5.3 Durum wheat – an interesting niche crop?

Introduction

2008 was a good year for durum production on ***agri benchmark*** farms. As you can see in Figure 5.3.1 durum wheat achieved a higher gross margin than common wheat and most other crops. This difference was mainly driven by exploding durum prices compared to prices of other wheat classes (see Figure 5.3.2). That's why the idea arose to take a closer look at durum wheat and its market.

Climate and agronomics

Durum is the hardest of all wheats. The combination of its high protein content and gluten strength make durum the best wheat for producing high-quality pasta or similar products like couscous, which is primarily consumed in North African countries, Syria and Turkey. The amber colored kernels of durum are vitreous and larger than those of other wheat classes. Durum has a yellow endosperm, which gives pasta its golden color in contrast to the white endosperm of common wheat.

Durum originated in hot and dry regions around the Mediterranean Sea, it reacts with downgrading quality to suboptimal climatic and agronomic impacts. Durum is primarily of spring growth habit; to make use of the winter moisture winter hardy varieties have been developed in several countries.

Durum requires a higher germination temperature than common wheat as well as highly-fertile soils with good water holding capacity. Cultivation on light soils is also possible provided enough moisture in the short vegetative phase is available. Heavy and cold soils usually do not allow a timely sowing.

In terms of yields in typical wheat growing regions, durum normally is inferior compared to spring wheat (10 % to 30 % lower yields), but in areas of low precipitation the cultivation of durum generates good yields compared to many alternative crops. Durum should be seeded early in the spring, if possible, after a broadleaf crop. Due to the possibility of fusarium head blight, especially in combination with reduced tillage, it should not follow corn or wheat in the rotation.

Durum wheat is slow growing during its early stages and should be planted into a fit seedbed. Depending on soil conditions and expectations for grain yield, protein levels and vitreousness, nitrogen may need to be added to the soil as well as adequate phosphor- and potash fertilization.

Early season weed control is essential to realize yield potential. A number of leaf- and spike infections could be costly to the crop if they are not treated in the beginning. Durum is more vulnerable to head blight than soft wheat, so if weather conditions are suitable for infection, a preventive application of appropriate fungicide is recommended to avoid yield and quality losses.

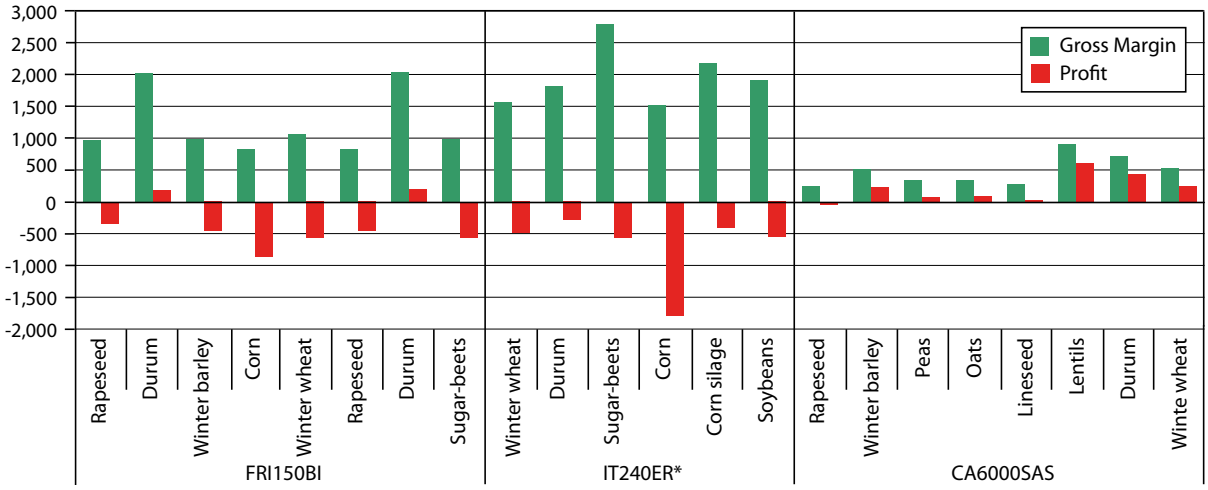
High precipitation directly before or during the maturation can easily lead to pre-harvest sprouting, which can have a negative impact on the bakery quality of the crop. Therefore durum should be harvested as soon as possible depending on crop maturity. If rainy weather is expected, durum should be harvested with higher moisture content in order to prevent pre-harvest germination and fungal disease. Therefore adequate grain drying and threshing capacity is necessary.

Because durum is almost exclusively used for pasta production, it has to achieve certain quality requirements, which are related to the semolina yield (coarse flour) and cooked firmness of the pasta. Durum that does not meet the strict quality standards may be received as feed grain and is traded usually with a discount of about 15 % or more.

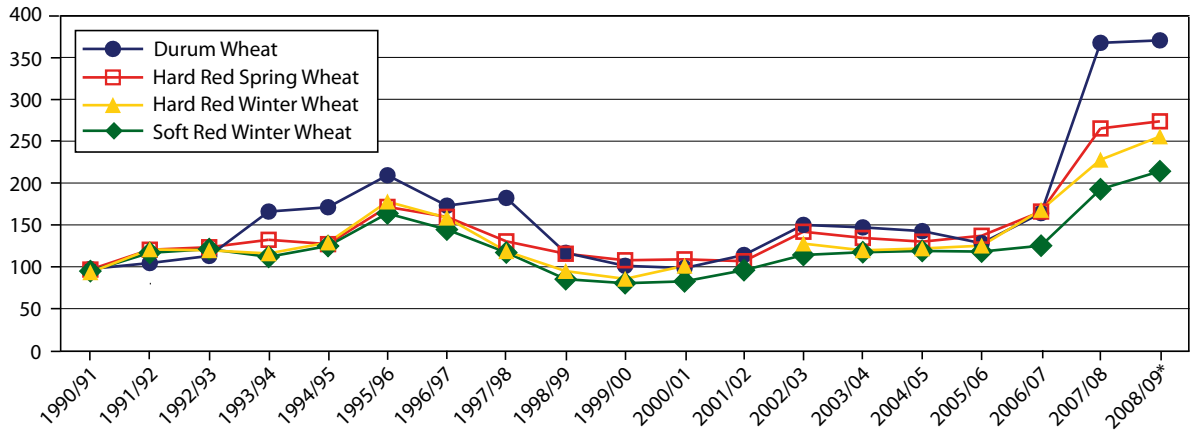
Basic quality requirements are: moisture content (max. 14.5 %), test weight (min. 78.5 kg/hl), protein content (min. 14.5 %), falling number (min. 220 seconds) and vitreousness (min. 75 %), black point (max. 8 %) as well as damaged kernels (max. 12 %).

The limits of the quality parameters differ between the countries and depend on the definitions of the milling and pasta industry.

5.3.1 Gross Margins of *agri benchmark* farms in 2008 (USD/ha)



5.3.2 History of US wheat average prices for different classes (USD/t)



* forecast
Source: USDA (August 2009)

5.3 Durum wheat – an interesting niche crop?

Global durum production

Durum is a minor cereal crop. The world durum production is, according to International Grains Council (IGC), with 38.5 million t only 6 % of the total wheat production in 2008. The EU, North American, North Africa, Turkey, Syria and Kazakhstan are the main durum producing areas worldwide and account together for 75 % of the durum production.

In 2008 durum wheat was grown on 3.2 million ha in the **European Union** (12 % of the soft wheat acreage), leading to an annual output of about 10 million t (see Figures 5.3.3 and 5.3.4). The EU durum acreage is highly concentrated in the Mediterranean countries (Italy, Greece, Spain and France), which typically produce approximately 98 % of the total EU production. Based on these capacities the EU is the main durum producer in the world.

Due to decoupling and decreasing of additional EU payments for durum production in traditional areas (cut down to 250 EUR/ha) plus large durum stocks after the record harvest in 2004, the durum acreage decreased through 2007 from 3.8 to less than 2.9 million ha. The introduced quality premium of 40 EUR/ha for production in traditional growing zones could not constitute the equalizing factor. But due to skyrocking prices the EU durum acreage increased again by almost 0.3 million ha. However, 2009 production is expected to decline by 20 %.

Canada, the second largest durum producer, also reduced their durum acreage within one year (2006) from 2.2 to 1.5 million ha. Lower plantings combined with devastating drought led to a reduced output of 3.35 million t. Due to increasing prices, Canadian farmers planted 2.4 million ha in 2008, 25 % above the previous year. As a result the production rose by 50 % to 5.5 million t, but is estimated to decrease by 24 % in 2009.

Most durum wheat in the **United States** is grown in Western North Dakota and Montana. In 2006 the U.S. durum acreage was at its lowest level since 1961.

One reason was that farmers increased their corn acreage to supply the more profitable biofuel market. This fact and a drought in North American led to a production decline of about 47 % to 1.46 million t. But the durum acreage increased by 22 % in 2008, to 1.11 million ha. As a result durum production increased by 18 % to 2.3 million t; till 2009 production is estimated to rise by 17 %.

Durum production in **North Africa** (Algeria, Morocco and Tunisia), which is dependent on unpredictable winter rains has been quite variable over the past years; from 5.1 million t in 2006 to 3.6 million t in 2008. According to IGC the production is expected to increase by 60 % in 2009.

Turkey is one of the world's largest durum producing countries with about 3 million t and 1.7 million ha harvested annually. **Syria** produces on 850.000 ha around 1.8 to 2.0 million t of durum in recent years. However, in 2008 the production decreased to 1.2 million t but is supposed to go up in 2009. **Kazakhstan** produces, with a constant growing area of 2.400 ha, on average 2.7 million t of durum mostly for the market of the Former Soviet Union.

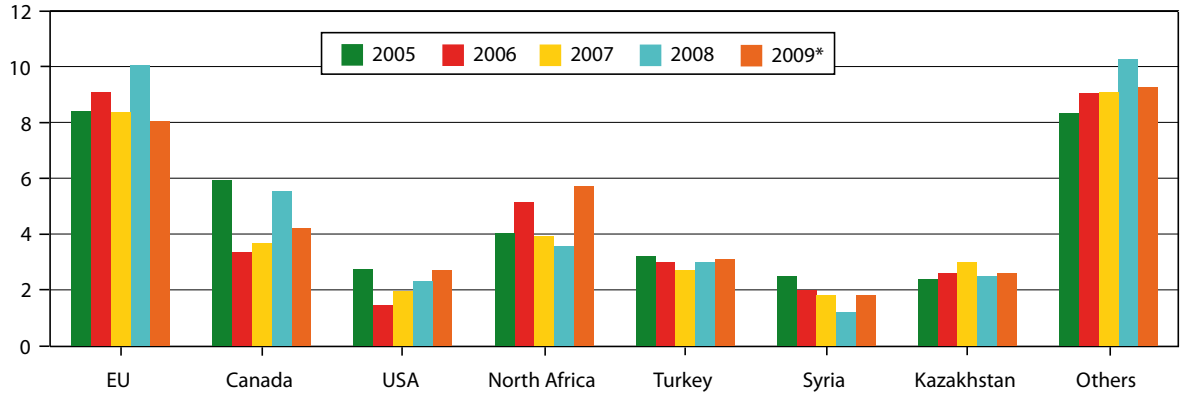
Yields

The yield potential is quite different between the countries (see Figure 5.3.5). Best yields are obtained in the EU with 3 t/ha in average, especially the French (4 – 5 t/ha) and German (5 – 6 t/ha) farmers produce high yielding durum. After a few years of increasing yields, the average yield expectation for 2009 is only 2.7 t/ha.

Durum yields in the United States and Canada are varying between 2 and 2.5 t/ha. While the average yield expectation for 2009 in Canada is 2.7 t/ha, in United States only 2 t/ha are expected.

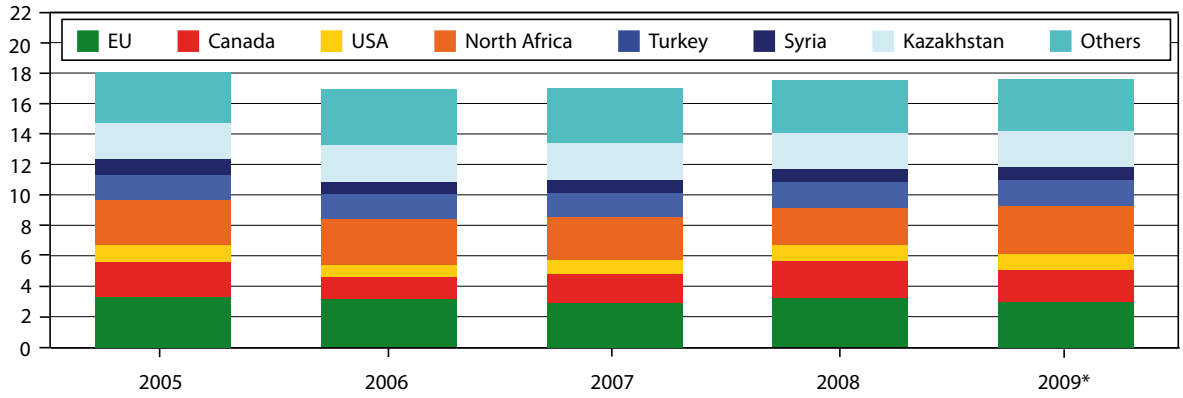
North Africa yields are 1.5 t/ha of durum on average with a slight increase assumed in 2009. The figure showed a decline in yields in Turkey and Syria until 2008, but durum yields are expected to rise to 2 t/ha in 2009. Kazakhstan has the lowest yield potential with about 1 t/ha in average.

5.3.3 Durum wheat production in major producing countries (million t)



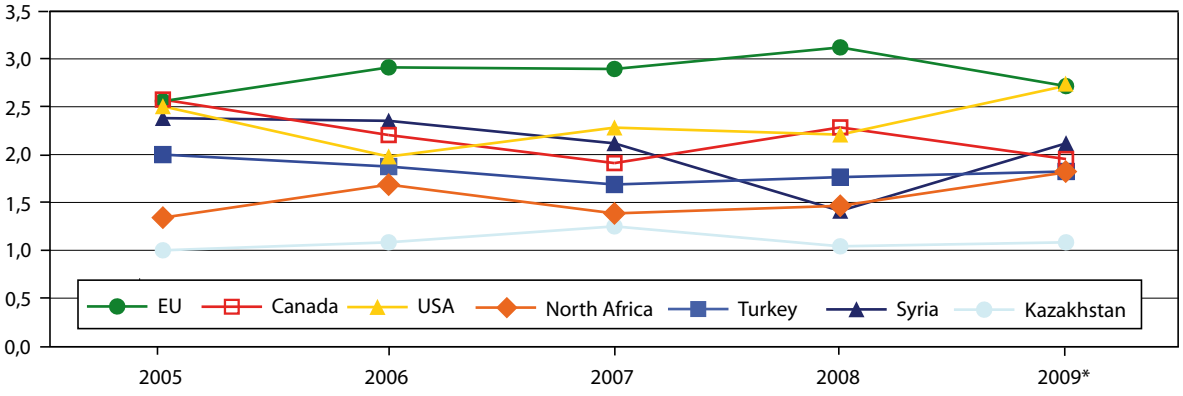
* forecast
Source: IGC (August 2009)

5.3.4 Global durum wheat acreage (million ha)



* forecast
Source: IGC (August 2009);

5.3.5 Average durum yields of major producing countries (t/ha)



* forecast

5.3 Durum wheat – an interesting niche crop?

Prices

High quality durum commands a premium to hard wheat which commands a premium over soft wheat.

In the past ten years the price of durum wheat in the United States has risen from about 100 USD/t to about 370 USD/t (see Figure 5.3.2).

The price rises since 1990/91 have been associated with constant increases in demand. A couple of years of falling harvests due to political and environmental impacts as well as the bioenergy boom led to dismantling grain stores in the three major durum wheat producing countries (see Figure 5.3.6). This and the general increase of grain prices resulted in a price jump in 2006/07 of about 125 %.

Durum wheat is competing for the same growing area as the other wheat classes. Therefore, premiums to compensate lower yields and the higher production risk of durum have to increase in times of high wheat prices. This resulted in the effect that the premium for durum relative to other wheat classes reached a record level of more than 100 USD/t in 2007/08 (see Figure 5.3.7).

Direct Costs of durum and wheat in ***agri benchmark*** farms

To show characteristics of durum production, yields and direct costs of durum in comparison to wheat are illustrated in Figure 5.3.8, which demonstrates differences in yield potential and production systems in durum producing ***agri benchmark*** farms.

In France and Italy durum yields are lower than in winter wheat (10 and 6 %). The Canadian farmers have identical yields in durum and summer wheat, but on a comparable low level.

In France the direct costs of durum are 100 USD/ha higher compared to winter wheat. One reason is a larger quantity of nitrogen (50 N kg/ha). Furthermore seed costs of durum are 25 USD/ha higher. The significant difference in seed costs is probably resulted in the using of certified seeds for quality durum production.

In Italy directs costs of durum are lower than of winter wheat. Though seed costs are 34 USD/ha higher in durum production, the N-amount is 50 kg/ha and thus the nitrogen costs are 60 USD/ha lower than in winter wheat, while the plant protection of durum and wheat is on the same level.

With the Canadian farm, the production systems of durum and spring wheat are equal. Only the costs of durum seeds are slightly higher.

Conclusion

Durum production does not necessarily require extra costs per hectare. Comparing yields, combined with premiums paid for quality durum wheat give growers in adequate areas a useful alternative to bread wheat production and make durum an interesting niche crop. But, it must be pointed out that durum makes high demands on the cropping practice and in case durum does not achieve the quality standards for human consumption it is hard to sell.

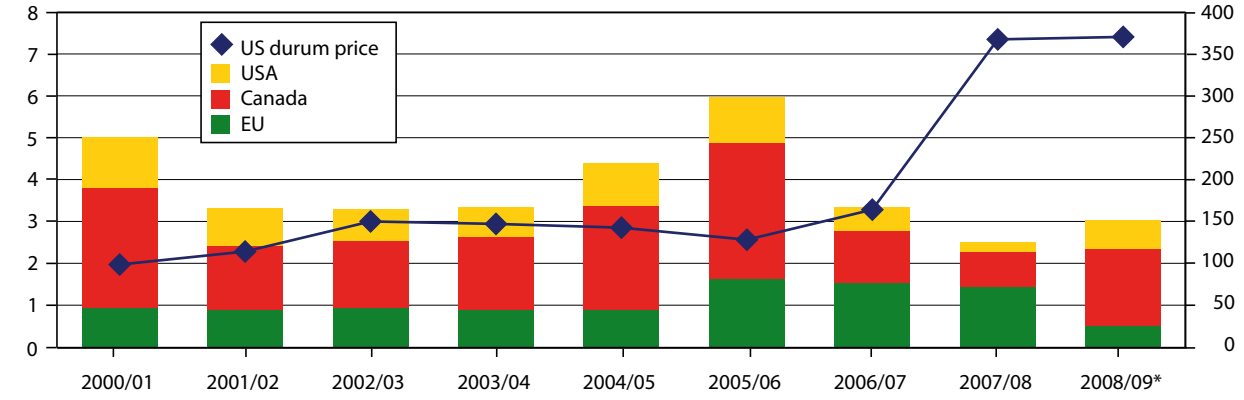
The market for quality durum is small and due to the unique characteristics and the limited substitutability of durum and common wheat, the demand for durum tends to be quite inelastic. This means that a small shortage of durum can result in a sharp increase in durum premiums over non-durum wheat and vice versa.

It is recommended to produce quality durum preferably on purchasing contracts considering quality influencing factors like soils, varieties, climatic conditions, cropping practice, rotation requirements as well as grain drying and storage capacities instead of anonymous mass production.

Janina Krug (janina.krug@vti.bund.de)

5.3.6 US Durum price and ending stocks of the three major exporters since 2000/01

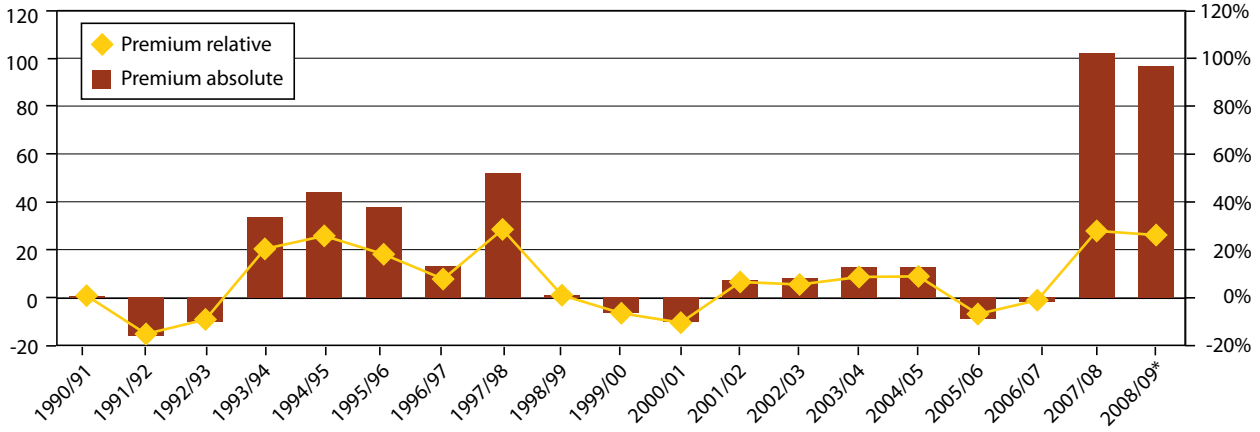
(left y-axis: million t; right y-axis: USD/t)



* forecast
Source: USDA, AAFC, EUROSTAT (August 2009)

5.3.7 Development of the durum premium in the USA

(left y-axis: USD/t; right y-axis: %)



* forecast
Source: USDA (August 2009)

5.3.8 Direct costs and yields of durum and common wheat in 2008

(left y-axis: USD/ha; right y-axis: t/ha)