower yielding spring wheat), wheat production on irritated versus non-irrigated land and other production factors. Significant yield variations at regional level can explain relatively low average yields per major producing countries. For example, in Canada, Saskatchewan, wheat yields can be as low as 2 ton/ha, while yields in Quebec are generally higher than 3 ton/ha[1].

Table 1: Average wheat yield in major producing countries and selected Early Transition countries (ETCs) and Western Balkan countries (WBCs) (ton/ha)

Country	1990–1992 3 year avg.	2007–2009 3 year avg.	Change %
Argentina	2.14	2.60	22
Armenia	2.05	2.21	8
Australia	1.63	1.43	–12
Azerbaijan	2.22	2.83	28
Bosnia & Herzegovina	0.84	2.73	226
Brazil	1.27	2.17	70
Canada	2.23	2.65	19
EU*	5.18	5.32	3
Kazakhstan	0.99	1.12	13
Kyrgyzstan	2.46	2.20	–10
Macedonia	0.89	2.33	161
Republic of Moldova	3.57	2.67	–25
Mongolia	1.12	0.93	–17
Russian Federation	1.88	2.19	17
Tajikistan	0.92	1.70	84
Turkmenistan	1.96	1.42	–27
Ukraine	3.37	3.00	–11
United States	2.53	2.90	15

** EU-15 data from 1990 to 1992.*
Source: United States Department of Agriculture

A further increase in wheat production in the world depends on many factors, including improved access to capital and adoption of technology, and grain storage and transportation infrastructure development (construction of grain elevators and storage facilities).

[1] *http://www.fas.usda.gov/remote/Canada/can_wha.htm*

1.4 Costs and margins of wheat production

Wheat production costs vary greatly and depend on the production system (mechanized or manual farm labour) and whether agricultural inputs and irrigation are needed. For instance, direct costs, such as seeds, fertilizers and plant protection chemicals required for wheat production may vary from as low as USD 100/ha in Argentina to as high as USD 500/ha in France. Including other variable and fixed costs such as machinery, labour, energy and irrigation, production costs per 1 ha are USD 600/ha in Western Europe and about USD 250/ha in Central Europe.

Please refer to the Agribenchmark[2] web site for information on wheat production cost benchmarking and revenues in the Russian Federation, Kazakhstan, the United States, Australia, the European Union (EU) and other major producing countries. The budget in Table 2 illustrates the major inputs needed for wheat production using Kyrgyzstan as an example.

Table 2: Average wheat input costs in Kyrgyzstan (40 ha farm)

(A) Production inputs			
Seeds	Standard – 25 kg/ha Cost (1 kg) – USD 0.30 Total – USD 300 or USD 7.90/ha	**Main assumptions**	
		Sown area (ha)	40
		Potential yield production (ton/ha)	12
		Average yield production (ton/ha)	6
Nitrogen fertilizers	Standard – 150 kg/ha Cost (1 kg) – USD 0.12 Total – USD 720 or USD 18/ha	Average seasonal rainfall (mm)	160–350 mm
		Average irrigation (mm)	800 m^3/ha
		Method	Furrow irrigation
		Representative locations	Chui region
PK phosphorusic and potassium fertilizers	Phosphorus – 200 kg/ha Cost (1 unit) – USD 0.075 Total USD 400 or USD 15/ha	Farmer's access to credit and inputs (fertilizers, seeds)	Limited
Herbicides	Standard – 2 l/ha Cost (1 kg) – USD 5 Total – USD 400 or USD 10/ha		
Water	USD 4		
Labour	40 hours/ha Cost (1 unit) – USD 1 Total – USD 1,600 or USD 40/ha		
Rent	USD 22.70/ha Total – USD 1,135		
Costs (A)	**USD 117.60/ha** **Total: USD 4,704**		
(B) Field prices			
Purchasing prices of producers	117.6		
(C) Gross margin= (B) – (A)	USD 156/ha Total: USD 6,096		

Source: FAO Wheat Database

[2] *Agribenchmark Cash Crop Report 2006 http://www.agribenchmark.org/cc_results_cash_crop_reports.html*

Margins/Revenues from wheat production are not solely dependent on the cost of wheat production. Farmers' revenues are influenced by state price support programmes and timing of sale (immediately after the harvest wheat prices are usually the lowest in any given marketing year) among other factors. Wheat quality, prices and farmer's location also have significant impact on farmers' revenues.

Wheat producers may target and obtain specific wheat quality by using appropriate wheat varieties at the time of planting and applying recommended doses of mineral fertilizers and pesticides during wheat growth. However, protein content and gluten quality would be largely determined by weather conditions and pest infestation during crop ripening and harvesting.

A farmer's location in relation to the main domestic and international markets, and the proximity of the crop to the grain handling infrastructure and ports also significantly influence the level of the farm-gate wheat prices and revenue. Farmers in remote areas typically receive lower prices than farmers located close to ports. This is especially true in situations where farmers compete in the same export markets. For instance, farmers in Ukraine received USD 145/ton of wheat in December 2009 due to their proximity to the Black Sea ports. Farmers in Kazakhstan with no access to ports received about USD 110/ton for similar or better quality wheat in the same month.

According to the Agribenchmark network, wheat farmers were estimated to have earned USD 12–20/ton of wheat (about 10–20% margin) in 2006; however, less fortunate wheat farmers experienced losses of up to USD 30/ton the same year. Following the increase in cereal prices in 2007, the revenues of wheat farmers also increased to an estimated USD 50–150/ton.

During the 2000s, production and consumption of wheat increased substantially. In 2000/2001, the world's total wheat output was estimated at 586 million tons. Since then wheat production has increased considerably. Following low wheat production in 2006 and 2007 as a result of the drought in major producing countries, wheat prices increased considerably (see Section 3). Wheat production rebounded to 685 million tons in 2008 in response to high prices. The increase in wheat production has been directly related to the increase in use for food, feed and other purposes as outlined in Table 3.

Table 3: Wheat: world balance (million tons)

	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009 (estimate)	2009/2010 (forecast)
Production	632	625	597	610	685	656
Trade	110	110	113	113	124	114
Consumption:	620	620	621	618	645	655
food	438	439	442	447	452	456
feed	111	116	113	102	120	127
other uses	71	65	65	69	73	72
Year-end stocks	174	180	160	152	191	192
Supply	793	806	776	768	832	n/a

Note: The international marketing year begins 1 July and ends 30 June of the following year.
Source: FAO estimates

Wheat remains one of the most affordable sources of protein in many countries. The growing population is the key factor contributing to the increase in use of wheat and wheat-based products such as flour, groats, starch and ethanol.

The EU-27, China, India, the United States, the Russian Federation and other major wheat producers increased wheat production in recent years.

Table 4: Major wheat producing countries (thousand tons)

Country/region	2005	2006	2007	2008	2009	Change %
Leading wheat producers						
EU-27	132,356	124,870	120,133	151,072	138,339	5
China	97,445	108,466	109,298	112,464	114,500	18
India	68,640	69,350	75,810	78,570	80,580	17
Russian Federation	47,700	44,900	49,400	63,700	61,700	29
United States	57,243	49,217	55,821	68,016	60,314	5
Canada	25,748	25,265	20,054	28,611	26,500	3
Pakistan	21,612	21,277	23,300	21,500	24,000	11
Australia	25,173	10,822	13,569	20,939	22,500	-11
Ukraine	18,700	14,000	13,900	25,900	20,500	10
Turkey	18,500	17,500	15,500	16,800	17,800	-4
Kazakhstan	11,200	13,450	16,450	12,550	17,000	52
Wheat production in selected ETCs and WBCs						
Uzbekistan	5,800	5,850	6,200	6,000	6,200	7
Azerbaijan	1,575	1,540	1,425	1,700	2,200	40
Serbia		1,876	1,994	2,100	2,000	7

Turkmenistan	1,600	1,600	1,600	900	1,200	-25
Kyrgyzstan	950	890	710	720	1,100	16
Republic of Moldova	1,100	700	450	1,400	750	-32
Tajikistan	550	530	530	350	530	-4
Albania	300	330	330	330	330	10
FYR Macedonia	280	250	280	280	280	0
Bosnia & Herzegovina	175	150	150	180	175	0
Armenia	258	147	300	230	140	-46
Mongolia	74	130	110	110	110	49
Georgia	190	70	76	135	100	-47

Source: USDA estimates as of 10 February 2010

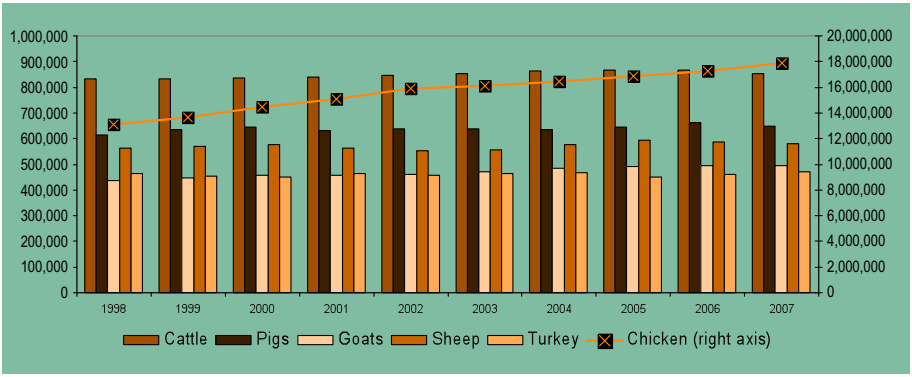
According to the baseline scenario of the FAO-OECD Agricultural Outlook for 2009–2018[3], wheat production is forecast to increase from approximately 630 million tons (2006–2008 average) to 722 million tons in 2018.

[3] *http://www.agri-outlook.org/dataoecd/2/31/43040036.pdf*

2.1 Animal feed

Approximately 17–20% of global wheat production is used for feeding animals and poultry. Although wheat is not the main feed ingredient worldwide, increasing demand for meat, especially in the Asia-Pacific region, has led to an increasing need for proteins to feed poultry, pigs and cattle. Accordingly, an increase in the livestock population requires an increase in the production of feed grain.

Figure 2: World livestock and poultry inventories (thousand head)



Source: FAOSTAT

2.2 Biofuels

During the last decade, the growing consumption and prices of oil and petroleum and related biofuels policies[4] led to a substantial increase in grain usage for bioethanol production. According to FAO-OECD estimates, approximately 93 million tons of wheat and coarse grains were used for ethanol production in 2007, double the amount used in 2005 (OECD-FAO, 2008). This represents more than half of the total growth in wheat and coarse grain usage.

Wheat, among other cereal crops, yields less ethanol per 1 ton of feedstock used or 1 ha of land cultivated (Table 5). While in the United States maize is the primary feedstock for bioethanol plants, in the EU the main feedstock is wheat.

[4] *For more information, please refer to Biofuels: prospects, risks and opportunities. The State of Food and Agriculture (SOFA) Report 2008 http://www.fao.org/publications/sofa/en/*

Table 5: Bioethanol yields from different grain crops

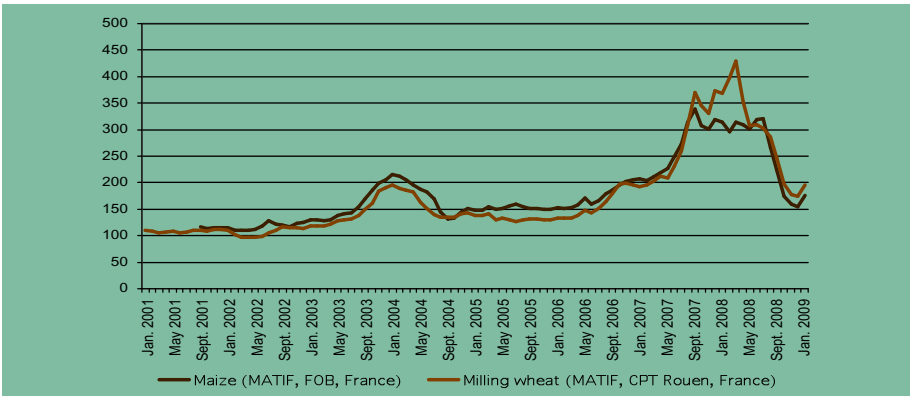
Feedstock cereal	Cereal yield ton/ha	Conversion kg of ethanol/1 ton	Biofuel yield ton/ha
Maize	4.9	400	1,960
Rice	4.2	430	1,806
Wheat	2.8	340	952
Sorghum	1.3	380	494

Source: FAO State of Food and Agriculture (SOFA) Report 2008

3.1 Wheat prices

World prices for many commodities, including wheat, nearly doubled over the period 2007–2008 but subsequently fell sharply from their record highs due to increased production, prompted by earlier price increases, and to slightly weaker demand, intensified by the global economic crisis. Due to sporadic shortages in wheat supply, wheat prices have been highly volatile. Between January 2001 and January 2009 MATIF (International French Futures and Options Exchange) milling wheat prices went up from USD 109.70/ton to USD 196.50/ton, with the peak in wheat prices at USD 429.50/ton in March 2008. As a result of increased use of wheat for food, feed and biofuel, demand for grains and wheat in particular will likely remain high and in turn wheat prices will also remain high in the foreseeable future.

Figure 3: Dynamics of world wheat and maize prices, 2001–2008 (USD/ton)



Source: International French Futures and Options Exchange (MATIF)

3.2 Wheat importers and exporters

Increasing global wheat consumption has led to increased trade. Wheat trade increased by an estimated 23% in the last nine years and reached 123.8 million tons in 2008/2009 compared with 100.9 million tons in 2000/2001. Wheat trade will increase to 134 million tons by 2018 according to FAO-OECD Agricultural Outlook 2009–2018. Developing countries such as those in South and East Asia, as well as countries in Africa such as Nigeria and Egypt, will continue to fuel global wheat demand in an effort to feed fast growing local populations.

Table 6: Wheat grain importers (left) and exporters (right) (thousand tons)

Importer	2007/2008	2008/2009	2009/2010*	2009/2010 vs 2007/2008 %
Egypt	7,700	9,900	8,300	8%
EU-27	6,942	7,740	7,000	1%
Brazil	6,711	6,000	6,500	-3%
Indonesia	5,224	5,423	5,500	5%
Algeria	5,904	6,359	5,300	-10%
Japan	5,701	5,156	5,300	-7%
Iran	200	6,700	4,500	2 times
Iraq	3,424	3,868	3,800	11%
Republic of Korea	3,092	3,371	3,700	20%
Nigeria	2,677	3,550	3,500	31%
Others	65,816	78,292	66,959	2%
World	**113,391**	**136,359**	**120,359**	**6%**

Exporter	2007/ 2008	2008/ 2009	2009/ 2010*	2009/2010 vs 2007/2008%
United States	34,363	27,637	23,814	-31
EU-27	12,271	25,390	19,000	55
Canada	16,116	18,812	18,500	15
Russian Federation	12,552	18,393	18,000	43
Australia	7,487	14,800	15,000	100
Ukraine	1,236	13,037	9,000	628
Kazakhstan	8,181	5,701	7,500	-8
Argentina	11,193	6,000	2,500	-78
Turkey	1,722	2,238	2,300	34
Mexico	1,261	1,406	1,200	-5
Others	10,820	8,874	7,859	-27
World	**117,202**	**142,288**	**124,673**	**6**

Source: USDA estimates as of December 2009

The United States, the EU-27, Canada, Australia and Argentina have been traditionally the most important wheat exporters in the world. Recently Kazakhstan, the Russian Federation and Ukraine (often referred to as the Black Sea grain exporters) have become the leading wheat exporters and will likely hold their dominant positions in wheat trade in the foreseeable future[5]. The Black Sea grain exporters possess significant production potential in terms of both wheat yield and area increases[6] and are located close to the traditional grain importers in the Middle East, North Africa and Central Asia, including the ETCs.

Although the EU is one of the main producers and exporter of wheat, it also imports significant quantities of wheat. Feed producers in Spain and Italy are

[5] *For the most recent updates of the global grain trade outlook from FAO-OECD, please visit http://www.agri-outlook.org*

[6] *For more on grain production and export potential in the Commonwealth of Independent States (CIS), please see http://www.fao.org/newsroom/common/ecg/1000808/en/FAOEBRD.pdf*

the main buyers of medium- and low-quality wheat. Until the end of 2002, the EU import tariff regime for cereal and rice was based on the Margin of Preference (MOP). Under the MOP, the import tariff on wheat and feed grains was the difference between the maximum duty-paid price (155% of the EU intervention price) and the landed price of wheat in Rotterdam based on United States market prices. This tariff system provided a high level of protection until 2002, after which time increasing supplies from the Russian Federation and Ukraine made this system ineffective. In 2002, the MOP was replaced with a quota system for low- and medium-quality wheat.

Overall rising per capita incomes and expanding populations fuelling demand in the food markets of developing countries are behind the increasing import and global demand that has outpaced domestic production capacity. However, growth in per capita food consumption of wheat is expected to remain modest or even to decline in some countries, notably in China. Diets in these countries are slowly shifting towards more value-added food products in the face of rising incomes, a phenomenon that has already taken place in much of the OECD area.

It is expected that Egypt, the EU, Indonesia, Japan, Brazil and Algeria will likely remain the main wheat importers until 2018, with each country importing more than 4.5 million tons per year (OECD-FAO Agricultural Outlook 2009–2018).

3.3 Grain trading contracts

Grain traders conclude contracts between themselves or prospective buyers well in advance of physical delivery of the commodity. Many of these physical delivery contracts (as opposed to futures trade contracts) are often concluded 6–9 months ahead of harvest, shipment or delivery time. Reputable international associations such as the Grain and Feed Trade Association (GAFTA) have developed standard terms for grain trading contracts that cover product quality, condition, shipping documentation requirements, payment terms, insurance requirements, default and damage clauses and arbitration procedures. In support of these contracts, GAFTA has developed rules for methods of grain weighting, sampling and analysis.

3.4 Tenders

Wheat importing countries use various mechanisms to regulate grain trade, including import tariffs, quotas or tender systems. Egypt, the Republic of Korea, Japan and many other importing nations announce wheat tenders in

which they specify desired quantities, qualities and origins of the wheat they would like to import. In some cases, wheat origin may be "optional" for tender purposes in order to allow for certain flexibility. For instance, the Egyptian General Authority for Commodity Supplies (GASC) may seek to buy 55,000–60,000 tons of United States North Pacific soft white wheat, United States hard red wheat, United States soft red winter wheat, French milling wheat, Australian standard white wheat, Australian hard wheat, German milling wheat, Canadian soft wheat, Argentine bread wheat and/or Kazakhstan milling wheat. At the same time, GASC may seek cargoes of 30,000 and/or 60,000 tons of Russian wheat, United Kingdom milling wheat (ukp or uks variety), Syrian wheat or Ukraine milling wheat[7]. In the case of a tender that indicates origin as "optional", the winner of the tender may decide at his/her own discretion on the origin of the wheat, considering the supply situation, qualities and prices in major producing countries.

3.5 Freight costs

With the exception of a few land-locked countries that have to import wheat by railway and road, most importing countries receive wheat shipped by sea in dry bulk cargo vessels that are classified by their dead weight: Panamax (74,000 tons), Supramax (52,454 tons) and Handysize (28,000 tons). Less frequently, wheat is shipped by Cape-sized vessels (above 100,000 tons) due to port size limitations. The ports must meet minimum berth length and depth requirements for each classification of vessel and have the loading/unloading machines and elevator capacity to handle wheat shipments. In addition, ports should not be too congested and allow moderate vessel waiting time. When port facilities cannot handle bulk wheat shipments and when freight costs permit, traders may choose to ship wheat in cargo containers. This is often done for food aid and commercial wheat shipments to the African ports that cannot handle bulk wheat shipments.

The cost of shipping wheat depends on the distance to destination (Table 7) and overall demand for dry cargo transportation. Freight costs can contribute a significant share to wheat landed price in the importing country. From January to March 2006, the freight cost from the United States gulf ports to Egypt, the world's major wheat importer, was USD 28–30/ton (Figure 4, left axis) as compared with the f.o.b. wheat price of USD 143–149/ton, which kept the freight cost/wheat price ratio at 19% (Figure 4, right axis). Due to the increasing demand for cargo transportation, freight cost on this route more than doubled

[7] *http://af.reuters.com/article/investingNews/idAFJOE57500V20090806 (last accessed on 9 February 2010)*

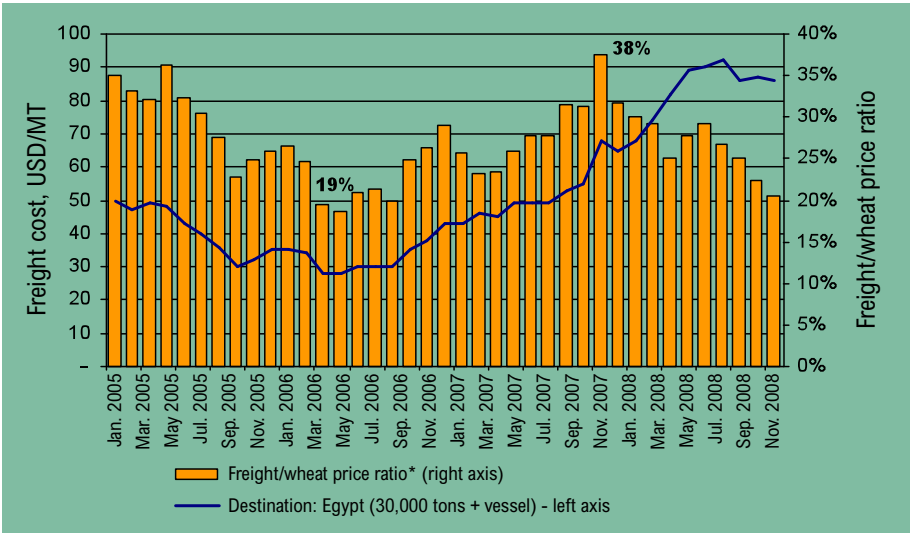
and reached USD 68/ton by May 2007. The price of wheat showed only a moderate increase to USD 181/ton during the same time. Thus, the share of maritime transportation costs in the landed price of wheat in Egypt (f.o.b. price + cost freight) increased to a sizable 38% (on the right axis below).

Table 7: Freight costs from United States gulf ports, January of each year (USD/ton)

Destination/vessel size	2005	2006	2007	2008	Change 2008 vs. 2005 %
Bangladesh/ over 40,000 tons	81	42	58	111	37
Egypt over 30,000 tons	50	28	49	92	84
Rotterdam over 40,000 tons	36	21	30	76	111

Source: CIMMYT Prices Database

Figure 4: Freight costs from United States gulf ports to Egypt as a ratio of the f.o.b. wheat price



*Note: *Ratio of freight cost to the f.o.b. price of United States soft red winter wheat (SRW#2).*

Source: Author's calculations based on CIMMYT Prices Database

The Baltic Dry Index (BDI)[8] is an international index to measure the cost of shipping raw materials, such as iron ore, coal and bulk agricultural

[8] *The London-based Baltic Exchange compiles the Baltic Dry Index (BDI) data from all major shipping routes to calculate the BDI.*

commodities, via a sea route. As the freight cost is usually high compared with the price of wheat, delays in vessel loading due to poor logistics and delays with grain fumigation, phytosanitary, procurement of quality certificates, customs clearance, etc., may cost the grain trader USD 15,000–30,000 per day depending on the type of vessel and the contractual arrangements. Thus, a trader who expects to earn a USD 3/ton margin on shipping 30,000 tons of wheat overseas can loose USD 0.50–1.00 in demurrage payments each day the shipment is delayed.

3.6 Wheat traders' margins

Grain trading is a low margin and high-volume business. Depending on wheat prices, freight rates, currency exchange rates, existence of own elevator and procurement (sourcing) network, government policies related to export refunds (subsidies) and the terms of value-added tax (VAT) reimbursement, wheat traders' margins may be highly variable. It is believed that grain traders who sell wheat from the Black Sea region earn on average USD 2–5/ton.

3.7 industry leaders in the grain trade

There has been some consolidation of the grain trading business due to the mergers and acquisitions of the last ten years (Cargill's purchase of the Continental Grain merchandising business, completion of the Archer Daniels and Midland (ADM) acquisition of A.C. Toepfer International, etc.). It is difficult to rank the grain trading companies in terms of trade volume as most of them do not declare grain trade volumes or separate wheat trade from their other trading activities in coarse grain, oilseeds, vegetable oils or other commodities.

The leading grain trading companies in the world are believed to be Cargill, Bunge, ADM (all United States companies) and Louis Dreyfus (French company).

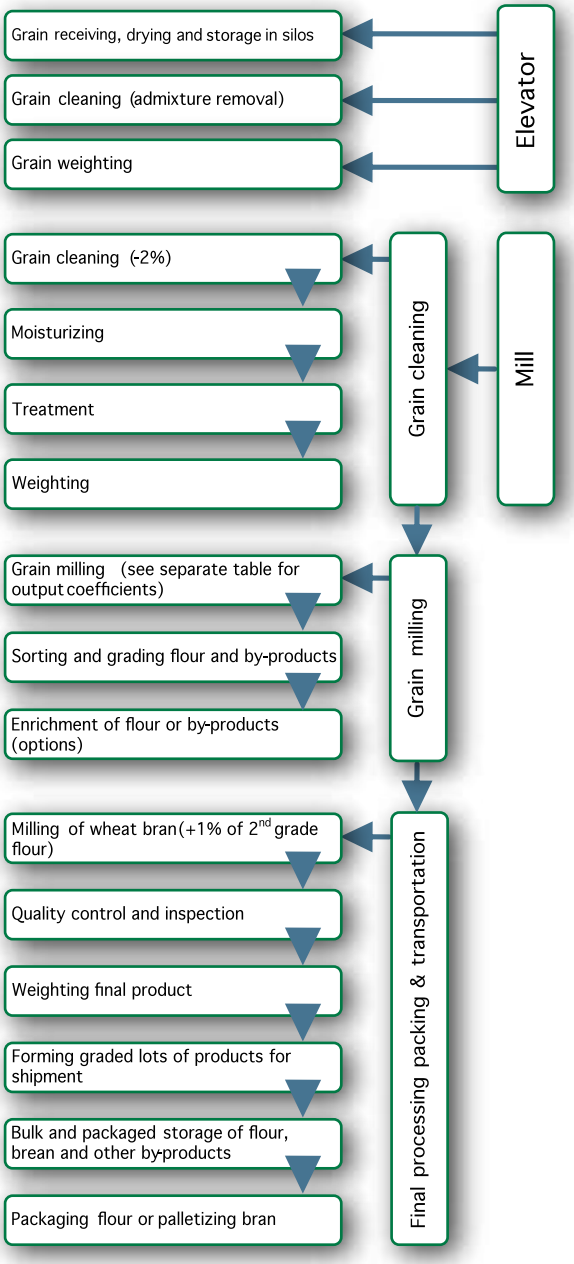
After harvesting, wheat is transported to on-farm storage facilities or directly to elevators. Most modern elevators are equipped for receiving grain from farm trucks and cleaning, drying and preparing it for shipment by sea, rail or truck to export ports or domestic flour mills. The flour milling industry is the main consumer of wheat and rye because these grains are the key cereals used for bread production. Maize, oat, barley and rice are used in flour production in significantly lesser quantities. Wheat flour – the most important product of wheat milling – is used in the baking and confectionary industries and for home cooking.

4.1 Milling wheat into flour

Before receiving wheat, samples are tested to ensure wheat quality and safety and to determine end-use qualities. These tests determine how the wheat will be stored and processed. Millers often blend different qualities of wheat to achieve the desired wheat flour quality.

Flour production is based on the mechanical extraction of the core part of the kernel, the endosperm which contains the bulk portion of the kernel's protein and carbohydrates. Figure 5 shows the main steps involved in wheat milling.

Figure 5: The process of milling wheat into flour



Source: Author

At the flour mill, the wheat is always cleaned. Cleaning involves using magnetic separators (to remove iron particles), vibrating separators (to remove straw and dirt), aspirators (to remove dust) and de-stoners (to remove stones). Disc separators are used later in the process for separating the various sizes of wheat kernels.

Wheat conditioning and tempering (moisturizing) finalize wheat preparation for milling. Moisture is added to toughen the bran and to facilitate easy separation of kernel parts. Tempered wheat is stored for about 8–20 hours, depending on the type of wheat, whether soft, medium or hard. Blending of different wheat types and qualities can be done at this stage to achieve a specific flour quality.

The wheat is then milled in roller mills. The modern mills use the process of gradual reduction of the wheat kernels with the goal to obtain middlings (coarse particles of endosperm). The middlings are then separated from the bran by sieves and returned to the appropriate rollers until the desired flour is obtained. Proper adjustment and settings of the rolls ensure maximum output of high-quality flour. Grinding that is too hard will result in bran particles getting into the flour, while grinding that is too light will result in the waste of endosperm.

From the rolls, the milled products are sent by pneumatic systems to rotating box-type sifters. The sifters separate the larger particles from the smaller particles. Larger particles are shaken off at the top, leaving the finer flour particles to sift to the bottom. This process may be repeated several times.

The following table summarizes the output coefficients of the main products received from wheat milling (measured as percentage of wheat that arrives at the mill). These coefficients largely depend on wheat quality, type of equipment, technological processes used and the experience of the flour mill staff.

Table 8: Approximate output of wheat flour and by-products (%)

	Admixt.	Semolina	Flour[9]			Bran
			Prime grade* ash, % DM – 0,55 gluten, % – 24	**1st grade*** ash, % DM – 0,75 gluten, % – 25	**2nd grade*** ash, % DM – 1,25 gluten, % – 21	
Min. %	1	0	25	15	5	19
Max. %	3	3	65	45	25	20

** According to Ukraine's State Standard ГСТУ 46.004-99 "Wheat Flour. Technical Conditions". DM = dry matter.*

[9] *Flour grade in the countries of the former Soviet Union is based on ash, fineness, gluten content and quality, particle size and whiteness. For more information, please refer to http://www.apk-inform.com/showart.php?id=12680*

In the case of industrial milling at factories with a daily grain processing capacity of 100 tons or more, wheat flour output reaches 75–78% of wheat weight. In small-sized mills, both roller and burr, flour output approximates 70–72% of wheat weight. In additions to flour, mills also produce semolina, wheat groats (white groats, couscous, bulgur, etc.) and pasta flour. The most important milling by-product is bran, which is used by the compound feed industry.

4.2 Costs and margins of wheat flour production

The approximate cost-price breakdown of flour production is as follows: the cost of grain accounts for approximately 81% of the total cost of flour, followed by electricity cost (6.5%), labour cost (4%), and expendable materials and other costs (8.5%), according to the International Association of Operative Millers.

Table 9: Annual production cost of a flour mill by type of product

Cost	Total		
	thousand USD	USD/ton	%
	Wheat grain milled per year, 34,629 tons		
1. Material costs, including cost of:	4,558.3	131.6	93.9
grain	4,350.1	125.6	89.6
electricity	126.1	3.6	2.6
fuel	39.5	1.1	0.8
water	16.5	0.5	0.3
additional materials	26.1	0.8	0.5
2. Labour costs	143.6	4.1	3.0
3. Social deductions	55.5	1.6	1.1
4. Depreciation	85.2	2.5	1.8
5. Other costs	10.6	0.3	0.2
Total production cost	**4,853.1**	**140.1**	**100.0**

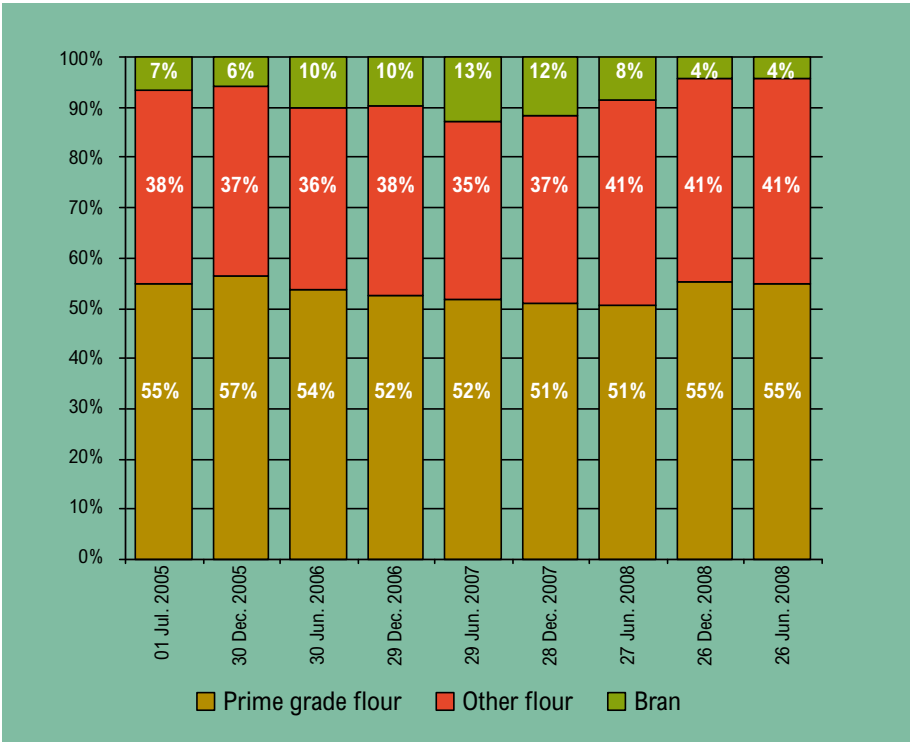
Source: Author's calculations, mill location: Ukraine

Like the grain trade, wheat milling is also a thin margin business. On the one hand, wheat millers depend to a great extent on wheat markets that determine the cost of the raw material. On the other hand, they depend on the preferences and willingness to pay of their consumers – bakeries, the confectionary industry, restaurants and other users of flour – for the flour they produce.

The ability of wheat millers to hedge the price risks is often limited due to the lack of grain futures markets or poor contract enforcement in the spot grain and flour markets in the transition countries. Millers in the private sector in many countries may be subject to government regulation as flour and bread are considered to be socially important food products. In this case, governments may regulate the wheat milling business through administrative price fixing, establishment of maximum margins or provision of input subsidies.

Depending on the output ratios, wheat flour may contribute 93% to the gross margin generated in wheat milling, while wheat bran may contribute 7% (Figure 6). These contribution ratios change depending on flour and feed demand and prices.

Figure 6: Wheat flour and bran contribution to wheat milling margin (%)

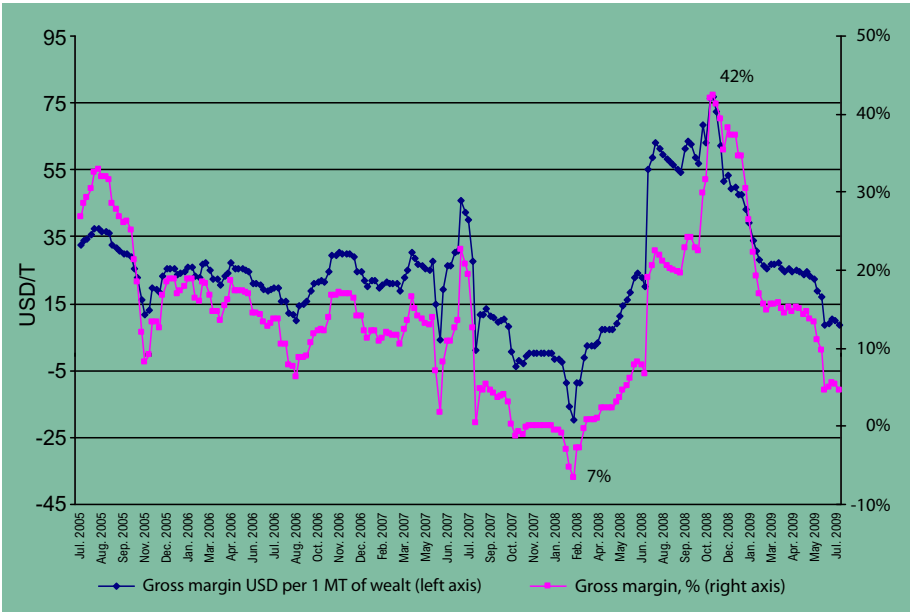


Source: Author's calculations based on APK-Inform price data for wheat, three types of flour and bran in Ukraine

The gross margin in wheat milling can change significantly throughout the marketing year and go from a negative value (i.e. wheat milling may generates

a net loss) to a hefty positive USD 75/ton or 42% as compared with the cost of the wheat grain milled (Figure 7). Therefore, in addition to good technical knowledge and equipment, price-risk management instruments and well-established relations with wheat suppliers and wheat flour buyers, clear and predictable policy mechanisms are critically important for the success of wheat flour businesses.

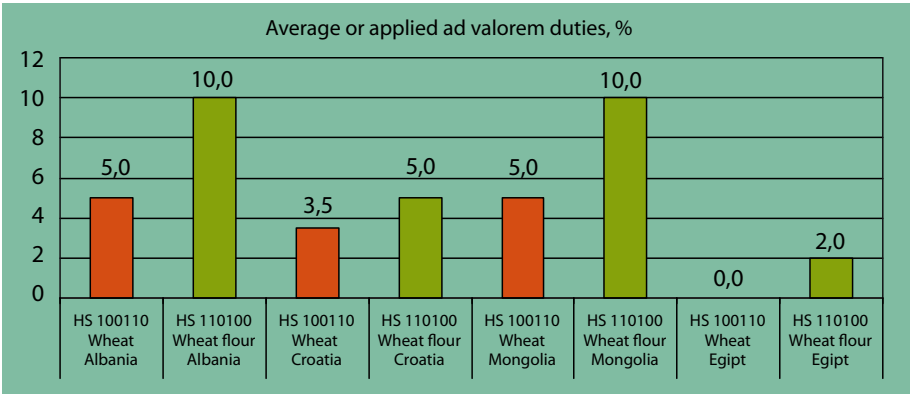
Figure 7: Wheat milling margins in marketing years 2005/2006–2008/2009



Source: Author's calculations based on APK-Inform prices data for wheat, three types of flour and bran in Ukraine

Wheat grain is a more widely traded product than wheat flour due to the following main reasons: (i) lower import tariffs on wheat grain as compared with wheat flour and (ii) logistical and quality issues such as greater difficulty with transportation and shorter shelf life of flour as compared with wheat grain.

Figure 8: Average or applied value-added duties (%) on wheat flour

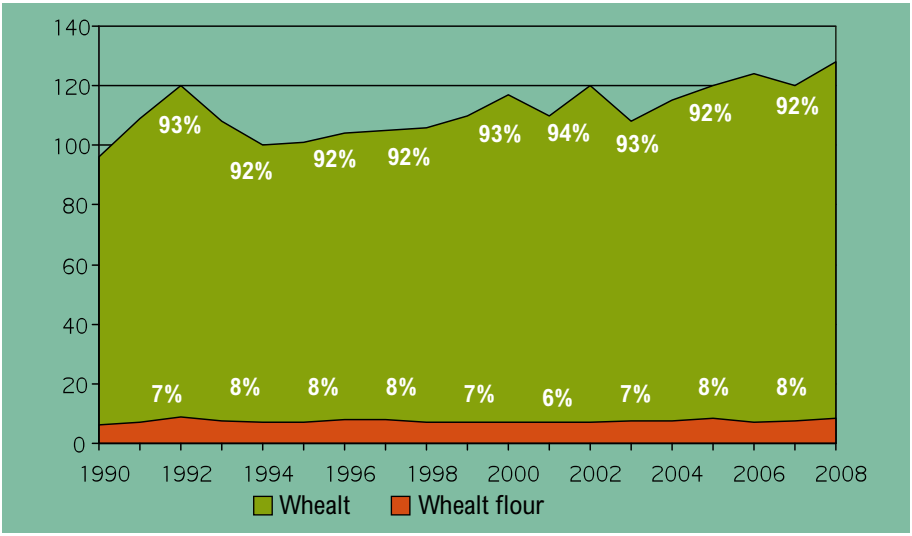


Source: World Trade Organization (WTO)

Flour trade is subject to a number of tariff restrictions. In 2007/2008 when many wheat and wheat flour importing countries removed trade barriers, global flour trade reached a record high of 11.5 million tons on a wave of high cereal prices (previous record of 11.2 million tons in grain equivalent was registered in 1996/2007). This was partially due to the fact that the cost of wheat milling increased only moderately as compared with the increase in wheat prices so some importers increased their import of flour rather than wheat grain.

World trade in wheat flour has accounted for 6–8% of total world wheat trade and has not experienced any significant change. Usually a larger volume of wheat trade results in lower wheat flour exports and vice versa.

Figure 9: Ratio of world wheat and wheat flour exports (million tons)

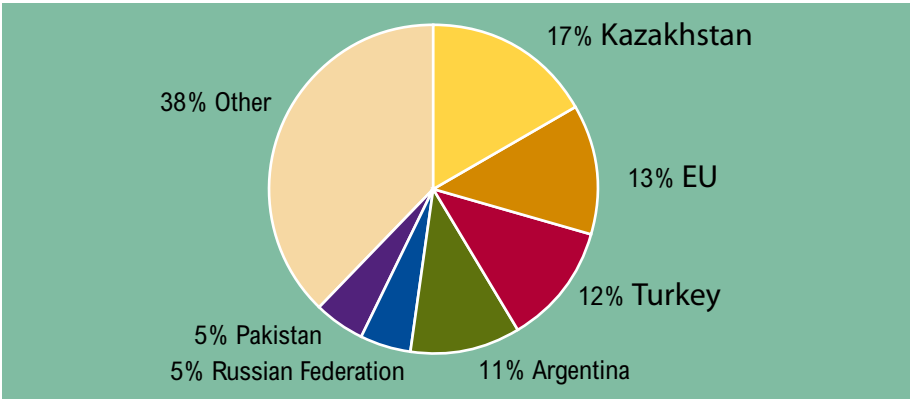


Source: Institute of the Agrarian Market Conjuncture based on the data of the International Association of Operative Millers (IAOM)

5.1 Wheat flour exporters and importers

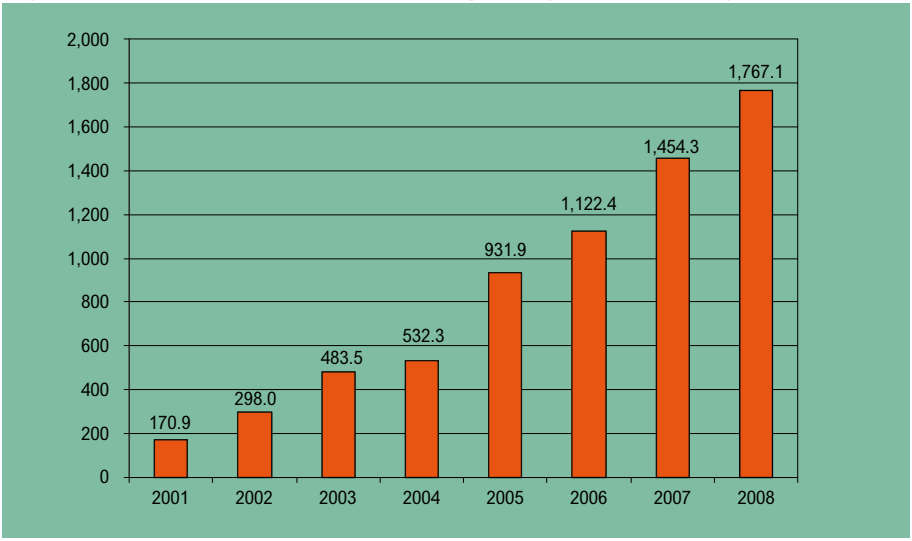
Kazakhstan, the EU-27 and Turkey have been the three main flour exporters in the last three years. Kazakhstani wheat flour exports showed remarkable growth from 171,000 tons in 2001 to 1.8 million tons in 2008, a ten-fold increase!

Figures 10: Main wheat flour exporters, in 2008/2009



Source: International Grains Council (IGC)

Figure 11: Kazakhstani wheat flour exports (thousand tons)



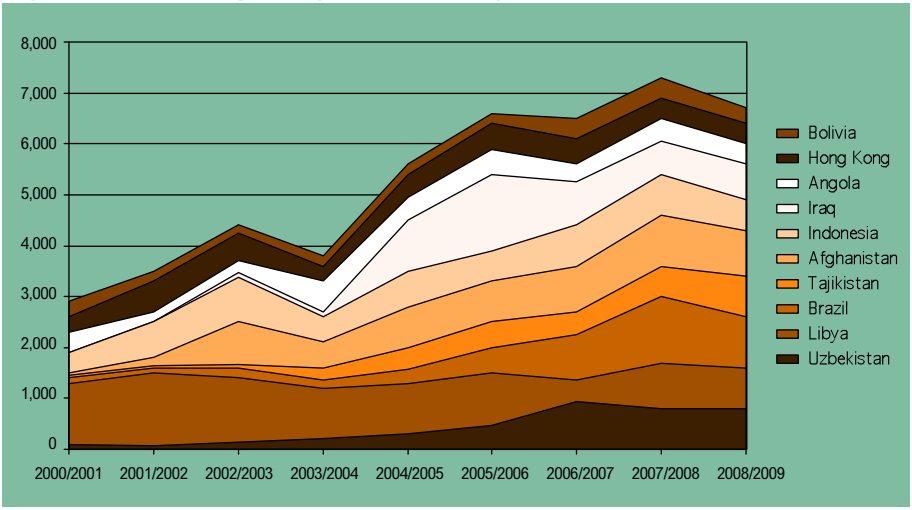
Source: IAOM

The EU-27, the second largest exporter, recently exported about 1.25 million tons of flour in wheat grain equivalent. It is worth noting that European flour exports peaked in 1996/1997, reaching 6.3 million tons in grain equivalent. Today, European flour holds a 13% share of the world market compared with a 65% share in 1996/1997.

Turkey, the third largest flour exporter, traditionally exports between 1.0 and 1.3 million tons of flour in grain equivalent annually. It is worth noting that while being one of the world's leading flour exporters, Turkey imports wheat on a regular basis. This is largely due to government policies promoting wheat imports and processing, and wheat flour exports.

The undisputed leaders among flour importers are Brazil and Libya (Figure 12). Each country buys about 1 million tons of flour annually. Uzbekistan, Tajikistan and Afghanistan are also major flour importers. Iraq has been trying to reduce its flour imports. According to data by the International Grains Council (IGC), in 2008/2009 Iraq imported 500,000 tons of flour in grain equivalent compared with 600,000 tons the previous year and with 1.5 million tons in 2005/2006.

Figure 12: Flour imports (thousand tons)



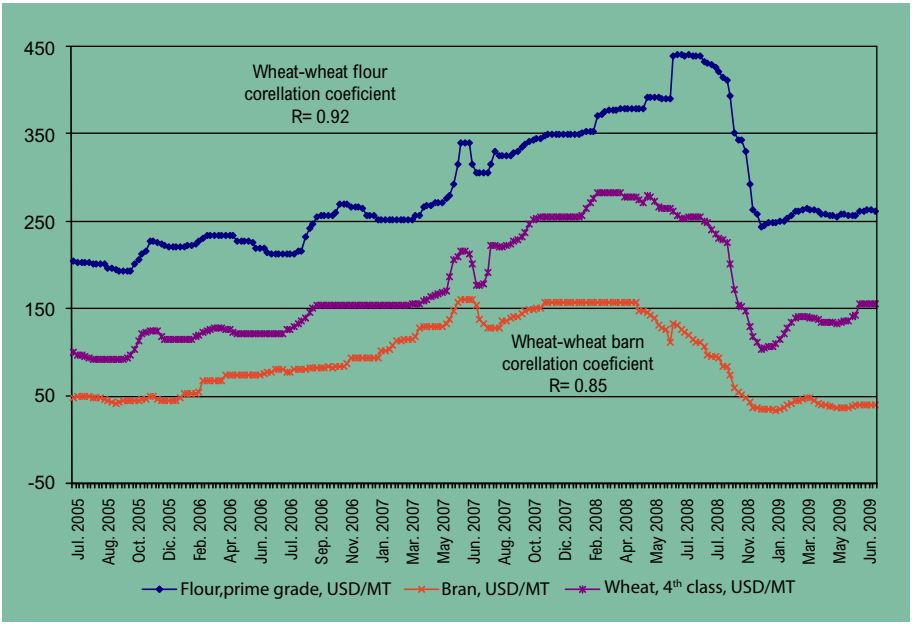
Source: Institute of the Agrarian Market Conjuncture based on IAOM data

The list of flour-importing countries has not changed much in recent years and includes countries with either limited wheat production (Brazil, Libya, Bolivia and Indonesia, and the region of Hong Kong) or continuing substantial population increase and absence of domestic grain processing infrastructure (Afghanistan, Tajikistan, Uzbekistan, etc.).

5.2 Wheat flour prices

Wheat millers in countries with well-developed futures trade can hedge their price risks through the simultaneous buy and sell of wheat futures contracts. However, access to futures markets is often limited in the transition countries and millers tend to limit wheat and flour trade to the spot market. Spot prices of wheat flour and wheat milling products tend to closely correlate with wheat grain prices. The example in Figure 13 illustrates the correlation of Ex-Works (EXW) wheat flour prices in Ukraine in 2005–2009.

Figure 13: Correlation of EXW wheat, flour and bran prices in Ukraine



Source: Based on APK-Inform prices data

6. WHEAT AND WHEAT FLOUR INDUSTRIES IN THE EARLY TRANSITION COUNTRIES (ETCs)

The ETCs include Armenia, Azerbaijan, Georgia, Kyrgyzstan, the Republic of Moldova, Mongolia, Tajikistan and Uzbekistan.

6.1 Wheat production

With the exception of the Republic of Moldova, the ETC are geographically located in the Caucasus region and in Central Asia. Their location in close proximity to main exporters and their traditional trade linkages with the Commonwealth of Independent States (CIS) determine grain and flour market trade patterns. First, the ETCs (except the Republic of Moldova) possess limited arable land suitable for cereal production due to mountainous landscapes, harsh climate, low rainfall and in some places salty soils. Second, limited access to water resources for irrigation is another important constraint in most Central Asian countries.

6.1.1 Weather and climate considerations

Wheat and most other agricultural crops need to be irrigated in most countries of Central Asia. In Kyrgyzstan, about 60% of the area under grain crops (mostly wheat) requires irrigation (Table 10).

Table 10: Precipitation levels and irrigated grain production in Kyrgyzstan, Kazakhstan and Tajikistan

	Kyrgyzstan		Tajikistan		Kazakhstan	
	Year	Data	Year	Data	Year	Data
Average precipitation in depth (mm/yr)	2007	533	2007	691	2007	250
Area equipped for irrigation: actually irrigated (thousand ha)	1994	1,077	1994	719	1993	2,314
Irrigated grain production as % of total grain production (%)	1994	60	1994	84.5	1994	6.3
Area equipped for irrigation as % of cultivated area (%)		75.5		68		13
Area salinized by irrigation (thousand ha)	1995	60	1994	115	1994	242

Source: FAOSTAT

Winter wheat accounts for most of the wheat produced in the ETCs as this type of wheat benefits from soil moisture available in the fall and allows for higher yields as compared with the spring wheat. Occasional low temperatures in January and February (-20 °C) can damage winter wheat in the absence of protective snow cover; however, low temperatures should not be considered a major constrain for winter wheat production in the ETCs.

6.1.2 Constraints on wheat production

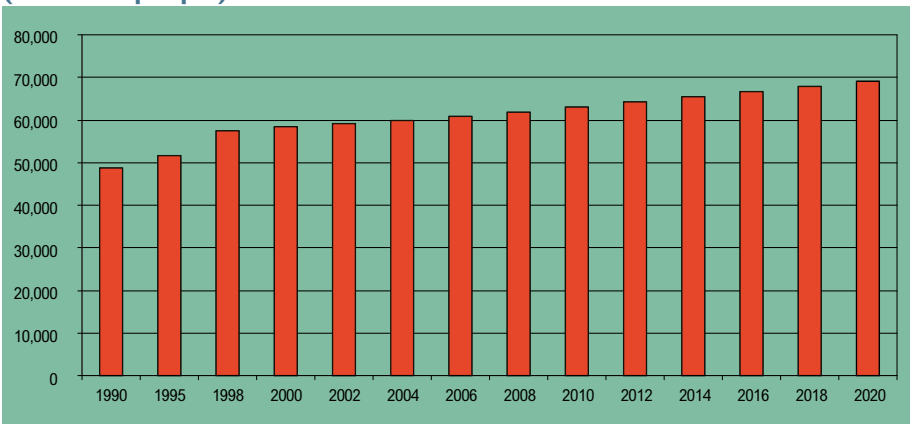
Despite the favorable wheat consumption outlook described below, a number of important constraints restrict local wheat production in the ETCs: small farm size, absence of quality wheat seeds adapted to conditions of a specific location, limited access to capital for farm machinery and fertilizer purchases, limited on-farm storage capacity, etc.

Limited availability of quality seeds is another important constraint. The demand for wheat seeds in Kyrgyzstan is about 100,000 tons per year, while local seed farms can supply only 35% of the seeds needed. The situation with seed supply in the Republic of Moldova is somewhat better because weather and climatic conditions in this country allow using wheat seeds from Ukraine or Romania without significant production potential losses.

6.2 Demand outlook for wheat and wheat flour

The growing population of the ETCs and strong local traditions of bread consumption suggest that the demand for wheat and wheat flour will continue to increase in the foreseeable future. The population of all ETCs increased from 48.6 million people in 1990 to 57.9 million people in 2007 (+19%). According to population forecasts, the population of the ETCs will continue to grow and by 2020 will reach 69.2 million people. This increase will have a positive effect on the dynamics of domestic consumption of wheat and wheat-based products. In turn, increasing domestic consumption will create business opportunities for local farmers and wheat and wheat flour importers.

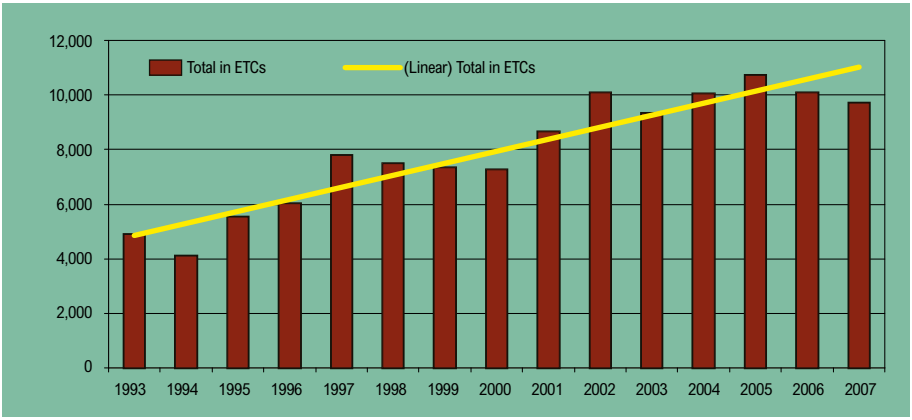
Figure 14: Population growth in the ETCs, 1990–2020 (forecast) (thousand people)



Source: FAOSTAT

Wheat production in the ETCs almost doubled in the period 1993–2007 and reached 9.7 million tons in 2007 (with a record output of 10.7 million tons in 2005) in response to growing demand and at the expense of other crops (mostly cotton).

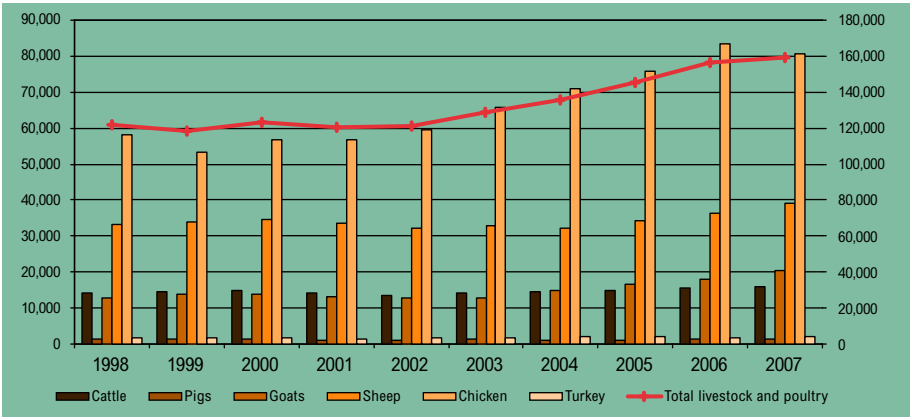
Figure 15: Wheat output in the ETCs (thousand tons)



Source: FAOSTAT

The growth of consumer disposable income in this region also resulted in increased consumption of meat and meat products (Figure 16). This will likely create additional competition between wheat and coarse grains for land.

Figure 16: Livestock (left axis) and poultry (right axis) inventories in the ETCs (thousand head)

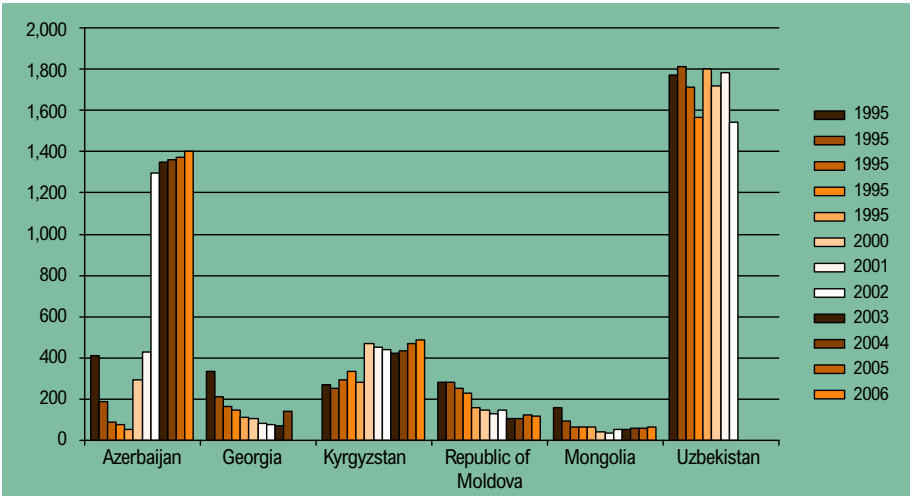


Source: FAOSTAT

6.3 Wheat flour production

Uzbekistan is the major producer of wheat flour among the ETCs. Wheat production in the ETCs is not sufficient and increasing imports of both wheat and wheat flour are necessary. Imports of wheat flour increased from 670,000 tons in 1997 to 1.6 million tons in 2007.

Figure 17: Wheat flour output in the ETCs (thousand tons)



Source: FAOSTAT

The people of Kyrgyzstan, Mongolia, Tajikistan and Uzbekistan are experiencing an acute deficit of iron and folic acid in their diets. To address this problem, the governments of Tajikistan and Uzbekistan, with support from the United Nations Children's Fund (UNICEF) and the World Bank, are implementing a voluntary programme for milling enterprises to enrich wheat flour with iron folate. Uzbekistan succeeded to the greatest extent in this endeavour: flour is enriched with iron folate at 50% of the nation's flour milling enterprises, with support provided by the GAIN grant administered by the World Bank. In 2009, Kyrgyzstan introduced the law On the Enrichment of Bread Flour that envisages a phased transition of all mills to mandatory production of enriched flour.

Only half of flour output in the ETCs is produced by industrial enterprises (with grain processing capacity of 100 or more tons daily). The remaining half of flour output is produced by low-capacity mini-mills located in villages and small towns. These mini-mills are often significantly behind the industrial-type competitors in terms of wheat quality, although they are usually price competitive and enjoy a number of tax and V.A.T privileges granted to small businesses in the ETCs. This is one factor limiting the development of the flour milling industry.

Owners of small farms – the main wheat producers in the ETCs – usually use village mills to process their flour on a commission (tolling) basis. Farmers sell flour surpluses left after home consumption to local wholesale traders. The commission for processing is typically 10% of the flour produced and is paid to the mill in kind. In contrast to the larger mills, small village mills do not generally buy wheat for milling.

Another important factor limiting development of the flour milling industry in all countries of the region is the absence of specialized educational institutions for preparing flour milling technologists/specialists. Training for this engineering profession is available in the neighbouring countries: Kazakhstan, the Russian Federation, Ukraine and China.

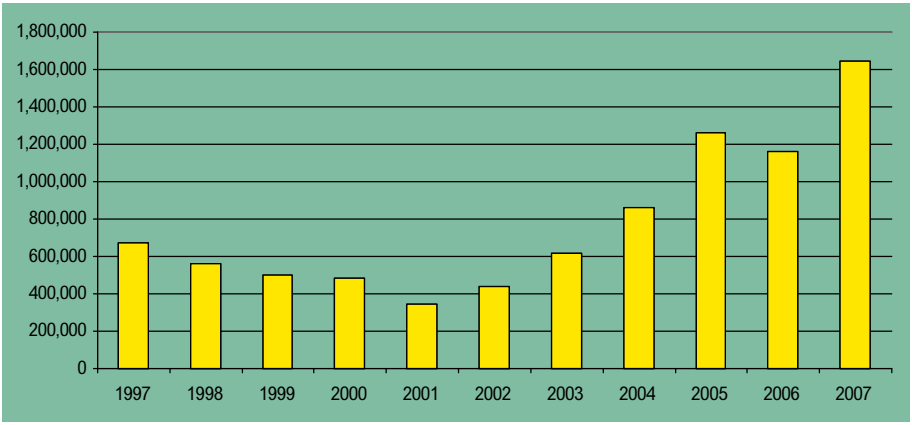
6.4 Wheat flour trade

As both quantity and quality of flour produced in the ETCs in relatively low, imports of wheat flour into the ETCs will likely continue to increase. Imports will most likely be significant in Kyrgyzstan, Mongolia, Tajikistan and Uzbekistan, as wheat production and flour milling in these countries is stable while their populations increase.

Of all the ETCs, only Azerbaijan, Tajikistan and Uzbekistan do not have membership in the World Trade Organization, although most of the former

Soviet Union (FSU) countries have signed bilateral free-trade agreements with each other to support trade.

Figure 18: Wheat flour imports to the ETCs (tons)



Source: FAOSTAT

Being one of the world's leading flour importers, Uzbekistan exports part of the imported flour and some domestically-produced flour to Afghanistan. Almost all flour imported by Georgia and the Republic of Moldova comes from Ukraine. The Russian Federation is the main supplier of flour to Armenia and Mongolia. Kyrgyzstan, Tajikistan and Uzbekistan buy wheat and flour from Kazakhstan.

6.5 Bread production

Wheat flour is mostly used for bread production. In Armenia, Azerbaijan, Georgia and the Republic of Moldova, the bulk of bread products are baked at specialized factories and bakeries that use standard bread recipes/technologies. In Kyrgyzstan, Mongolia, Tajikistan and Uzbekistan, most bread products are baked in private households or small bakeries.

In most ETCs, consumers prefer traditional types of bread. Uzbekistan is famous for the exceptional taste and fanciful shapes of its gid-ja, pulat, obi-non, katyr, sutli-non and kulcha. Similar shapes and cooking methods are used for Tajik chabots, noniragvani, lavash and djuibori, Kyrgyz chui-nan, koliuchnan and others. Armenian bakers make very thin sheets of dough. Georgian baked breads include tandoor, madauli, shoti, trakhtinuli, saodjakho, mrgvali and kutkhiani. Churek is a very popular bread in Azerbaijan.

6.6 The flour milling industry in selected ETCs

Wheat can be grown throughout Azerbaijan but most of the wheat is produced in seven provinces in Central Azerbaijan: Agcebedi, Terter, Berde, Isamilli, Saki, Aksu, Celilabad Beylogan and Goranboy. Some wheat crops are irrigated. Turkish millers have reportedly invested in the flour milling sector through purchases for shares, and renovation and/or construction of new mills. Most of the mills are believed to have a capacity of 150–350 ton/day. There are also two macaroni/pasta factories operating in the country.

Azerbaijan and Kazakhstan jointly built a new flour milling factory to process Kazakh wheat. It has an output capacity of 150 tons of flour daily. The National Fund for the Support of Entrepreneurship of Azerbaijan is currently financing construction of 21 grain elevators, each with a storage capacity of 10,000 tons.

Azerbaijan is the only ETC that has the capacity to manufacture modern milling machinery. Asena is a Baku-based company that manufactures a wide range of equipment for grain milling and for the compound feed industry. Other ETCs for the most part purchase flour production equipment in the Russian Federation, Turkey and China.

In Kyrgyzstan, farms with less than 50 ha of land under wheat accounted for 72% of the total area sown in wheat, according to the most recently available National Agricultural Census in Kyrgyzstan (2002). Farms with only 1–5 ha of land accounted for 26% of the total area under wheat. These farmers devoted 1.5 ha on average to wheat crops. Clearly, at such a level of fragmentation in wheat production, farmers in Kyrgyzstan as compared with farmers in the main wheat producing countries in the CIS are at a disadvantage for accessing modern machinery and technologies.

Kyrgyzstan is a net importer of wheat. Wheat is imported by large local companies or government agencies. There are eight grain elevators in Kyrgyzstan: two in the Bishkek area (capacity of 18,000 tons); two in Balykchy (capacities of 10,000 and 95,000 tons); one in each location of Kara-Balta (capacity of 56,000 tons); Chui-Tokmok (capacity of 75,000 tons); Kara-Suu (capacity of 26,580 tons); and Djalal-Abad (capacity of 26,580 tons). Most of the existing elevators in Kyrgyzstan were built in the 1970s and 1980s using a combination of flat storage warehouses and more modern vertical concrete silos (25 metres high, each with a capacity of 500 tons). There have been no new elevators built since Kyrgyzstan gained independence.

In Kyrgyzstan, the production of flour is the second most important food processing industry by value after the dairy industry. There are 22 medium-

to large-scale flour mills and approximately 2,400 mini-flour mills in the country, with a registered capacity of 1,600 tons of flour per day. This equals approximately 2,300 tons of wheat flour per day or 660,000 tons of wheat flour per year (based on 11 months of operation at full capacity). The existing flour production capacity in Kyrgyzstan, also including the capacities of the small-scale flour mills, is more than sufficient to process all grown and imported wheat. However, the number of mini-flour mills continues to increase. Many medium- and large-scale flour mills operate at only 40–50% capacity.

In Tajikistan, wheat is grown on both irrigated and rain-fed lands, with a little over 50% planted on irrigated land. About 40% of the flour made from Tajik wheat is milled mainly at small village mills on a commission (toll) basis. The tolling fee is typically 8–10% of the flour produced and is paid to the mill in kind. In contrast to the larger mills, small village mills in Tajikistan do not generally buy wheat for milling. Village mills are usually equipped with either Chinese or Pakistani machinery that costs USD 2,000–2,500. The key technical constraint to the operation of the mills is the variability of the electricity supply. The small mills typically have a technical capacity of approximately 2.5–3.5 metric tons/day but generally mill around 0.5–1.0 metric tons/day during the peak season, operating hours being determined by the availability of electricity.

Uzbekistan, produces about 6 million tons of wheat per year. About 200,000 tons are exported to the Islamic Republic of Iran, Afghanistan and the FSU countries. State procurement agencies reportedly purchase about 2 million tons of wheat per year. The remaining wheat can be marketed by farmers. Only an estimated 50% of the locally grown wheat is suitable for food use. As in other Central Asian countries, many private bakers prefer using Kazakh wheat flour, which is imported both officially and unofficially.

In the Republic of Moldova, the total flour milling capacity of grain processing enterprises is about 2,000 tons/day. The large factories (kombinats) in the four towns of Ceadir Lunga, Comrat, Chisinau and Beltsi have the greatest milling capacity (together 1,500 tons/day). The largest mill is in Chisinau and has a capacity of 600 tons/day. In addition to the kombinats, there are about 400 mini-mills located throughout the country. The main bread producers are Franzeluta in Chisinau, two bakeries in Balti and one bakery in Cahul. There are also more than 110 small- and medium-sized bakeries. The two pasta-producing facilities produce annually about 11,000 tons of pasta, using blends of the durum wheat flour produced in Kazakhstan and local flour (USDA/FAS[10]).

[10] *http://www.fas.usda.gov/gainfiles/199906/25454793.pdf*

7. WHEAT AND WHEAT FLOUR INDUSTRIES IN THE WESTERN BALKAN COUNTRIES (WBCs)

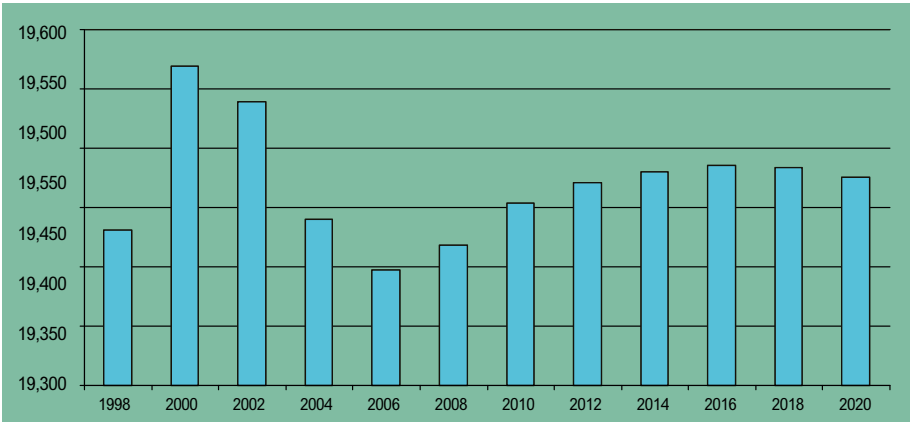
The WBCs include Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Kosovo, and Serbia and Montenegro.

7.1 Production of and demand for wheat

Unlike in most ETCs, precipitation is not the major constrain for wheat production in the WBCs. According to available FAO data (Auqstat), precipitation ranges from 615 mm in the former Yugoslav Republic of Macedonia to 1,485 mm in Albania, which is sufficient rain for wheat production on most rain-fed land.

Decreasing population is the main cause of the downward trend in wheat consumption in the region. The population of the WBCs decreased from 19.6 million people in 2000 to 19.4 million people in 2008. According to available population dynamics forecasts, the population in the WBCs is forecast to decrease slightly by 2020. Therefore, the negative wheat consumption trend will likely continue into the future.

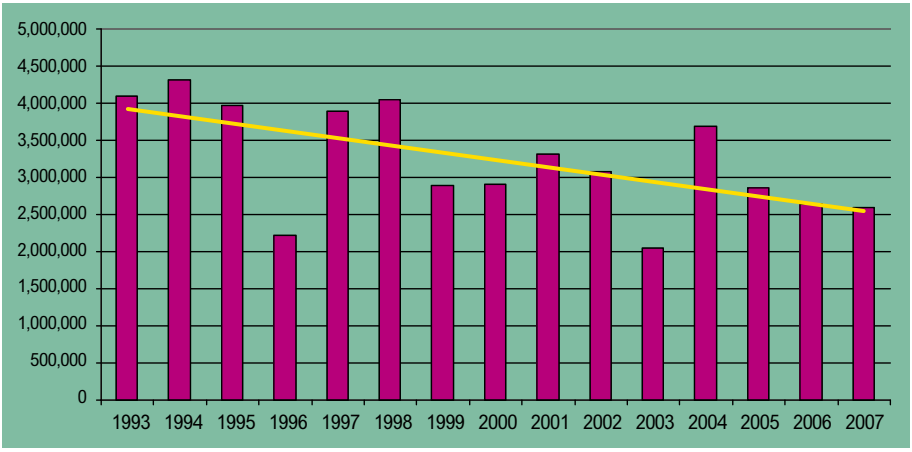
Figure 19: Population dynamics and forecast in the WBCs until 2020 (thousand people)



Source: FAOSTAT

Wheat production in the WBCs has shown a clear downward trend from 1993 to 2007.

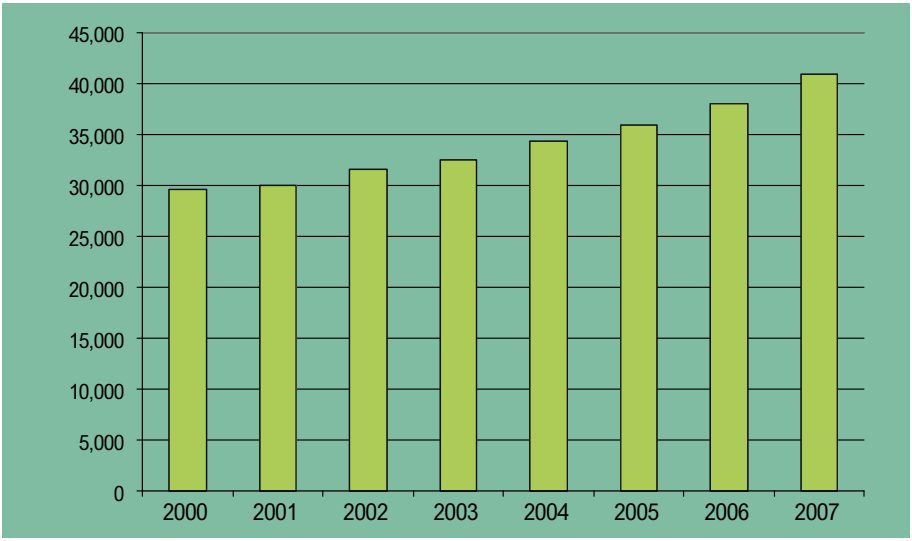
Figure 20: Wheat output in the WBCs (tons)



Source: FAOSTAT

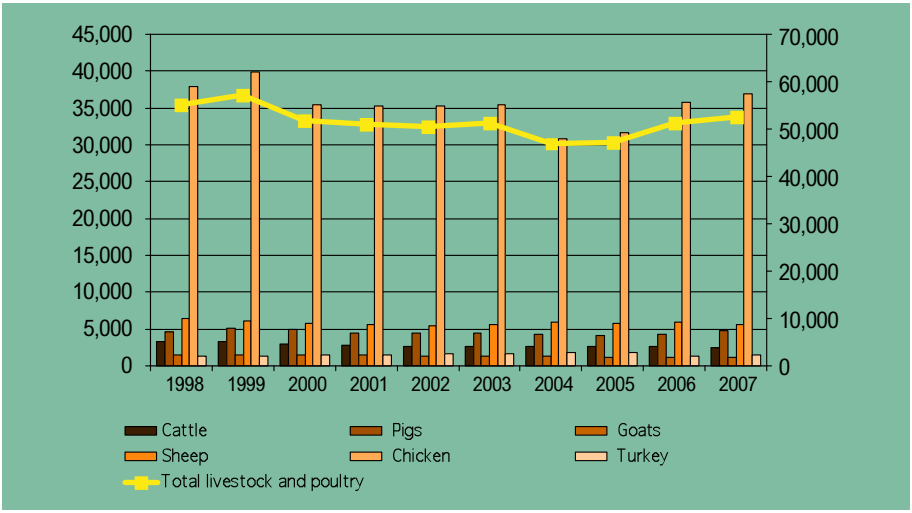
At the same time, the growth of consumer incomes and the trend in increasing livestock protein in human diets have allowed these countries to maintain livestock and poultry inventories at nearly constant levels.

Figure 21: Per capita gross domestic product in the WBCs (million USD)



Source: FAOSTAT

Figure 22: Livestock (left axis) and poultry (right axis) inventories in the WBCs (thousand people)



Source: FAOSTAT

Most WBCs experienced urbanization and emigration of the workforce to neighbouring EU countries during the last nine years. This is especially true of the former Yugoslav countries, although the opposite situation is observed in Albania, where urbanization is quite moderate. Urbanization does not help to increase individual income and, consequently, lead to an increase in the per capita consumption of flour.

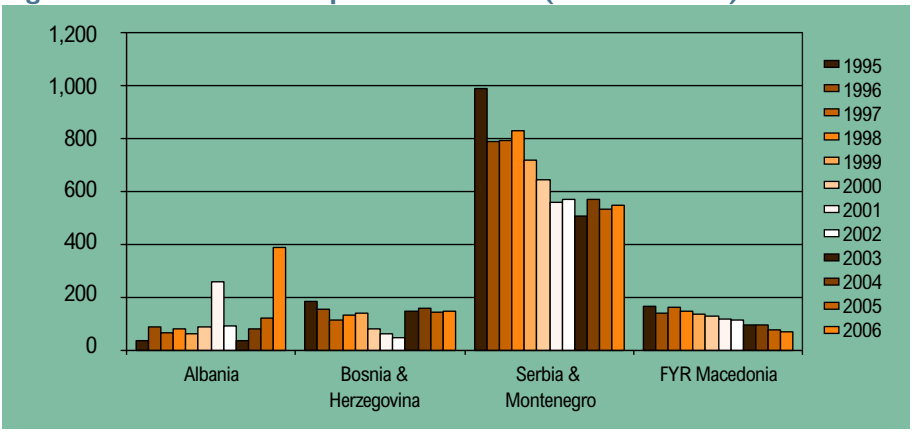
7.2 Wheat flour production and consumption

7.2.1 Milling industry

Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, and Serbia and Montenegro, and have a sophisticated flour milling industry that was built using European technologies back in the times of the former Yugoslav countries. Today, the largest suppliers of milling machinery and equipment to these countries are the Swiss, Italian and Czech manufacturers (Buhler, GBS, Prokop, Ocrim and others). In the last few years, Turkish manufacturers also assumed a substantial role in the supplying of milling machinery. Prospects of entry into EU markets prompted flour producers in the WBCs to introduce new production techniques to produce hydro-thermally processed flour, fast-cooking groats and stabilized wheat embryos, and to improve the quality of local flour.

Despite technological innovations, flour production and consumption in the region has been declining due to decreasing demand. Albania is the only WBC experiencing an increase in flour production and consumption.

Figure 23: Wheat flour output in the WBCs (thousand tons)

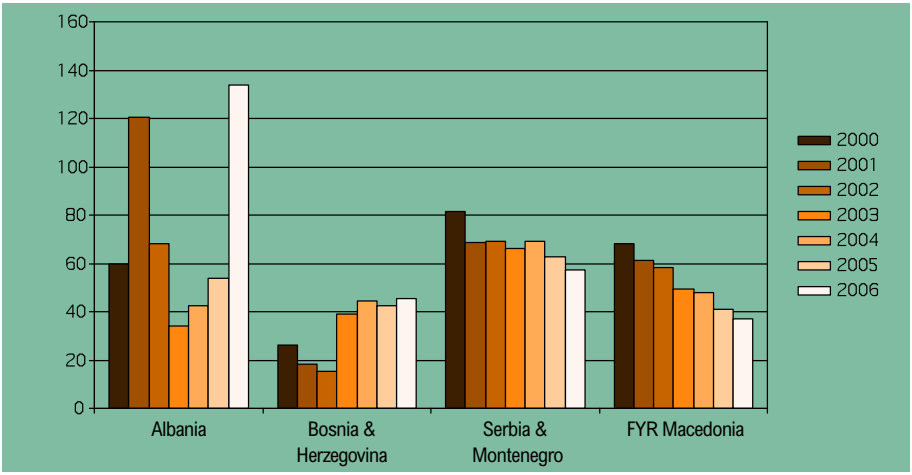


Source: FAOSTAT

7.2.2 Consumption

A number of WBCs (Serbia and Montenegro, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia), with the prospect of further integration into the EU, may be regarded as having the lowest growth potential for the consumption of wheat and wheat flour.

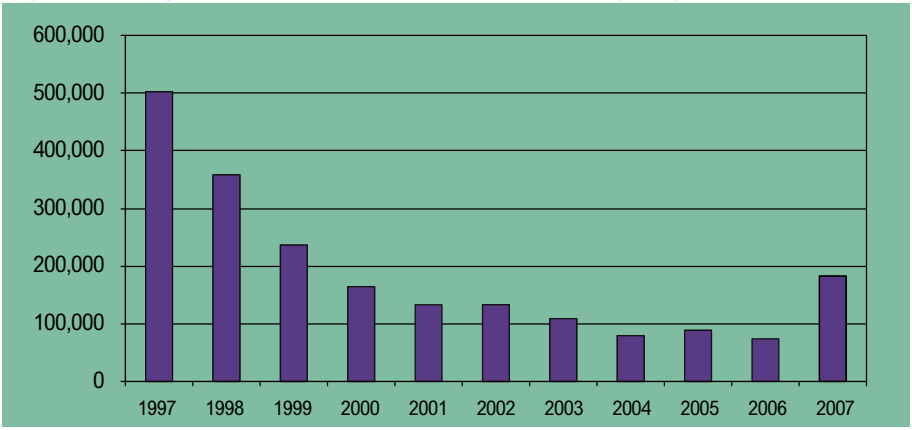
Figure 24: Wheat flour consumption in the WBCs (kg/capita)



Source: FAOSTAT

Wheat flour imports in the WBCs have also declined considerably over the last ten years, reflecting a decrease in demand.

Figure 25: Imports of wheat flour into the WBCs (tons)

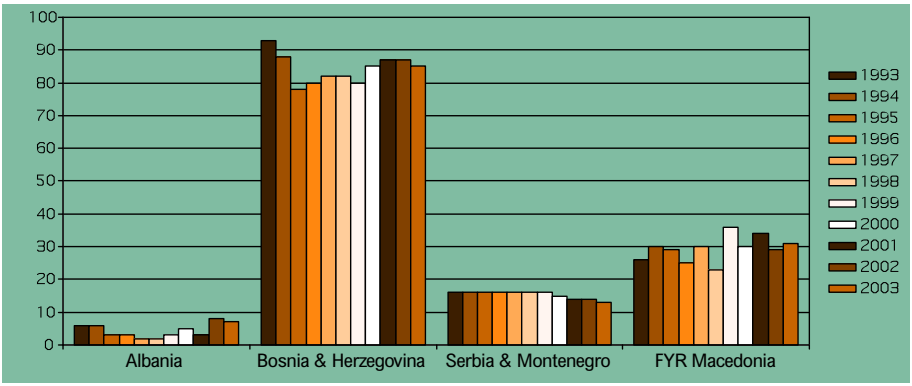


Source: FAOSTAT

7.2.3 Consumption of flours made from grains other than wheat – maize

In addition to wheat flour consumption, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia have traditionally had high consumption of maize and maize flour for food purposes.

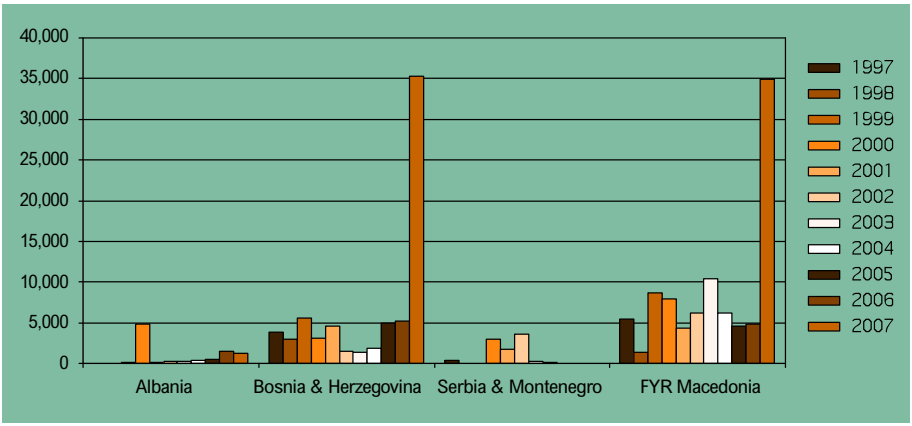
Figure 26: Maize consumption in the WBCs (kg/capita/year)



Source: FAOSTAT

Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia import substantial quantities of maize flour: about 5,000 tons per year. Because of the poor maize harvest in 2007, imports of maize flour in that year increased to 35,000 tons.

Figure 27: Imports of maize flour to the WBCs (tons)



Source: FAOSTAT

7.3 Wheat and wheat flour industries in selected WBCs

Serbia is a net wheat exporter, supplying about 100,000–150,000 tons mostly to the former Yugoslav countries. The government provides some support to wheat producers: CSD 5,000 (Serbian dinars) (USD 70/ton) per ton per ha and CSD 750 (USD 11/ton) for wheat storage as well as low interest commercial loans to qualified farmers.

Domestic wheat consumption in Serbia is estimated at about 1.8–2 million tons per year, including 1.3 million tons for human consumption. There are 340 wheat elevators of various sizes in Serbia. They are owned by milling companies, grain traders and farmer cooperatives. The total capacity of these elevators is estimated at 3.8 million tons. Wheat milling capacity is estimated at about 2.5 million tons per year, but only about 60% of this capacity is currently utilized. There are 120 industrial bread production facilities in addition to a large number of registered bakeries (about 1,700) with an annual capacity of about 1.5 million tons of bread and bread products. There are six large companies involved in pasta production and over 600 small private pasta producers in Serbia (USDA/FAS[11]).

[11] *http://www.fas.usda.gov/gainfiles/200703/146280666.doc*

Bosnia and Herzegovina imports on average 350,000 tons of wheat per year. Serbia and Croatia – the traditional suppliers – banned wheat exports in 2008, causing some concerns over food supply to Bosnia and Herzegovina. In response, local governments[12] in Bosnia and Herzegovina decided to increase agricultural support to farmers to encourage them to produce more grains in the future. Bosnia and Herzegovina imported wheat, flour and pasta valued at the equivalent of USD 76 million from Hungary, Serbia and the Russian Federation.

[12] *Bosnia and Herzegovina consists of two entities, the Federation of Bosnia and Herzegovina (BiH) and the Republika Srpska. There are two levels of government – the entity-level and the state level of government. The entities are responsible for agricultural and food issues, and there is no national-level agriculture ministry. Due to this dual governmental structure, there is no coordinated agricultural policy at the national level.*

8. FURTHER READING AND INFORMATION

Wheat Facts and Futures 2009. J. Dixon, H-J. Braun, P. Kosina and J. Crouch (eds.). 2009. Mexico, D.F.: CIMMYT
http://www.cimmyt.org/english/docs/facts/whtfacts09.pdf

Agribenchmark Cash Crop Reports (wheat economics)
http://www.agribenchmark.org/cc_results_cash_crop_reports.html

Organisation for Economic Co-operation and Development (OECD) and the United Nations Food and Agriculture Organization (FAO). Agricultural market outlook
http://www.agri-outlook.org

FAO Commodity Prices Database (weekly, monthly, annual wheat prices)
http://www.fao.org/es/esc/prices

FAO World Food Situation and Food Outlook Reports
http://www.fao.org/worldfoodsituation/wfs-home/en/

International Association of Operative Millers (IAOM) (publications, regional sections)
http://www.aomillers.org/

North American Millers' Association (NAMA). Milling process
http://www.namamillers.org/

U.S. Wheat Associates (glossary, weekly prices)
http://www.uswheat.org/buyersGuide/glossary

USDA PSD Online (production, supply and demand forecasts and estimates)
http://www.fas.usda.gov/psdonline/psdHome.aspx

European Bank
for Reconstruction and Development

Food and Agriculture
Organization of
the United Nations