World Wheat Market Supply-Demand Trends

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The World wheat market is "segmented" into groups of countries with diverse productive capacities and levels of use, differing competitive positions in export - import markets, and dissimilar prospects for the future as World wheat market participants. Wheat grain has played a critically important role in meeting World nutritional needs in recent history, and is anticipated to continue doing so in the future. As a staple food in World diets, wheat is used to make flour (for leavened, flat and steamed breads), biscuits, cookies, cakes, breakfast cereal, pasta, noodles, and couscous. It is also used for fermentation to make beer, other alcoholic beverages, and biofuel (source: http://en.wikipedia.org/wiki/Wheat). Wheat may also be used as a forage crop for livestock, and its straw can be used as a construction material for roofing thatch in subsistence-level World economies and populations.

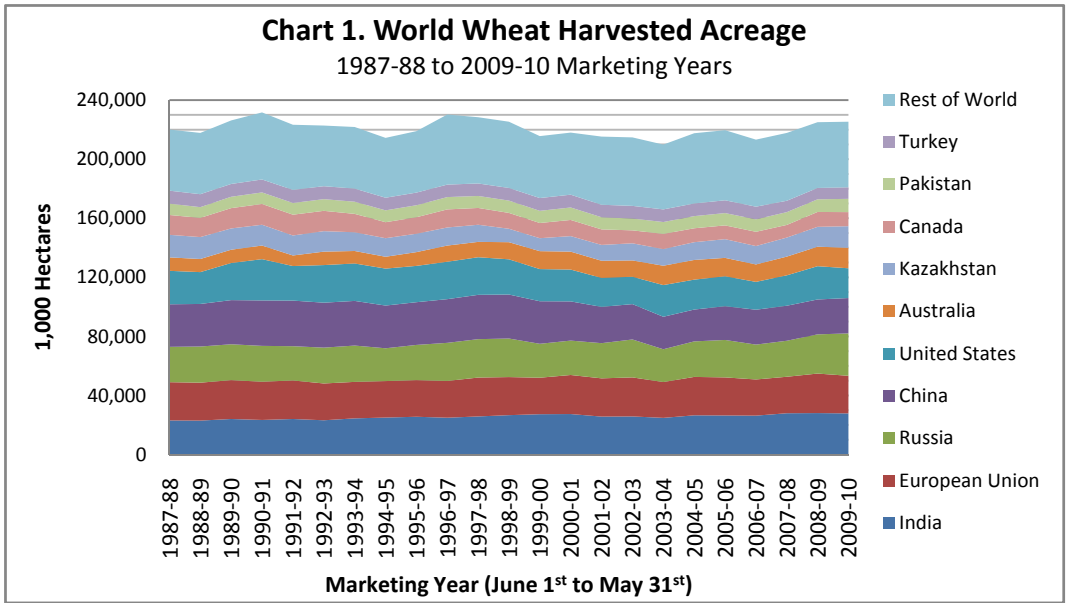
Given the critically important role of wheat as a necessity in international diets and food-economic systems, World wheat demand is projected to continue to grow along with World population. Population growth is projected to grow from 6.8 billion in 2009 to 7 billion in 2011, and to 8 billion in 2025 (http://geography.about.com/od/obtainpopulationdata/a/worldpopulation.htm). Given limited global "arable" or "farmable" land resources and anticipated challenges in meeting international nutritional needs in the future (http://www.globalchange.umich.edu/globalchange2/current/lectures/food_supply/food.htm), it is important to understand current World wheat supply-demand trends and to try to understand their future implications.

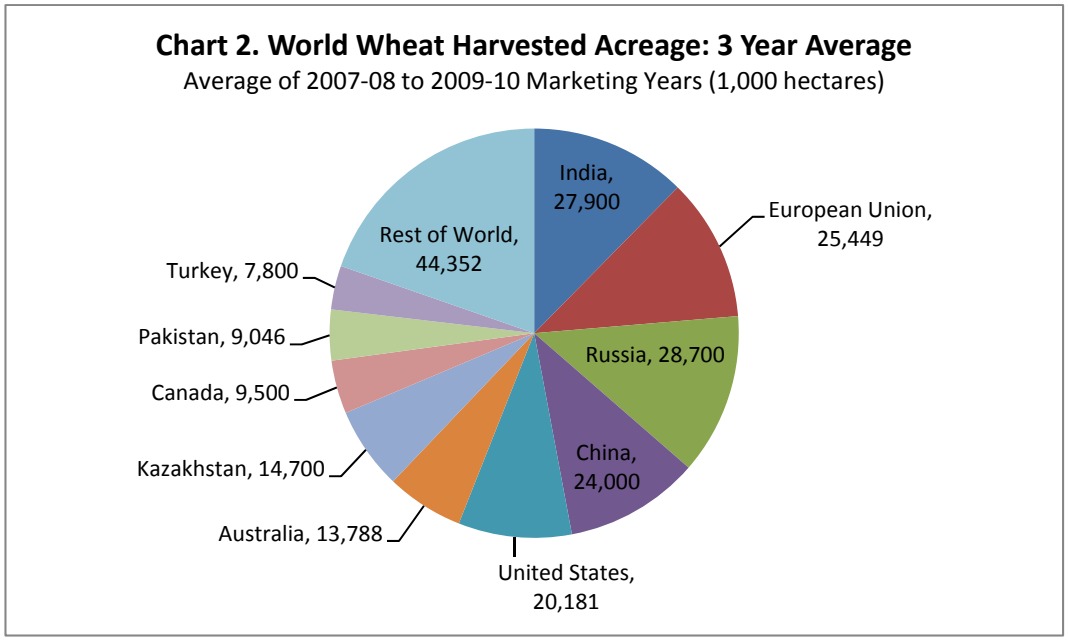
This article examines World wheat supply-demand trends for the 1987-88 through 2009-10 wheat marketing years on a country by country or regional basis. It examines the recent history of global wheat harvested acres, yields, production, exports, imports, and ending stocks. Current figures for the 2009/10 marketing year are examined in comparison to historical average levels and trends through time. The variability of these World wheat supply-demand measures in recent history is also examined, providing some measure of the primary sources of risk and uncertainty in World wheat markets.

World Wheat Harvested Area

The harvested acreage of wheat in the World in the 2009-10 marketing year is estimated to be 225,416,000 hectares (http://www.fas.usda.gov/psdonline/) (Chart 1). This compares to an average World harvested wheat acreage estimate of 220,635,000 hectares since the 1987-88 marketing year, with average declines of 381,000 hectares per year over the most recent 23 marketing years. (Note: 1 hectare equals 2.471 acres).

The 10 largest wheat producing countries or regions provided an average of 80% of World wheat harvested acreage over the 1987-88 to 2009-10 marketing years. Over the most recent 3 marketing years (2007-08 to 2009-10), the 5 largest countries in terms of average World wheat harvested acreage were India (27.9 million hectares or mh), the European Union (25.4 mh), Russia (28.7 mh), China (24.0 mh) and the United States (20.2 mh) (Chart 2).





Australia and Canada have the largest historic variability in wheat area harvested relative to their average harvested area since 1987-88 measured in terms of the "coefficient of variation" or "cv", at 0.018 and 0.16, respectively (see http://en.wikipedia.org/wiki/Coefficient_of_variation). A coefficient of variation of 1.00 indicates that a measure of the variability of a variable (defined as the standard deviation) is equal to the average value of the variable. When the cv value is less than 1, it meals that the standard deviation is less than the average of the variable.

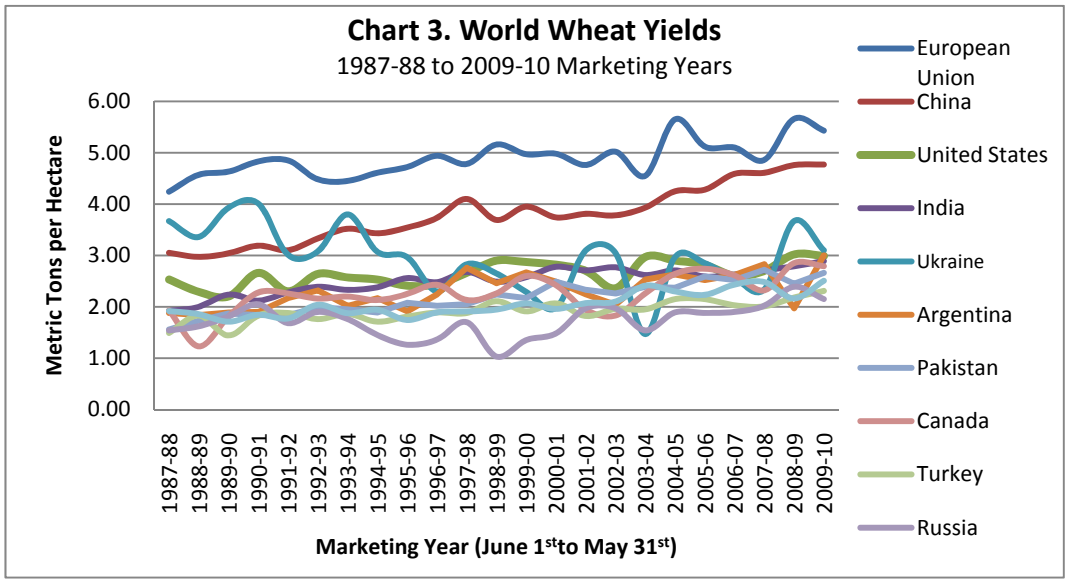
In this case, Kazahkstan (cv = 0.13), China and the United States (cv = 0.12) have lower levels of relative variation in harvested area of wheat over time than Australia and Canada, followed by Russia and India (cv = 0.06), Pakistan and Turkey (cv = 0.04), and the European Union (cv = 0.03). In comparison, aggregate World wheat harvested acreage has a relatively low level of relative variability (cv = 0.07) since the 1987-88 marketing year.

From a market analysis perspective, these results indicate that the largest wheat acreage shifts over time have occurred in Australia and Canada, and that aggregate relative World variability in harvested wheat acreage is less than most in the countries that produce wheat.

World Wheat Yields

Average World wheat yields in the 2009-10 marketing year are estimated to be 3.01 metric tons per hectare (mt/ha) (equivalent to 44.8 bushels per acre). This compares to an average World wheat yield estimate of 2.66 mt/ha (39.6 bu/ac) since the 1987-88 marketing year, with an average annual increase of 0.03 mt/ha (0.45 bu/ac) over the 23 year period.

Among the 10 largest wheat producing countries or regions, the highest average wheat yields over the most recent 10 year period (2000-01 to 2009-10 marketing years) were produced in the European Union (5.17 mt/ha or 76.9 bu/ac), with yields trending upwards at 0.07 mt/ha (1.0 bu/ac) per year (Chart 3). The second highest yields over the most recent 10 year period were produced in China at 4.37 mt/ha or 65.0 bu/ac, with yields trending upwards at 0.15 mt/ha (2.2 bu/ac) per year. United States' wheat yields averaged 2.8 mt/ha (41.6 bu/ac) over the last 10 years, increasing at a rate of 0.07 mt/ha (1.0 bu/ac) per year.

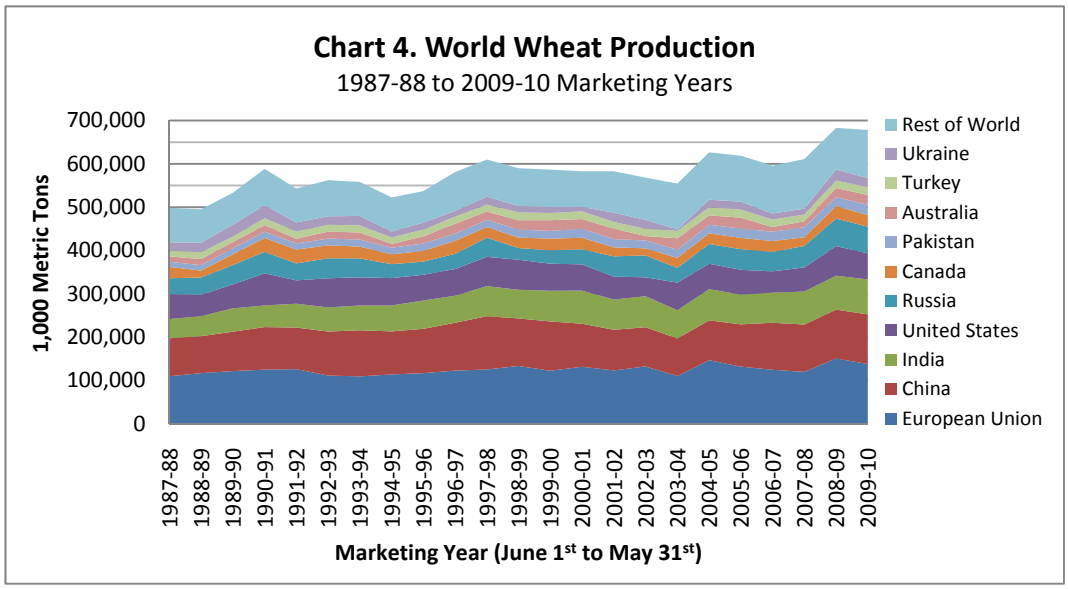


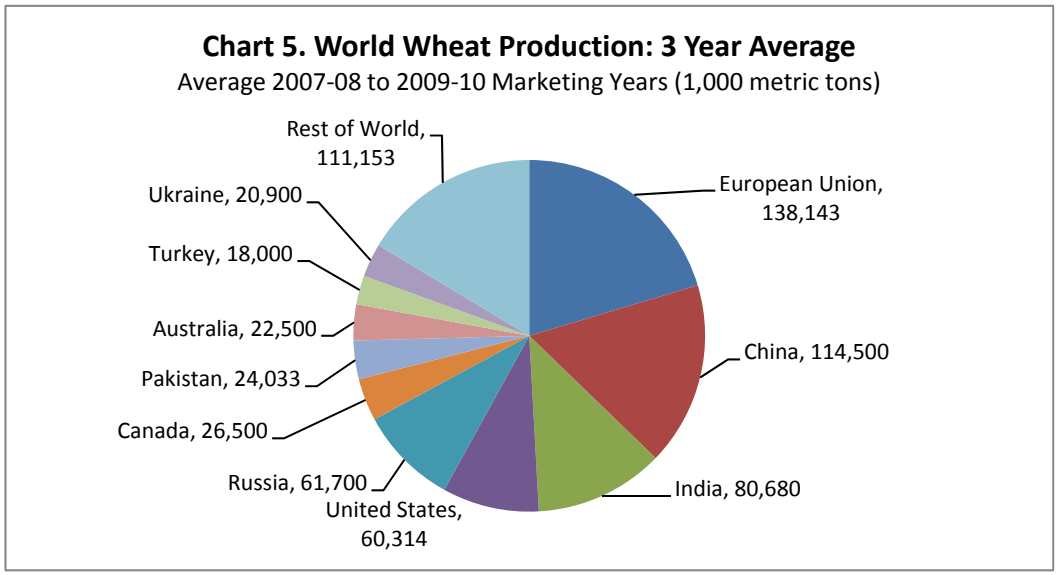
The Ukraine and Russia have the largest historic relative variability in wheat yields since 1987-88, with cv measures of 0.22 and 0.19, respectively. Argentina and China (cv = 0.14), Pakistan and Canada (cv = 0.13) have lower levels of relative variation in wheat yields over time, followed by the United States (cv = 0.09), India (cv = 0.08) and the European Union (cv = 0.07). Aggregate World wheat yields have exhibited a relatively low level of relative variability (cv = 0.07) since 1987-88. This indicates that countries in the Baltic Sea region (Ukraine and Russia) have the largest year to year uncertainty in regards to wheat yields, and that the varying yields in individual countries and regions tend to offset each other over time relative to aggregate average World wheat yields.

World Wheat Production

World wheat production in the 2009-10 marketing year is estimated to be 678,423,000 metric tons (1 metric ton equals 2,204 pounds or 36.73 bushels of wheat). This compares to average World wheat production of 586,529,000 metric tons since the 1987-88 marketing year, with average increases of 5,110,000 metric tons per year over the 23 year period.

The 10 largest wheat producing countries or regions produced an average of 84.4% of World wheat over the 1987-88 to 2009-10 period (Chart 4). Over the most recent 3 year period (2007-08 to 2009-10 marketing years), the 5 largest countries or regions in terms of average World wheat production were the European Union (138.1 million metric tons or mmt), China (114.5 mmt), India (80.7 mmt), the United States (60.4 mmt) and Russia (61.7 mmt) (Chart 5).





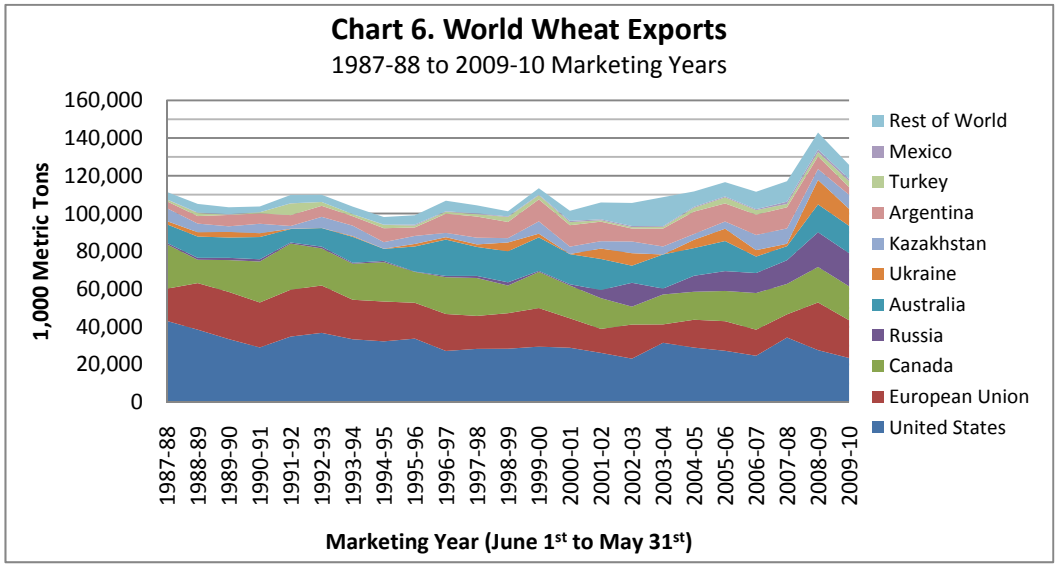
The Ukraine, Australia and Russia have the largest historic variability in wheat production relative to their average quantity produced since 1987-88, with cv measures of 0.34, 0.30, and 0.23, respectively. Pakistan (cv = 0.16), Canada (cv = 0.15), India (cv = 0.13) and the United States (cv = 0.12) have lower levels of relative variation in wheat production over time, followed by Turkey, China, and the European Union (cv = 0.09). Aggregate World wheat production has exhibited a relatively low level of production variability (cv = 0.07) since 1987-88. Overall, annual wheat production has been more variable in the Ukraine, Australia and Russia than in other major wheat

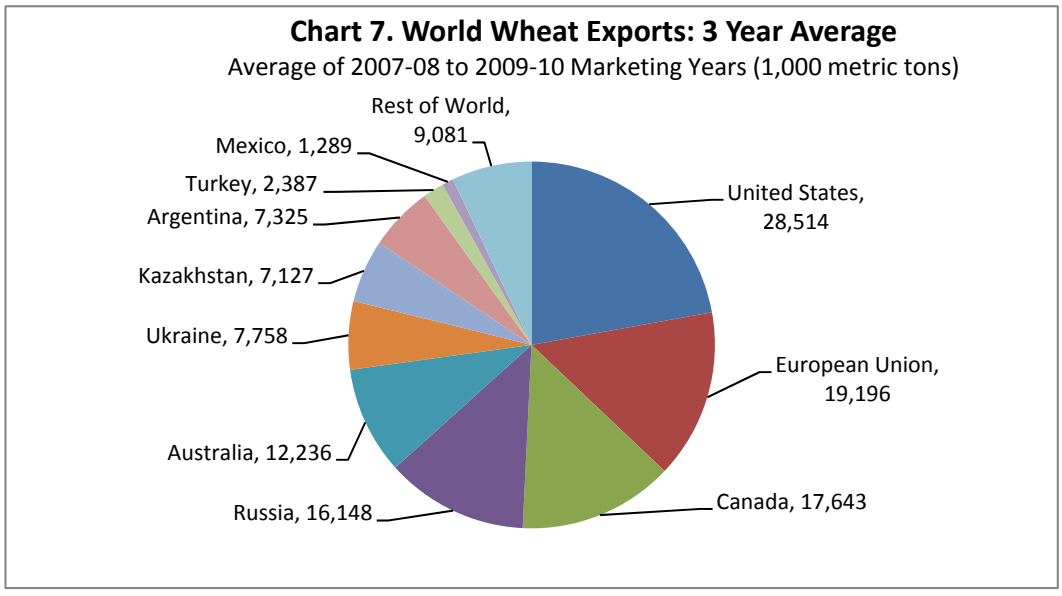
producing countries, and variation of aggregate total World wheat production has been less than that among individual countries and regions since 1987-88.

World Wheat Exports

World wheat exports in the 2009-10 marketing year are estimated to be 125,888,000 metric tons. This compares to average World wheat exports of 109,529,000 metric tons since the 1987-88 marketing year, with an average increase of 843,000 metric tons per year over the 23 year period.

The 10 largest World wheat exporting countries or regions shipped an average of 94.5% of World wheat exports over the 1987-88 to 2009-10 period (Chart 6). Over the most recent 3 marketing years, the 5 largest countries in terms of average World wheat exports were the United States (28.5 mmt), the European Union (19.2 mmt), Canada (17.6 mmt), Russia (16.1 mmt) and Australia (12.2 mmt) (Chart 7).



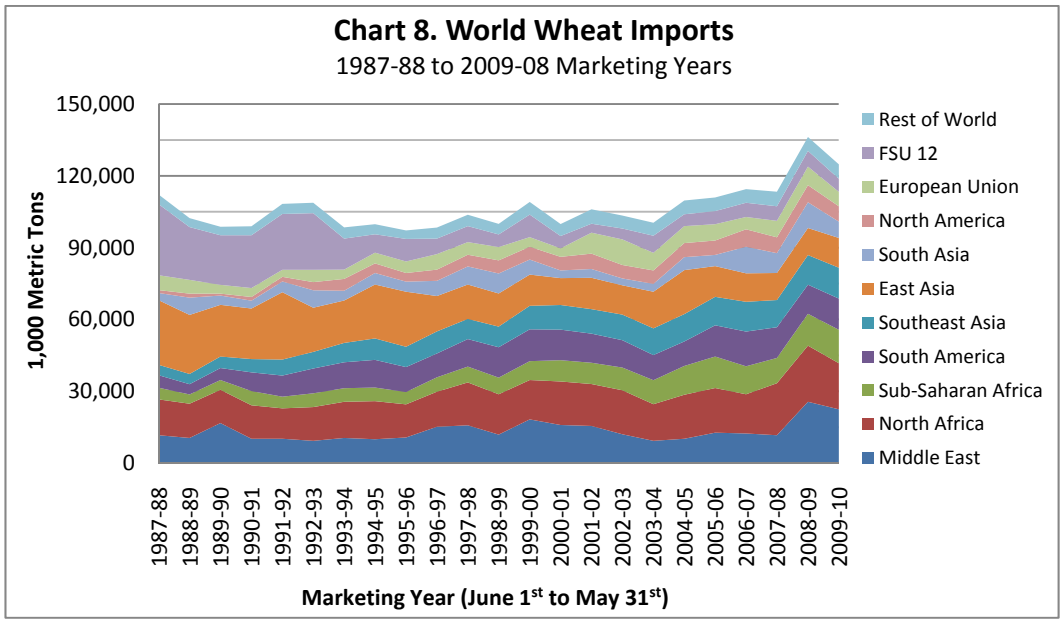


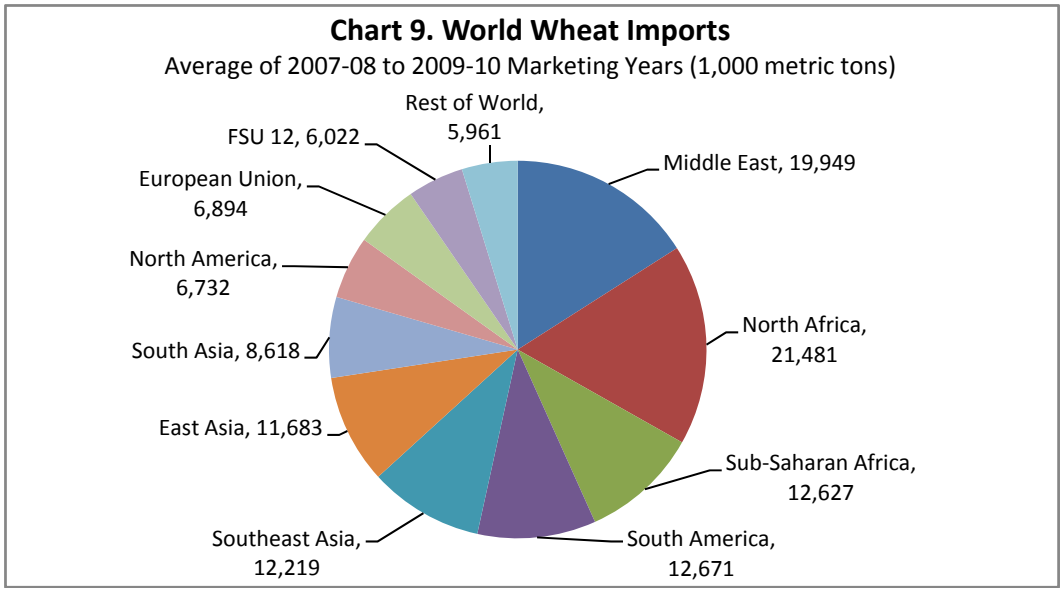
Russia and the Ukraine have the largest historic variability in wheat exports relative to their average export shipments since the 1987-88 marketing year, with cv measures of 1.24 and 1.07, respectively. Mexico (cv = 0.90) and Turkey (cv = 0.70) have lower levels of relative variation in wheat production over time, followed by Kazakhstan (cv = 0.40), Argentina (cv = 0.38), Australia (cv = 0.29), Canada (cv = 0.19) and the United States (cv = 0.16). Aggregate World wheat exports have exhibited a relatively low level of variability (cv = 0.09) compared to individual countries since 1987-88. Taken together, these results indicate that annual wheat exports have been more variable in the Ukraine and Russia, and to a lesser degree in Mexico and Turkey, than in other exporting countries and regions. The least amount of annual variability in wheat exports are evident in the United States and Canada. Total aggregate World wheat exports have been less variable relatively speaking than that of individual major exporting countries.

World Wheat Imports

World wheat imports in the 2009-10 marketing year are estimated to be 124,845,000 metric tons. This compares to average World wheat imports of 106,809,000 metric tons since the 1987-88 marketing year, with average increases of 807,000 metric tons per year over the 23 year period.

The 10 largest World wheat importing regions secured an average of 95.4% of World wheat imports over the 1987-88 to 2009-10 marketing year period (Chart 8). Over the 3 most recent marketing years, the 6 largest regions in terms of average World wheat imports were North Africa (21.5 mmt), the Middle East (19.9 mmt), South America (12.7 mmt), Sub-Saharan Africa (16.6 mmt), Southeast Asia (12.2 mmt), and East Asia (11.7 mmt) (Chart 9). East Asia includes China, while South Asia includes India. Turkey is included in the Middle East while Egypt is included in North Africa.





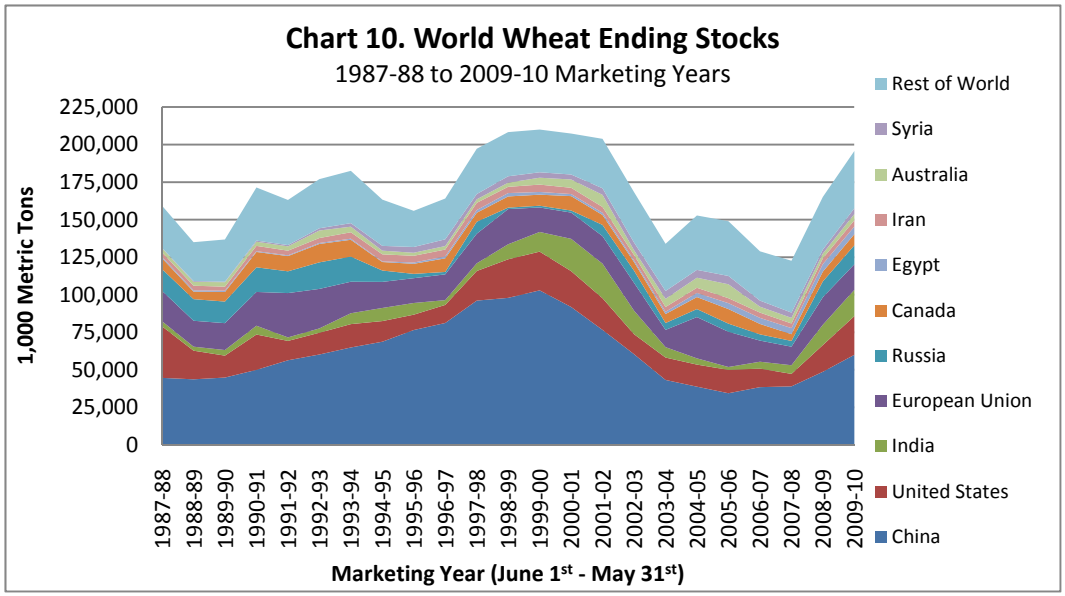
The Former Soviet Union region has the largest historic variability in wheat imports relative to their average import shipments since 1987-88, with a cv measure of 0.70. North America (cv = 0.43), South Asia (cv =0.42), and Sub-Saharan Africa (cv =0.40) have lower levels of relative variation in wheat production over time, followed by the European Union, East Asia and the Middle East (cv = 0.32), Southeast Asia (cv = 0.32), South America (cv = 0.26), and North Africa (cv = 0.16). Aggregate World wheat imports have exhibited a relatively low level of variability (cv = 0.09) compared to individual regions since 1987-88, displaying a tendency for offsetting changes in imports to occur across major wheat importing regions of the world.

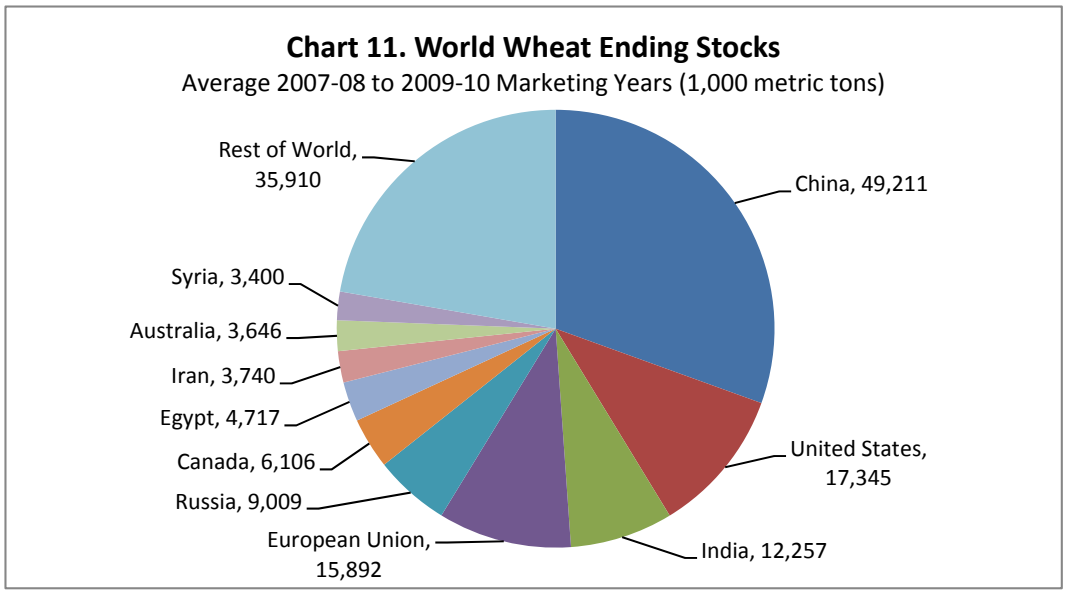
World Wheat Ending Stocks

Total World wheat ending stocks in the 2009-10 marketing year are estimated to be 195,819,000 metric tons. This compares to average World wheat ending stocks of 167,501,000 metric tons since the 1987-88 marketing year, with average increases of 11,000 metric tons per year over the 23 year period.

The 10 largest World wheat countries or regions in terms of ending stocks had an average of 81.2% of total World wheat stocks over the 1987-88 to 2009-10 period of marketing years (Chart 10). Over the most recent 3 years, the 5 largest countries or regions in terms of average World wheat ending stocks were China (49.2 mmt), the United States (17.3 mmt), the European Union (15.9 mmt), India (12.3 mmt), and Russia (9.0 mmt) (Chart 11).

During the 1997-98 through 2000-01 period, China held 47% of the World's ending wheat stocks. This compares to an average of 30% of the World's ending stocks of wheat held by China during the more recent 2006-07 through 2009-10 period. The large holdings of world wheat stocks during the 1997-98 through 2000-01 period indicate that it is not unprecedented for the Chinese to accumulate even larger proportions of the World's wheat ending stocks than they have today.





Egypt, India, and Russia have the largest historic variability in wheat ending stocks relative to their average stocks since 1987-88, with cv measures of 0.78, 0.75, and 0.66, respectively. Syria (cv = 0.53) and Australia (cv = 0.47) have lower levels of relative variation in wheat ending stocks over time, followed by the United States (cv = 0.35), China (cv = 0.34), Canada (cv = 0.27), the European Union (cv = 0.23) and Iran (cv = 0.17). Aggregate World wheat ending stocks have exhibited a relatively low level of variability (cv = 0.16) compared to individual countries since the 1987-88 marketing year.

Summary and Conclusions

Since at least the 1987-88 marketing year, global wheat markets have been strongly influenced by a small number of countries that either produce or export large portions of the World's wheat. Global wheat production is concentrated (84.5%) in the top 10 wheat producing countries and regions of the World, including the top 5 of 1) the European Union, 2) China, 3) India, 4) the United States, and 5) Russia. World wheat export markets are also strongly influenced by a limited group of countries and regions, with the top 10 accounting for 94.5% of World

wheat exports. The top 5 World wheat exporters are 1) the United States, 2) the European Union, 3) Canada, 4) Russia, and 5) Australia, followed closely by the Ukraine, Kazakhstan, and Argentina.

World wheat import markets are less concentrated than World wheat production and export markets in terms of predominant countries or regions. The top 18 world wheat importing countries in the 2009/10 marketing year are projected to purchase 63% of world wheat imports, varying from 6 mmt (Egypt) down to 1.8 mmt (Saudi Arabia). From the perspective of economic theory regarding competitive agricultural markets, in this case a relatively large number of countries are involved in buying wheat for imports to help meet the dietary needs of their respective populations.

Ending stocks of wheat in World markets tend to be concentrated in the hands of a limited number of countries or regions. In the 2009-10 marketing year, the top 5 wheat stocks owning countries or regions are projected to have 67.9% of total World wheat ending stocks. These countries include 1) China, 2) the United States, 3) India, 4) the European Union, and 5) Russia. Canada, Egypt, Iran, Australia and Syria are projected to collectively hold another 12.6% of World Wheat ending stocks in 2009-10, bringing the proportion of World wheat ending stocks held by the top 10 countries to 80.5%.

Taken together, these World wheat market supply-demand statistics indicate that fairly concentrated production and export sectors exist. It also indicates that a World wheat import buyers are less concentrated as a group than are World wheat exporters. A relatively small number of wheat export sellers interacts with a somewhat larger group of World wheat import buyers in today's wheat market. A large proportion of projected World wheat ending stocks for the 2009-10 marketing year are owned by a relatively small number of countries. Furthermore, at least two countries in that group (China and India) focus on domestic usage of wheat, and at this time would be unlikely to sell their ending stocks into World wheat export markets.

Because of the availability of natural agricultural farmland resources and the likelihood of continued population growth in the future, the roles of various countries or regions in determination of World wheat market supply-demand balances is unlikely to change appreciably in the foreseeable future. However, wheat acreage in the United States has been declining since 1981 due to the profitability of competitive crops and other factors. Wheat yield trends in the United States have been relatively flat or only rising slowly over this same time period. The possibility of future declines in U.S. wheat acreage and production, and of declining U.S. wheat exports as well, are among the factors most likely to affect future World wheat supply-demand balances.