

Chapter 4

The Everchanging World Wheat Market



Andrew Schmitz and Claudine Chegini

Abstract For some countries, wheat is no longer the primary grain crop grown. Over the past ten years, wheat production in the USA has declined by almost 15%. For many farmers in the USA and Canada, wheat has become a minor crop partly due to the introduction of oil and pulse crops and the increase in canola, peas, and lentils acreage. The shift away from wheat was made possible through new technologies, such as the use of air seeders and combine headers for straight combining. This shift, however, has caused transformations in the world wheat market, including changes in government policies over time, some of which have affected world wheat crops. This chapter highlights the changes that have taken place in the world wheat market from the 1970s to the present and how policies and programs have influenced the changing structure of the world wheat market.

Keywords Acreage · International trade · Production · Wheat

4.1 Introduction

This chapter highlights the changes that have taken place in the world wheat market along with the policies and programs that have influenced the changing structure of the world wheat market. From 1954 to 1959, average world production of wheat was 8127.4 million bushels and wheat acreage was 493,134 acres. For the year 1959/60, the USSR had 26% of the world wheat market share of wheat, followed by the USA, Canada, and China. From 1959 to 1964, approximately 22% of the world's cultivated acreage was sown to wheat, the largest single acreage of any cereal crop (Schmitz, 1968).

A. Schmitz (✉) · C. Chegini
University of Florida, Gainesville, USA
e-mail: aschmitz@ufl.edu

C. Chegini
e-mail: cchegini@ufl.edu

Table 4.1 Wheat acreage and production for major regions of the world, average, 1954/55–1958/59 and 1959/60–1963/64

Region	Harvest years			
	Acreage, 1000 acres		Production, million bushels	
	1954/55–1958/59	1959/60–1963/64	1954/55–1958/59	1959/60–1963/64
Europe (includes USSR)	223,498	227,644	3928.4	4359.9
Asia	147,257	150,464	1926.2	1966.4
North and Central Americas	74,794	76,690	1553.1	1749.7
South America	19,808	17,011	347.4	307.1
Africa	18,093	17,762	206.2	202.8
Oceania	9684	14,848	166.1	279.8
World Total	493,134	504,419	8,127.4	8,895.7

Source International Wheat Council [IWC] (1980)

Table 4.2 Countries ranked according to wheat acreage and production, average, 1959/60–1963/64

Country	Acreage, 1000 acres	Country	Production, million bushels	World total production, %
USSR	157,363	USSR	2,354.2	26.46
China (mainland)	61,923	USA	1188.7	13.36
USA	48,795	China (mainland)	792.2	8.91
India	32,713	Canada	507.2	5.70
Canada	25,747	France	414.7	4.66
Turkey	19,400	India	398.1	4.48
Australia	14,655	Turkey	306.1	3.44
Pakistan	12,145	Italy	302.7	3.40
Italy	11,123	Australia	270.8	3.04
Argentina	10,793	Argentina	223.4	2.52
Totals	394,657	Totals	6758.1	75.97

Source IWC (1980)

Table 4.1 shows total wheat acreage and production for some of the largest wheat producing regions during that time period for two four-year periods: 1954/55–1958/59 and 1959/60–1963/64.

The largest wheat producer was the USSR (former Soviet Union), which accounted for over 25% of the world's production total (Table 4.2). The USA, China, and Canada combined produced 22% of the total.

The six major wheat-exporting countries in 1959/60–1963/64 are given in Table 4.3. The USA and Canada were the largest wheat exporters, followed by Australia and Argentina.

Table 4.3 Countries ranked according to wheat exports and imports, average 1959/60–1963/64

Country	Exports, million bushels	World total exports, %	Country	Imports, million bushels	World total exports, %
USA	674.6	40.47	UK	167.1	10.45
Canada	373.9	22.44	India	135.4	8.47
Australia	198.7	11.92	China (mainland)	123.3	7.71
Argentina	81.2	4.87	Germany (Federal Republic)	85.1	5.32
			Brazil	76.3	4.77
Totals	1571.4	94.27	Totals	695.6	43.60

Source IWC (1980)

The top importers of wheat for 1959/60–1963/64 were the UK, India, China, Japan, Germany, and Brazil. Later in the 1980s, the USSR emerged as the largest single importer of wheat.

This chapter highlights the changes that have taken place in the world wheat market from the 1970s to the present and how policies and programs have influenced the changing structure of the world wheat market. For example, in 2019/20, Russia (formerly part of the USSR) emerged as the world's largest wheat exporter, accounting for approximately 20% of world wheat exports, even though at times it placed restrictions on wheat exports.

4.2 World Wheat Chronology (1980/81–2019/20)

In the following, we extend the time period analysis by Schmitz (1968) and Schmitz and Bawden (1973) and consider four additional periods to demonstrate the changing nature of world wheat: 1980/81–1989/90, 1990/91–1999/2000, 2000/01–2009/10, and 2010/11–2019/20. Major policies that have affected world wheat are highlighted (Kennedy et al., 2020; Schmitz & Kennedy, 2016; Schmitz et al., 1981, 2010; van Kooten et al., 2020).

4.2.1 Period 1970/71–1979/80

Prior to 1972, the USSR was a wheat importer, but did not import wheat from the USA. Beginning in 1972, the USSR began importing wheat from the USA due to decreased domestic production in 1971 and 1972. In 1972, the USSR purchased almost 25% of the US wheat crop at below market price—referred to as the Great Grain Robbery of 1972. This topic was debated by Schmitz at the James Snyder Memorial Lecture in Agricultural Economics at Purdue University.

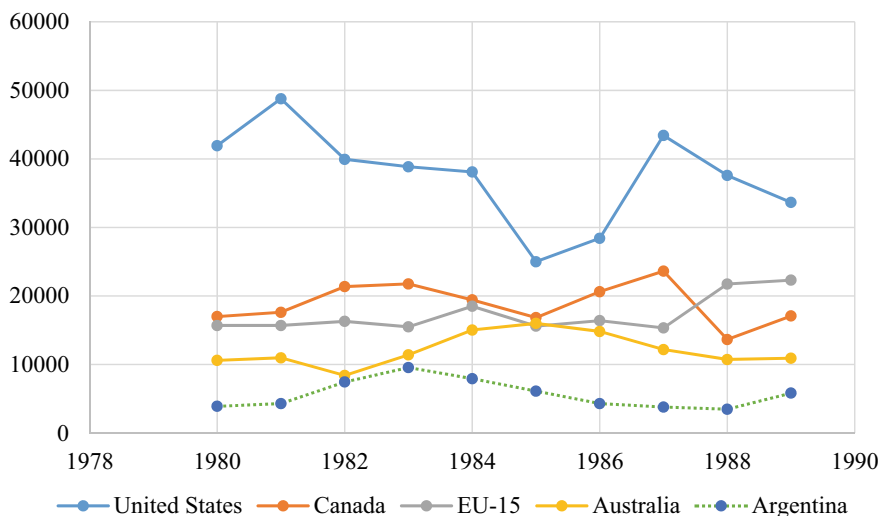


Fig. 4.1 World wheat exports, thousand tons, by country/region, 1980/81–1989/90. *Source* United States Department of Agriculture, Foreign Agricultural Service [USDA-FAS] (2021a)

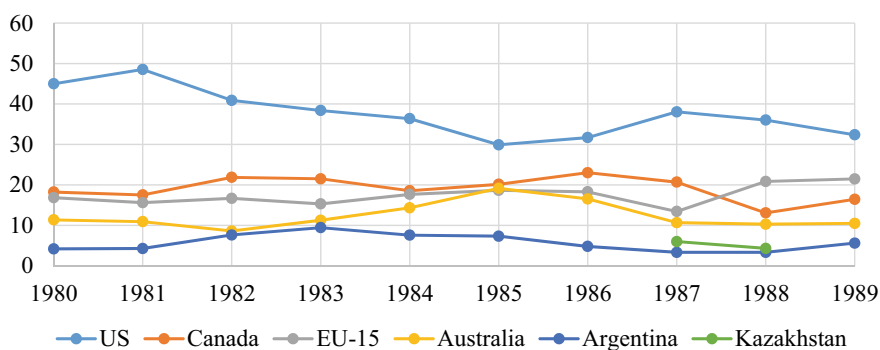


Fig. 4.2 Wheat export shares, percentages, by country/region, 1980/81–1989/90. *Source* USDA-FAS (2021a)

4.2.2 Period 1980/01–1989/90

World wheat exports for 1980/81–1989/90 are given in Fig. 4.1. In 1985, US wheat exports reached a low of roughly 25 million tons.

World wheat export shares for 1980/81–1989/90 are given in Fig. 4.2. The US market share fell from 50% in 1981 to a low of 30% in 1985. Among the countries shown (e.g., Canada), export shares remained relatively stable.

World wheat imports for the top six wheat importing countries for 1980/81–1989/90 are given in Fig. 4.3. For most of the decade, the EU was the largest importer

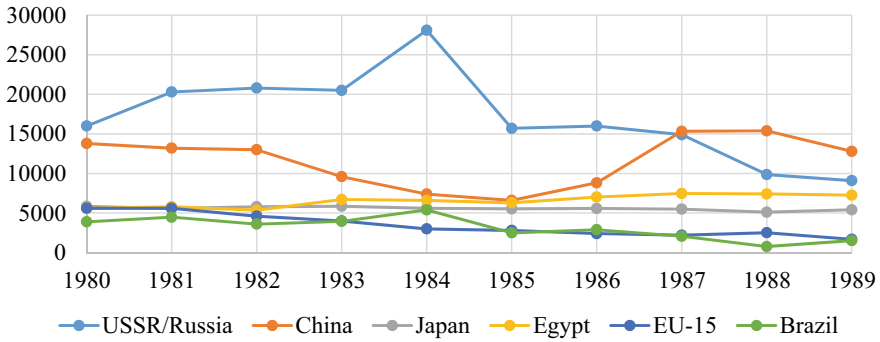


Fig. 4.3 World wheat imports, thousand tons, by country/region, 1980/81–1989/90. *Source* USDA-FAS (2021a)

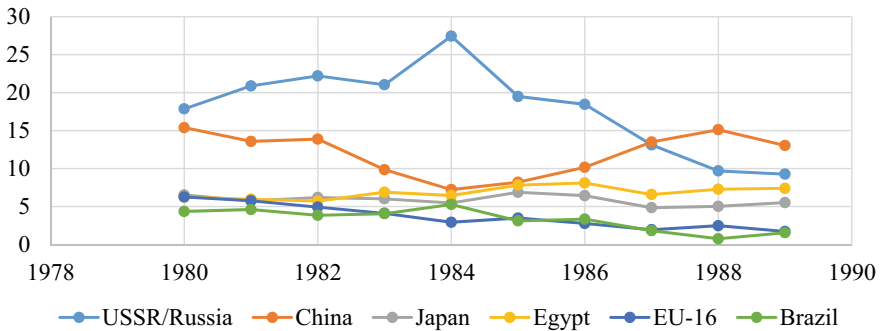


Fig. 4.4 Wheat import market shares, percentages, by country/region, 1980/81–1989/90. *Source* USDA-FAS (2021a)

of wheat, which reached a maximum of roughly 27.5 million tons in 1984. Their total imports were greater than the combined imports of other countries shown, including Japan and China.

In Fig. 4.4, the EU market share of wheat in 1984 was roughly 28%, followed by Egypt at 7%. By 1989/90, Egypt had emerged as the largest importer of wheat.

4.2.3 Government Policy

Wheat production, imports, and exports are impacted by government policy. During 1980–1989, the USA faced large surpluses of wheat. As a result, in the 1980s several major wheat programs were introduced in the USA that dealt with overproduction: the Payment-in-Kind (PIK), the Conservation Reserve Program (CRP), and the Export Enhancement Program (EEP) (Schmitz et al., 2002).

The PIK certificate program, introduced in 1983 and terminated in 1984, was a means to support US grain prices by subsidizing US farmers not to plant crops (Schmitz et al., 2002). PIK was a means to support US farmers who could redeem them for grain or sell them to others. Either way, grain stocks were reduced, which adversely affected input suppliers. Despite PIK, the USA still accumulated large wheat stocks.

The CRP, established by the Food Security Act of 1985, was put in place to reduce soil erosion and to increase farm gate prices and net farm income. By 2000, approximately 34 million acres of US farmland were covered under the CRP (Knutson et al., 1998).

The EPP was a major US policy introduced in 1985 to reduce surpluses. Subsidies under the EEP increased US competition in the international trade market by decreasing US grain stocks and compensating commodity brokers for exporting wheat to international markets when world prices were lower than US prices for wheat. From 1985 to 1994, EEP payments totaled \$48 billion, with EEP payments highest in 1988 and 1992 (Schmitz et al., 2002).

4.3 Wheat Stocks and Commodity Storage

Figure 4.5 shows the magnitude of wheat stocks globally and by country. Several countries are engaged in wheat stockholding activities. There is considerable variability in the volume of wheat stocks over time. For 2011/12–2020/21, China held the largest wheat stocks, and these continued to grow from 2018 and onward. In 2020, China held roughly 150 million tons of wheat stocks. This is a sharp contrast to China's significantly lower holdings in earlier periods.

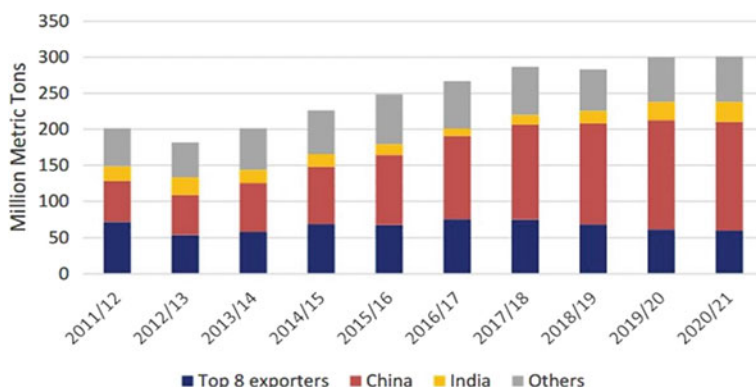


Fig. 4.5 Global wheat storage, million tons, by country/region, 2011/12–2020/21. *Note* Top 8 exporters: Russia, USA, EU, Canada, Australia, Ukraine, Argentina, Kazakhstan; top 2 importers: China, India. *Source* USDA-FAS (2021a)

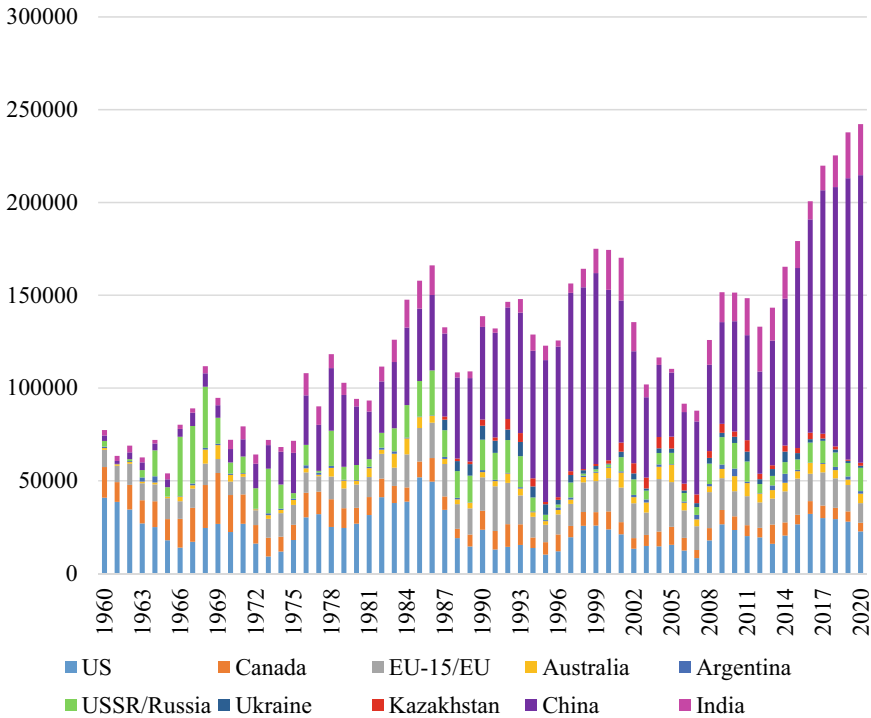


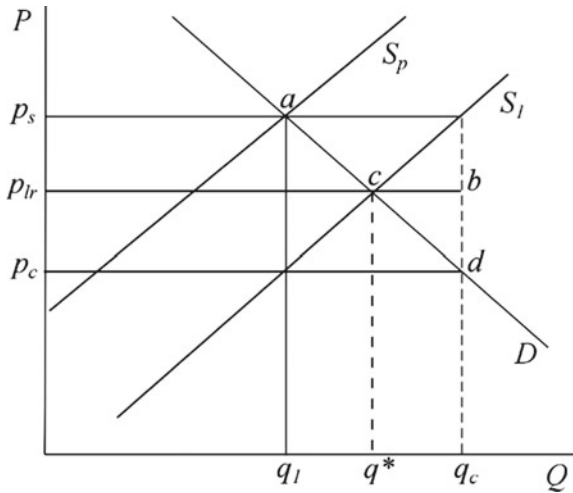
Fig. 4.6 Global ending wheat stocks, thousand tons, by country/region, 1960/61–2020/21. *Source* USDA-FAS (2021a)

As shown in Fig. 4.6, US wheat stocks have remained relatively stable since the 1960s while Canada has decreased its wheat stocks. However, since 1988 China’s wheat stocks have grown considerably and vary greatly from year to year.

In the late 1990s, the United States Commodity Credit Corporation (CCC) held excessive grain reserve stocks on behalf of the US government. These stocks were due to US farm policy that set both the target price and loan rate for wheat. The loan rates were set at levels that at times were above market prices; thus the government had to purchase wheat and store it, resulting in high stocks.

Figure 4.7 incorporates both a price support and a loan rate policy instrument (Schmitz & Bawden, 1973). In period 1, the equilibrium price and quantity in the absence of government are p_s and q_1 . In period 2, the equilibrium price and quantity are p_{lr} and q^* . Now suppose the government supports price at p_s and sets the loan rate at p_{lr} . What is the effect of a supply shock that shifts supply from S_p to S_l ? In the absence of the loan rate, the market would clear at price p_c . However, with the loan rate in place, there is storage required of $q_c q^*$, which is equal to the amount cb .

Fig. 4.7 Storage under price supports and loan rates.
 Source Schmitz (2021)



4.3.1 Period 1990/91–2000/01

The wheat export and import markets in 1990/91–2000/01 are given in Figs. 4.8 and 4.9. US wheat exports fell from roughly 37 million tons in 1992 to 28 million tons in 2000. During this period, Canada’s wheat exports increased from approximately 12 million tons in 1990 to 18 million tons in 2000.

The US wheat export market share fell from 35% in 1995 to 27% in 2000, while Canada’s export share was relatively stable at 22%. The market share for Argentina actually increased from 5% in 1990 to 11% in 2000.

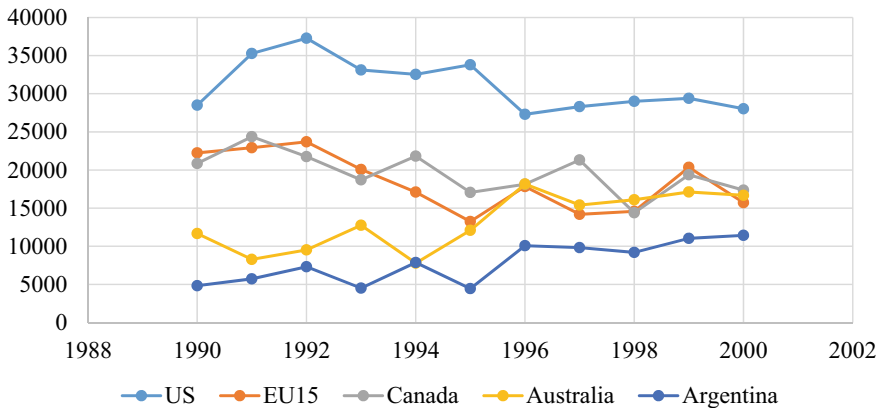


Fig. 4.8 World wheat exports, thousand tons, by country/region, 1990/91–2000/01. Source USDA-FAS (2021a)

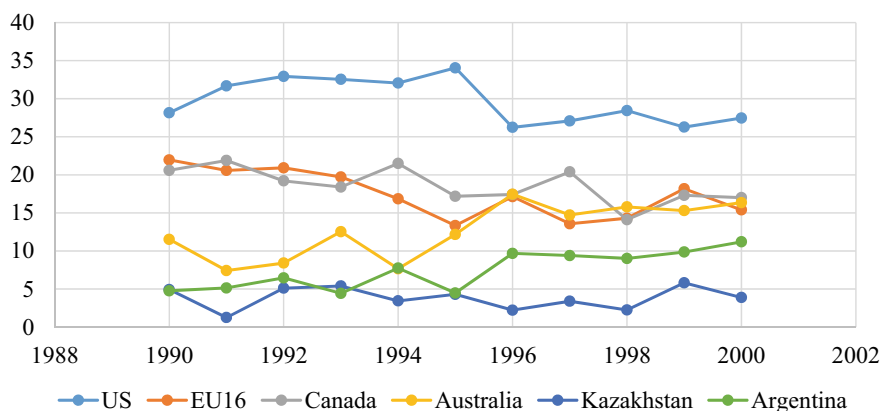


Fig. 4.9 World wheat export market shares, percentages, by country/region, 1990/81–2000/01. Source USDA-FAS (2021a)

Table 4.4 US wheat exports by destination in 1987

Destination, country	Quantity, tons	US wheat exports, %
Russia (USSR)	4.8	15.8
Japan	3.0	9.8
Egypt	2.4	7.9
Morocco	2.0	6.6
South Korea	1.9	6.2
Algeria	1.9	6.3
China	1.9	6.3
Rest of world (ROW)	12.6	41.1
Total	30.6	100.0

Source USDA-ERS (1988)

In the 1980s, Russia (formerly part of the USSR) was the largest importer of US wheat from all US ports (Table 4.4). For example, in 1987, Russia imported 4.8 million tons of wheat from the USA, nearly 16% of total US exports, with 98% moving through the Gulf ports (United States Department of Agriculture, Economic Research Service [USDA-ERS], 1988). The second largest importer of US wheat that year was Japan, which imported 3 million tons, or 9.8% of total US wheat exports (USDA-ERS, 1988).

Between 1987 and 1991 the USSR again halted wheat imports from the USA. But with the full dissolution of the Soviet Union in 1991, Russia became a large importer of US wheat from 1991 until 2002, when imports from the USA once again ceased.

Beginning in the 1990s, Kazakhstan, Russia, and Ukraine (KRU region) became major global wheat exporters, moving from a central-controlled economy to a market economy (Liefert & Liefert, 2015; Petrick & Oshakbaev, 2015). By 2022, the KRU

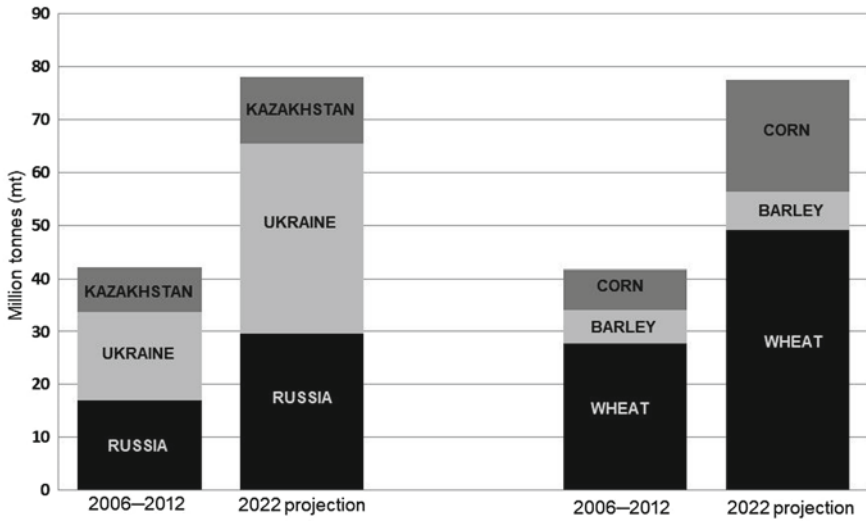


Fig. 4.10 KRU grain exports, million tons, 2006–2012, and 2022 projection. Source United States Department of Agriculture [USDA] (2013), Liefert and Liefert (2015)

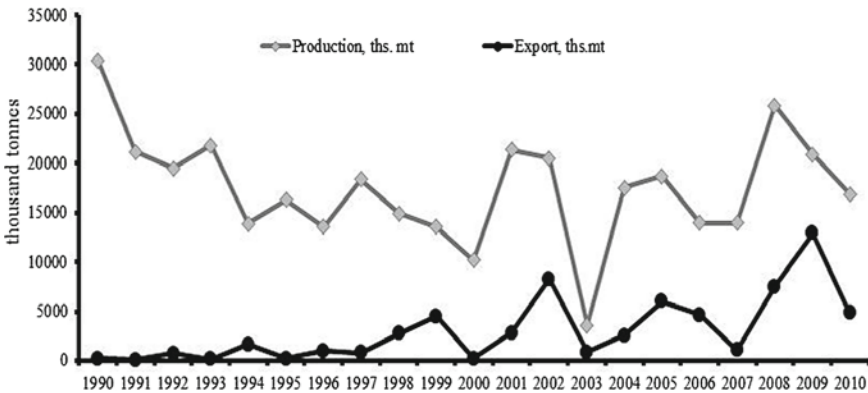


Fig. 4.11 Changes in Ukraine wheat production and exports, thousand tons, 1990–2010. Source State Statistics Service of Ukraine (2021), Kobuta (2015)

region is projected to supply 20% of the world’s total grain exports and 30% of the world’s wheat exports (Fig. 4.10.). Thus, in 2022, KRU wheat export volume will be 92% larger than the US volume (Liefert & Liefert, 2015).

Since 2000, Ukraine has become one of the world’s largest suppliers of feed wheat in the low and medium quality market (Schmitz & Meyers, 2015). Figure 4.11 shows that from 1990 to 2010, wheat production in Ukraine decreased, while wheat exports trended upwards due to declining world wheat reserves and rising wheat prices.

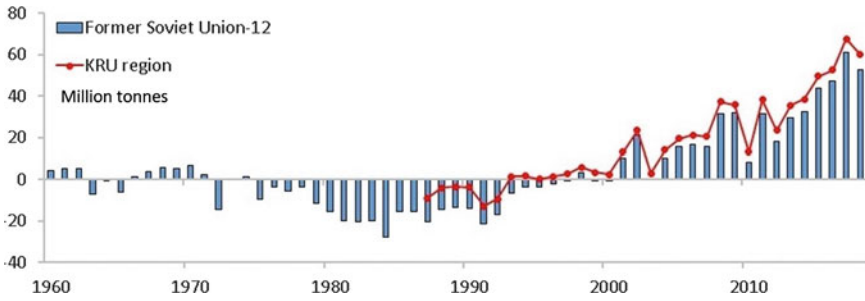


Fig. 4.12 KRU movement from large grain importer to large grain exporter, million tons, 1960–2018. *Note* KRU Region: Kazakhstan, Russia, and Ukraine

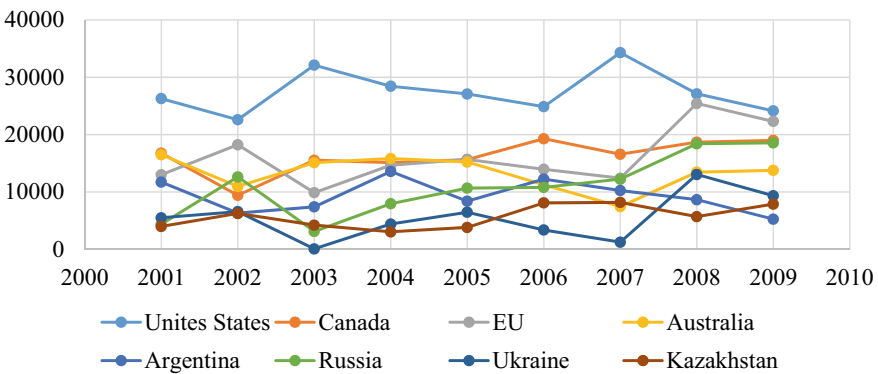


Fig. 4.13 World wheat exports, million tons, by country/region, 2001/02–2009/10. *Source* USDA-FAS (2021a)

4.4 Agricultural Trade in KRU Region

As shown in Fig. 4.12, from 1980 to 1990, the former Soviet Union was a large wheat importer. Between 1985 and 2000, the KRU region’s net imports were essentially zero. From 2000 onward, the KRU region became a significant importer. In late 2020, the KRU region exported roughly 16 million tons of wheat.

4.4.1 Period 2001/02–2009/10

World wheat exports for 2001/02–2009/10 are given in Fig. 4.13. US wheat exports peaked in 2007 at 35 million tons. EU wheat exports peaked in 2008 at 25 million tons. In 2009, the US and EU wheat export volumes were roughly the same.

Wheat market shares are given in Fig. 4.14. In 2007, the US wheat market share was roughly 30% before falling to roughly 18% in 2009. By 2009, Russia’s wheat market share was roughly 50%.

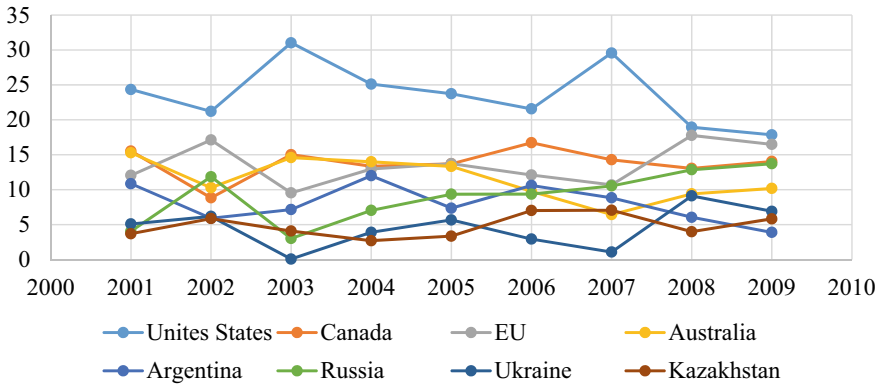


Fig. 4.14 World wheat export market shares, percentages, by country/region, 2001/02–2009/10. Source USDA-FAS (2021a)

The US remained the largest exporter of wheat from 2001 to 2010; however, their percentage share of the world export market decreased relative to previous time periods as other players entered the market and increased relative production. For instance, when adding more member states from 2007 to 2008, the EU increased production from roughly 12 million to 25 million tons. This is due less to an actual increase in production and more to the expansion of the EU. During this same period, Russia began the move towards becoming a major exporter of wheat to the world market, with export growth from 5 million tons to almost 20 million tons over the span of 8 years.

4.4.2 Period 2010/2011–2020/21

As shown in Fig. 4.15, by the end of the period, Russia is the largest wheat exporter at roughly 40 million tons. The EU and Canada are tied as the second largest wheat exporters at roughly 28 million tons.

World wheat as a percentage of exports by country/region is given in Fig. 4.16. Russia eclipsed all other wheat exporters from 2010 to 2020, increasing their market share at least fourfold. In 2020, Russia’s wheat market share was 20%, followed by the EU and Canada, each at 15%.

During the same period, the US percentage of export market share of wheat fell from 27 to 13%. Taken together, the KRU region as a whole commanded more than 32% of the export market by 2021.

As shown in Figs. 4.17 and 4.18, during the same time period, Egypt remained the world’s largest importer of wheat, importing anywhere from 6 to 8% of the global import share of wheat. Wheat imports to Egypt in 2020 were at a high of 13 million tons. From 2014 to 2020, China increased wheat imports from 2 to 10 million tons, becoming one of the top five global importers of wheat.

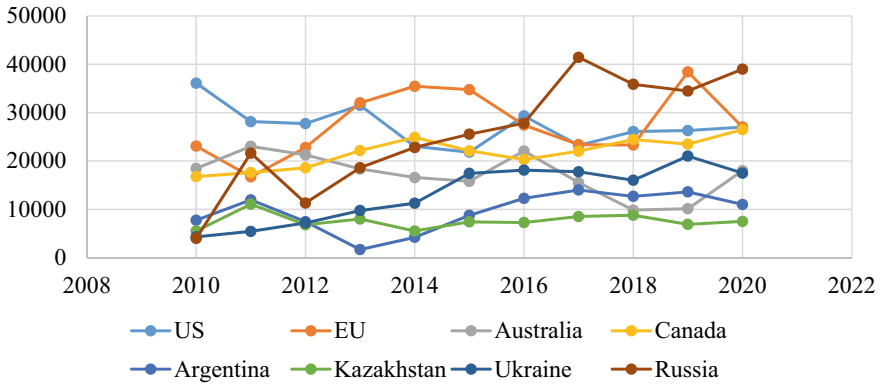


Fig. 4.15 World wheat exports, tons, by country/region, 2010/11–2020/21. *Source* USDA-FAS (2021a)

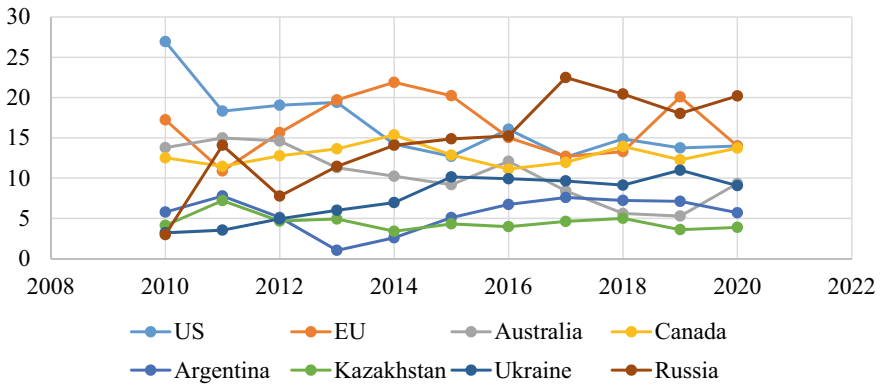


Fig. 4.16 World wheat market shares, percentages, by country/region, 2010/11–2020/21. *Source* USDA-FAS (2021a)

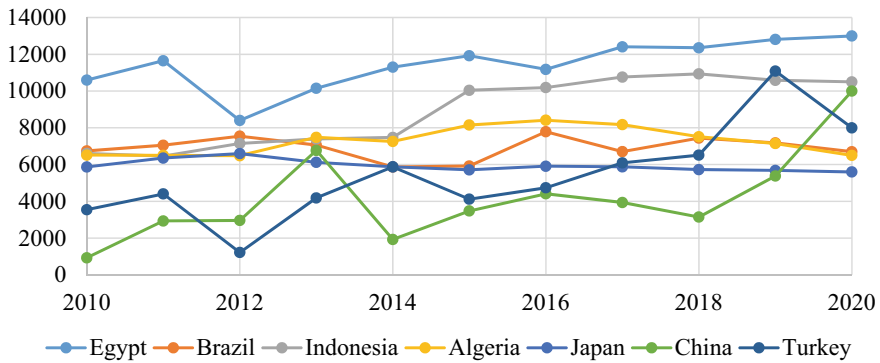


Fig. 4.17 World wheat imports, thousand tons, by country, 2010/11–2020/21. *Source* USDA-FAS (2021a)

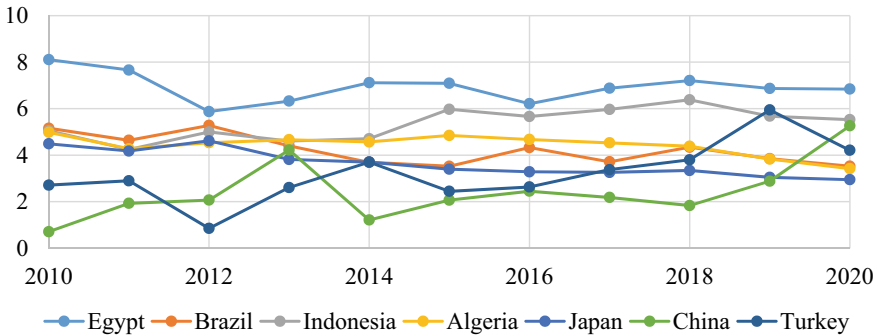


Fig. 4.18 World wheat imports, percentages, by country, 2010/11–2020/21. *Source* USDA-FAS (2021a)

4.4.3 Government Policy

The KRU region implemented wheat export restrictions between 2007 and 2011 during the global commodity price peaks to protect their domestic wheat and bread markets. Like many exporting countries, the KRU governments reduced or banned exports through restrictions, whereas importing countries reduced or eliminated import restrictions (Martin & Anderson, 2012). The export restrictions failed to stabilize prices, leading to higher prices along the wheat-to-bread supply chain throughout the KRU region (Götz et al., 2015). Despite the intervention measures, the wheat export restrictions did not reduce domestic food price inflation nor did they protect the KRU region against high food prices.

4.5 Volatile Wheat Prices

World wheat prices have been highly unstable (Fig. 4.19.). For example, between 2008 and 2009, wheat prices doubled. In 2010, wheat prices reached a low of \$160/ton; a drop of more than 100%. Also, for the period 2013–2017, world wheat prices dropped from 320 to 120 \$/ton.

Within this scenario, perhaps our theory that stocks are stabilizing is incorrect, and maybe stocks are actually destabilizing. When examining the instability of world wheat prices, what seems paradoxical is when this price instability is related to holding of world wheat stocks. As noted earlier, over time, the volume of stocks held by China increased significantly, and as of December 2020, stocks were at an all-time high. At the same time, wheat prices started increasing in October 2020 and continued into 2021. China once again emerged as one of the largest importers and holders of wheat in 2020. How could this be possible with the world holding large wheat reserves? What would the world look like if there were no publicly held stocks and the private sector were to undertake storage? (In this context, one might question the validity of stock level data.)

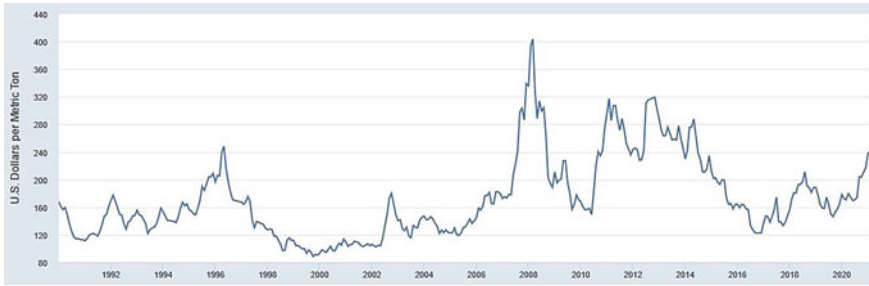


Fig. 4.19 Global wheat prices, dollars per ton, 1990–2021. *Source* International Monetary Fund [IMF] (2021)

4.6 Conclusion

This chapter highlights trade in wheat (a major non-GMO crop) and the dynamics of change in the global wheat market. For some countries, wheat is no longer the primary grain crop grown. For example, Canada’s decrease in world wheat exports is partly due to the introduction of oil and pulse crops. The increase in canola acreage has been significant, as have increases in peas and lentils. For many farmers in the USA and Canada, wheat has become a minor crop. Over the past ten years, wheat production in the USA has declined by almost 15%. This is in sharp contrast to the KRU region, where wheat is still king. The shift away from wheat was made possible through new technologies, such as the use of air seeders and combine headers for straight combining.

The instability in the world wheat market is due to many factors, including changes in government policies over time, some of which have affected world wheat crops. China is the largest holder of wheat stocks, but the role these stocks play in world wheat trade instability remains unclear. China, at times, imports large amounts of wheat, but at other times, their imports of wheat are very small.

There are many classes of wheat, which we have not taken into account since we do not separate out the many wheat classes in this chapter. For example, soft white wheat grown in the US state of Washington is very different from winter wheat grown in the US state of Kansas and from hard red spring wheat grown in Canada. Also, as noted, a considerable amount of the wheat shipped from the Ukraine is feed wheat. Very recently, China has increased purchases of soft white wheat from the USA in an attempt to diversify their diet. In this regard, per capita consumption of wheat in the USA has been on the decline, partly due to the increase in demand for a gluten-free diet.

Appendix

See Tables [A1](#), [A2](#), [A3](#), [A4](#), [A5](#) and Figs. [A1](#), [A2](#), [A3](#), [A4](#), [A5](#), [A6](#).

Table A1 Regression for wheat production, thousand tons, 1961–2017

Country	Annual growth	Standard deviation	Testing statistics	p-value
Former Soviet Union (1961–2017)	696.74	354.33	1.97	0.06
Ukraine (1992–2017)	350.51	107.49	3.26	0.00
Russia (1992–2017)	1,348.57	257.17	5.24	<0.0001

Source USDA-FAS (2021b)

Table A2 Regression for wheat yield, tons/hectare, 1961–2017

Country	Annual growth	Standard deviation	Testing statistics	p-value
Former Soviet Union (1961–2017)	0.02	0.00	4.96	<0.0001
Ukraine (1992–2017)	0.04	0.01	2.79	0.01
Russia (1992–2017)	0.04	0.01	6.47	<0.0001

Source USDA-FAS (2021b)

Table A3 Regression for wheat production, thousand tons, by country, 1961–2017

Country	Annual growth	Standard deviation	Testing statistics	p-value
USA	375.50	79.66	4.71	<0.0001
Canada	267.66	36.83	7.27	<0.0001
China	2,107.83	90.55	23.28	<0.0001
India	1,598.79	29.70	53.84	<0.0001

Source Food and Agriculture Organization of the United Nations [FAO] (2021)

Table A4 Regression for wheat yield, tons/hectare, by country, 1961–2017

Country	Annual growth	Standard deviation	Testing statistics	p-value
USA	0.03	0.00	19.12	<0.0001
Canada	0.03	0.00	12.45	<0.0001
China	0.09	0.00	60.89	<0.0001
India	0.04	0.00	40.22	<0.0001

Source FAO (2021)

Table A5 Regression for net exports, million tons, by region, 2000–2018

Country	Annual growth	Standard deviation	Testing statistics	p-value
Former Soviet Union-12	2.650	0.38	6.95	<0.0001
KRU Region	2.884	0.38	7.54	<0.0001

Note KRU region: Kazakhstan, Russia, and Ukraine

Source USDA-FAS (2021b)

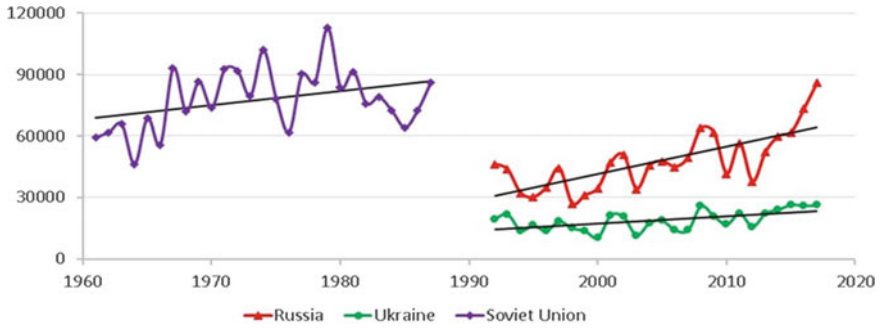


Fig. A1 Wheat production, thousand tons, former Soviet Union (1961–1987) and Russia and Ukraine (1992–2017). *Source* FAO (2021)

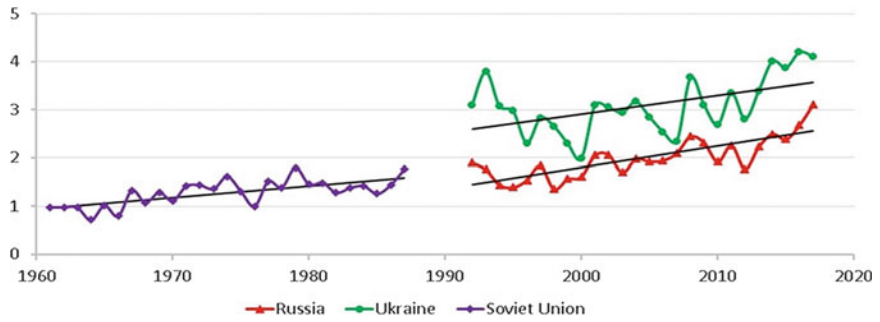


Fig. A2 Wheat yield, tons/hectare, former Soviet Union (1961–1987) and Russia and Ukraine (1992–2017). *Source* FAO (2021)

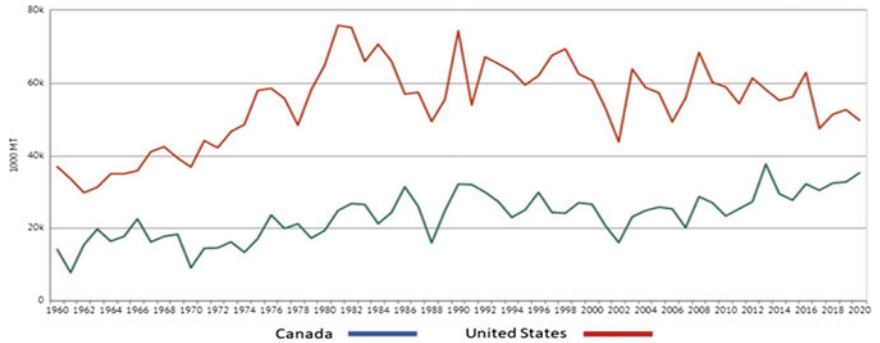


Fig. A3 Wheat production, tons/hectares, by country, 1961–2017. *Source* FAO (2021)

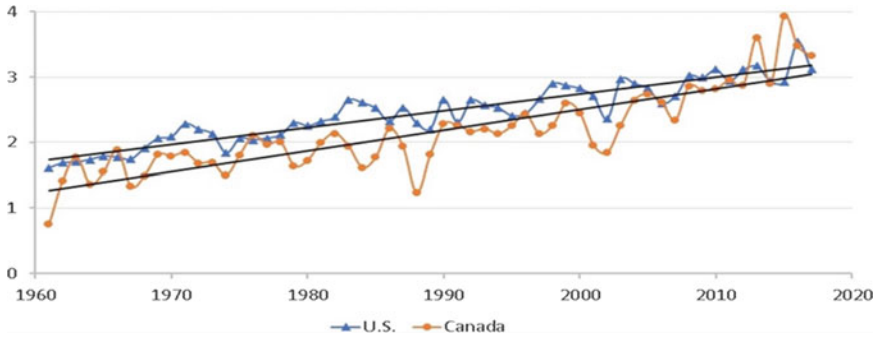


Fig. A4 Wheat yield, tons/hectare, by country, 1961–2017. *Source* FAO (2021)

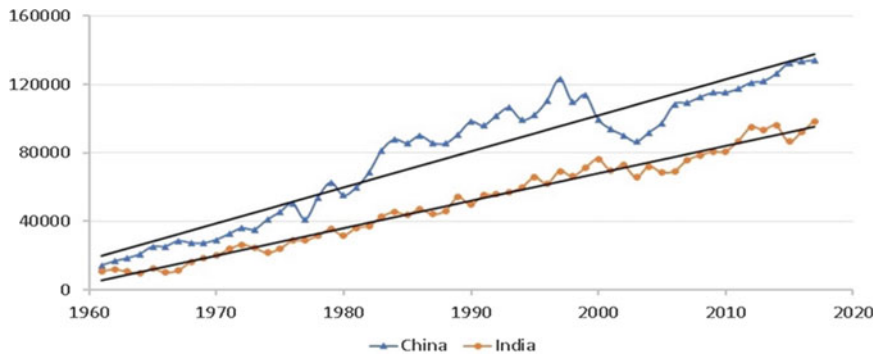


Fig. A5 Wheat production, thousand tons/hectare, by country, 1961–2017. *Source* FAO (2021)

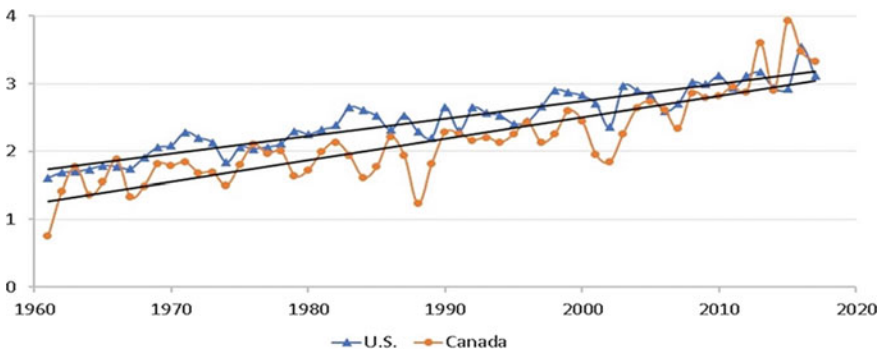


Fig. A6 Wheat yield, tons/hectare, by country, 1961–2017. *Source* FAO (2021)

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