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A Special Management Report From

Ag Equipment Intelligence

Russia, Ukraine & Kazakhstan

The State of Farm Technology in the Commonwealth of Independent States

An *Ag Equipment Intelligence* Staff Report

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The 12 Countries of the Commonwealth of Independent States

AEI SPECIAL REPORT
Russia, Ukraine & Kazakhstan: The State of Farm Technology in the CIS

"One John Deere combine is worth two Russian combines," is how Vladimir Kazarkin, director of a 50,000-acre farm in Kazakhstan, described the state of farm equipment technology in the countries that once made up the Soviet Union in a recent article from *Farm Industry News*.

Like Russia and the Ukraine, Kazakhstan is just now beginning to get back on its agricultural feet following the collapse of the USSR in 1992. While most observers agree that these countries continue to dramatically lag the West when it comes to farm technology and cropping productivity, they also agree that these three former Soviet states are making progress and possess significant potential to become major players in the worldwide ag market, especially in production of grains.

Despite years of false starts toward economic reform and ongoing institutional and political instability, at least some of the *Commonwealth of Independent States* (CIS) countries are beginning to emerge as places that U.S. and European companies with an eye toward growing worldwide no longer can afford to ignore.

> ***"At some point in the next 15 years or so, Russia will have a 5-year growth spurt when everything comes together and they will have 9% to 10% compounded growth."***

In an article in the November/December 2006 issue of *Corporate Board Member* magazine, author Randy Myers quotes Peter Morici, professor of international business at the Univ. of Maryland, as saying, "Russia is the next big emerging market. It has size, oil wealth and technology, and it will get organized to succeed."

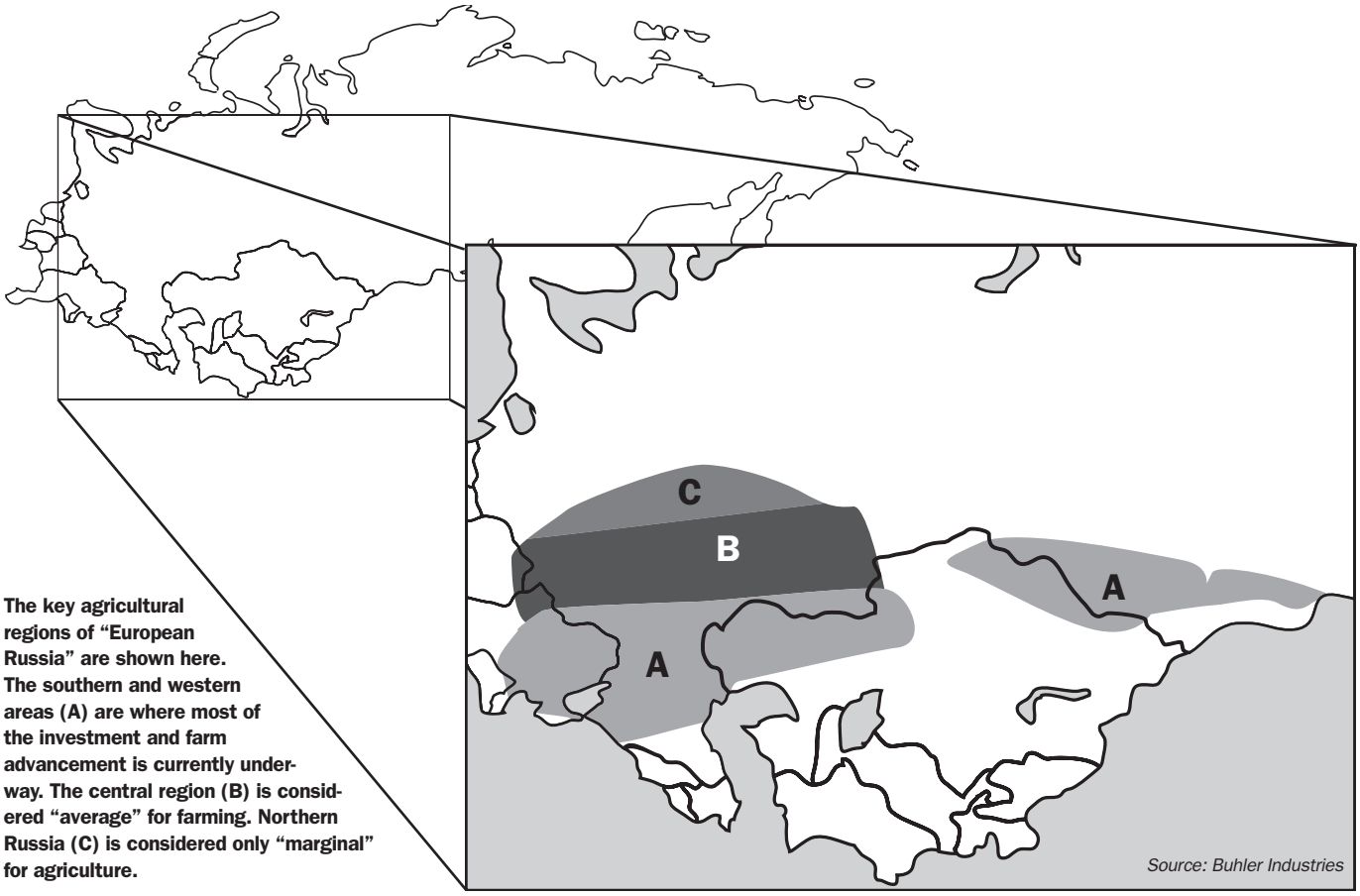
The article goes on to say that, despite its ongoing internal turmoil, Russia's recent performance has been stellar. "Since its financial crisis in 1998, the Russian economy has grown nearly 6% annually, including 6.4% last year."

Robert Kennedy, executive director of the William Davidson Institute at the Univ. of Michigan Business School, agrees that the potential of Russia and other CIS countries is tremendous, despite internal issues.

"They have a decent institutional infrastructure, fantastic natural resources and growing linkages to Western Europe," he says.

"Corruption and the business culture are still big problems, but at some point in the next 15 years or so, Russia will have a 5-year growth spurt when everything comes together and they will have 9% to

Map of Key Growing Regions in the CIS



The key agricultural regions of "European Russia" are shown here. The southern and western areas (A) are where most of the investment and farm advancement is currently underway. The central region (B) is considered "average" for farming. Northern Russia (C) is considered only "marginal" for agriculture.

Source: Buhler Industries

10% compounded growth."

Enormous Ag Potential

Not to be ignored among the wealth of resources found in the CIS countries are the vast expanses of rich, fertile farmland to the west, predominantly in Ukraine, Kazakhstan and Russia. Together with the volume of antiquated farm machinery in dire need of replacement and the relatively poor productivity of its farming practices, this is proving to be a fertile market for ag equipment suppliers.

It is estimated that the total production of ag machinery in Russia in 2006 amounted to $1.4 billion. At the same time, the industry imported $2.1 billion worth of equipment. This was up from $1.4 billion in 2005, which included 22,000 tractors imported from Belarus.

In addition to the leading European manufacturers, U.S. farm equipment makers are carving out their share of this rapidly emerging market.

The Assn. of Equipment Manufacturers calculates that Russia imported $281 million in American farm machinery products through June 2007, a 112% increase from the previous year. Ukraine had $142 million in American-made machinery purchases through the first half of 2007, a 113% increase over the previous year.

So, it should come as no surprise that full-line manufacturers such as John Deere and AGCO, along with shortliners like Krause Corp. and Amity Technology, are hustling to establish a foothold in the agricultural regions of the CIS.

John Deere, the world's largest supplier of farm equipment based in Moline, Ill., has been doing business there since 2003 when it opened an office to explore sales and investment opportunities. In 2005, Deere started assembling tractors in Orenburg, 800 miles southeast of Moscow, and it has set up spare parts outlets in Moscow and St. Petersburg.

On April 1, 2008, the company announced that it is planning to invest nearly $80 million in a central operations center in Russia. The new facility will include a distribution center for replacement parts, a training facility and the possibility for local production in the Kaluga region, also southwest of Moscow. The new 98-acre facility is scheduled to be operational in 2010.

"The site will leave room for further expansion potential as our business in Russia continues to grow," says Mark von Pentz, president of Deere's ag division for Europe, Africa and South America. "As an interim step for further investments, it also contains a provision for local assembly and manufacturing at a later stage."

In May 2006, Duluth, Ga.-based AGCO Corp., with an already strong presence throughout Europe, extended its influence when it announced a

joint-venture company in Russia. AGCO SM Group, which is comprised of a partnership between AGCO and the SM Group, is responsible for the distribution of the company's Fendt- and Valtra-branded equipment throughout Russia and Kazakhstan. AGCO has a 51% ownership stake in the joint venture.

The SM Group is an expert within the Russian market. The Russian firm owns the Yenisey combine factory in Krasnoyarsk, the number two combine manufacturer in Russia. It also has a partnership interest in Agromash Agricultural Machinery.

AGCO SM Group was developed to focus on distributing Fendt and Valtra tractors above 150 horsepower, Fendt combines and associated AGCO tillage and planting equipment to areas with the largest growth potential.

"This is a significant step in AGCO's investment into one of the world's fastest growing regions," said Gary Collar, senior vice president and general manager of AGCO's Europe-Africa-Middle East region. "We have seen the market for Western agricultural machinery increase 150-200% in the last 2 years."

According to Collar, AGCO already enjoyed a strong distribution network for its Challenger and Massey Ferguson brands in the region.

Case IH, based in Racine, Wis., has also made headway in the CIS market. In August 2006, it obtained a $55 million order to supply Turkmenistan, via a local distributor, with 220 farm tractors and 100 cotton pickers.

Shortliners Also in the Market

But it isn't only the big-name manufacturers that are making strides in establishing themselves in the CIS market. Krause Corp., a shortline manufacturer of farm tillage equipment based in Hutchinson, Kan., began exporting tillage equipment to Russia in 2006 and was recognized by the U.S. Dept. of Commerce for its pioneering work in that market.

Unlike Deere, which is setting up its own operation, or AGCO with its joint-venture approach, Krause Corp.'s market entry is through a direct relationship with a Russian ag equipment dealer. According to Richard Brown, president & COO, a broker might have charged 10%, so working with a dealer directly has helped Krause keep its equipment costs competitive.

But compared to Amity Technology of Fargo, N.D., most other farm machinery manufacturers are Johnny-come-lately's to the CIS market.

Since 1991, Howard Dahl, president of the company, has made at least 50 trips to the CIS developing the market for his sugar beet harvesting equipment, according to a report in the January 21, 2008 edition of *Agweek*.

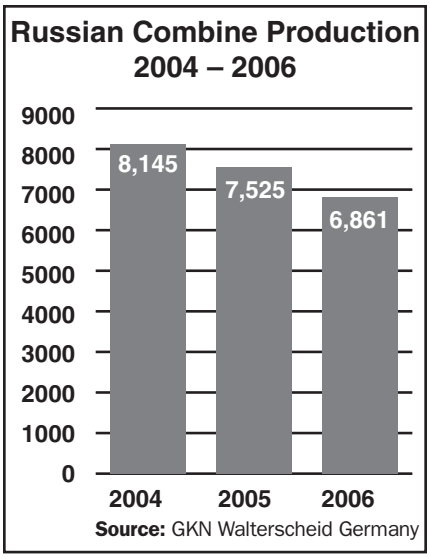
Since the breakup of the Soviet Union, Dahl says Amity has had more than $150 million in sales to Kazakhstan, Ukraine, Russia and Azerbaijan, including $50 million in the last 2 years.

The North Dakota Trade Office says exports of farm machinery produced in the state to Russia and Ukraine have risen from $1.2 million in 2001 to $81 million in 2006. Sales for the first 9 months of 2007 totaled $98.9 million.

"Consensus appears to place the overall level of farm technology and productivity of CIS growers 30-40 years behind that of the best Western producers."

CIS Technology Lagging

Much of the opportunity for Western manufacturers of ag machinery in the CIS market exists because of the world-class quality of American and Western European farm machinery compared with to that produced in the Former Soviet Union (FSU). Consensus appears to place the overall level of farm technology and productivity of CIS growers 30-40 years behind that of the best Western producers.



Between 2004 and 2006, overall production of combines in Russia dropped nearly 16%, while Combine Factory Rostselmash's market share grew from 54% to more than 71%.

Nickolay Ryabov, an attorney and international business specialist for Amity Technology, said in the *Agweek* report that there's a strong preference for U.S.-made farm equipment in the CIS. He explains that it has made farming much more efficient in Russia and is considered by Eastern European farmers as the best engineered and most reliable in the world.

"Farmers don't care about politics," says Ryabov. "They want the same thing as here. They like the product."

Nonetheless, like the CIS growers intent on upgrading farming practices, equipment manufacturers are focusing on improving the quality and productivity of their machinery — whatever it takes.

Evidence of this came in the acquisition of Buhler Industries by Russian combine maker Rostselmash Ltd. in November 2007. Rather than wait until it could develop the technology and manufacturing capabilities to compete at a world-class level, the Russian firm chose the acquisition route to satisfy growing customer demand for more productive and efficient farm machinery.

Rostselmash, a major combine manufacturer located in Rostov-on-Don, Russia, claims to produce over 17% of all the combines in the world. It currently has a distribution network

of over 200 Russian dealers.

Buhler, Canada's largest farm equipment maker, is best known for its high-powered Versatile row-crop tractors. John Buhler, who held a majority of the shares in the company when it was sold, said following the sale, "They needed a tractor for their 200 dealerships in Russia. They wanted the higher technology equipment and they wanted to control it."

Playing Catch-Up

While the level of agricultural technology in CIS countries remains poor, the industry is going through a major consolidation — both in farming and equipment manufacturing — in an effort to raise its productivity to the benchmark levels being achieved in high-performing Western countries.

In his assessment of the farm machinery sector in the CIS, Peter Rottgen, managing director of GKN Walterscheid Germany, told members of the Farm Equipment Manufacturers Assn. last fall that the industry essentially collapsed during the last decade. He estimates that of the nearly 700 manufacturers in the CIS that previously produced equipment for agriculture, only about 100 survived.

GKN's off-highway division manufactures systems and components for farm machinery, ranging from axles and driveline systems to wheels and tractor attachments. The division had sales of $810 million in 2007.

Rottgen says that only a handful of strong CIS manufacturing groups, like Rostselmash and Agromash, will dominate and absorb a lion's share of ag machinery manufacturing throughout the Former Soviet Union (FSU).

In the meantime, imports of farm equipment will grow substantially, with most being of the high-end, high-horsepower variety. According to Rottgen, 90% of CIS imported tractors today are over 200-horsepower.

While attempts to increase import duties for specific machinery have been pushed, most failed due to WTO agreements.

"Although the lower horsepower and economy type of machinery will remain in local production," Rottgen says, "manufacturers in Russia are keen to upgrade their machinery in a short period of time in terms of horsepower and harvesting efficiency.

"Greenfield [new] production of equipment has only been successful in terms of assembly because domestic supplies of raw materials and components are still not available," he adds.

With an increasing recognition of the benefits of Western machinery, a window of opportunity for "double digit" sales growth exists over the next several years, according to Rottgen.

Over time, Western suppliers will be pressured to localize production, which he contends will be beneficial, as it will provide access to the fast-growing markets in Eastern and Central Europe. "Central Europe and the Baltics are becoming like the Western European market," says Rottgen.

Getting established in most CIS nations is still heavily dependent on developing "connections" within the country. He adds that major growth in the area will be closely linked to the quality of distribution and the ability to offer retail financing.

The need for parts and service support is also critical to increasing sales volume in these countries as well. According to Rottgen, these needs are already outstripping the ability of local manufacturers and distributors to provide support.

The Ag Equipment Market in the CIS

Under the centralized, controlling influence of the Soviet Union, farm machinery was readily available to growers throughout the USSR for decades. But with no one but themselves to benchmark against, the technology of ag equipment remained years, if not decades, behind that of advanced nations.

With the government meting out subsidies to growers, setting quotas and directing manufacturers as to how and what equipment to be built, the entire industry suffered from stagnant development and a lack of incentive to advance. As one professor from Soviet-controlled Romania described the situation, "We pretended to work and they pretended to pay us."

Production volume was the only standard by which most manufacturing was measured. Neither efficiency nor profitability was considered in the equation of manufacturing success.

Some estimate that compared to the equipment used in North America and Western Europe, the technology of the farm machinery used by most CIS farmers is akin to what was considered state of the art in the 1960s.

"Russian manufacturers in 2006 met less than one-third of the market's need for tractors."

When the Soviet Union collapsed in 1992, it took with it much of its vaulted manufacturing capacity. Without government subsidies or artificially maintained markets to support the inefficient operations, the new CIS countries have relied on imported equipment to get them back on their feet.

Rottgen estimates that it is in only the production of combines that Russian manufacturers are capable of meeting the needs of the expanding local markets in the CIS, thanks in large part to the focused efforts of Rostslemash. Even here, most observers agree that combine technology is years behind that being used in the West.

Beyond this he estimates that in all other major categories of ag equipment, current levels of Russian manufacturing lack the capability of meeting the domestic requirements of CIS farmers.

As shown in Table 1 on page 7, Russian manufacturers in 2006 met less

than one-third of the market's need for tractors. Growers relied on imported equipment for not only equipment volume, but for the advanced technology needed to replace its outdated and deteriorating machinery.

In 2006, imported machinery accounted for nearly 30% of forage harvesters, hay tools and balers needed by CIS growers. Rottgen estimates that 20% of tillage equipment and 60% of planting/seeding machinery requirements were filled by imports. In that year, he also noted that nearly all (98%) of Russian growers' fertilizer application equipment was supplied by imports.

In the case of Russia and the Ukraine, Germany was the leading supplier of farm machinery, supplying 36% of Ukraine farming needs and 32% of Russian equipment. North American manufacturers' exports of ag machinery accounted for 13% of Ukraine's requirements and 17% of Russia's.

He estimates that only 30% of German farm equipment is used in the German market, while the remainder is exported.

CIS Manufacturing Responding to Demand

While much of the manufacturing base that previously produced farm machinery has disappeared since the Soviet Union was dissolved in the early 1990s, those remaining companies are making a concerted effort to expand their operations to not only meet local demands but to compete on a worldwide basis.

One such firm is Combine Factory Rostselmash Ltd.

Rostselmash, located in Rostov-on-Don, Russia, is the CIS's largest combine manufacturer, producing 17% of the total world production of combines and 75% of those used in the FSU.

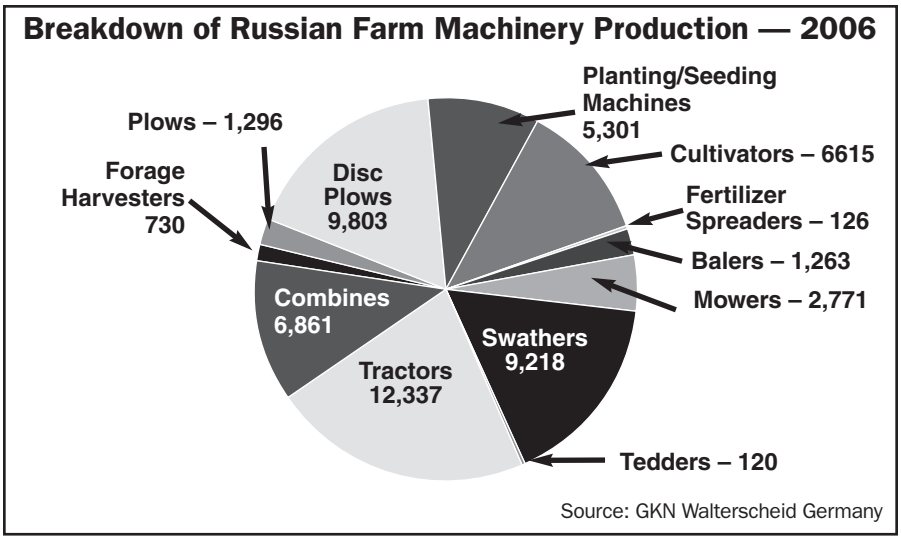
In November 2007, Rostselmash culminated its acquisition of Buhler Industries, Canada's largest farm equipment maker, best known for its high-horsepower Versatile-branded tractors.

Following the acquisition, Dmitry Lyubimov, an executive from Rostselmash, took over the reins at Buhler and has since increased R&D spending, bolstered its support staff (including the addition of parts and service specialists) and is making it known that the company aims to increase its international presence.

During this fiscal year (October 1 2007 to September 30, 2008), Buhler's plans call for 40% of its tractor production to be sold in North America and the remainder available for export. The company expects to split production 50/50 during its 2008-09 fiscal period.

Lyubimov told *Ag Equipment Intelligence* that he sees Russian manufacturers increasing their investment to upgrade Russian-made equipment and to improve distribution channels.

"Russian manufacturers are



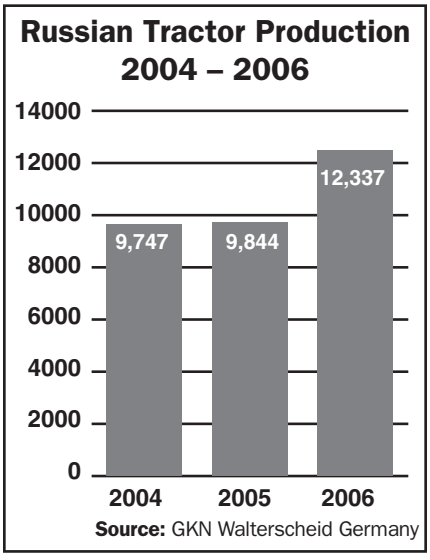
Note the production of 12 types and volume of farm equipment produced by Russian manufacturers in 2006.

Russian Manufacturing Capacity — Farm Machinery

	Local Mfg. Capacity	Local Market Needs	Local Prod./Mrkt Share
Tractors	12,337	38,706	31.9%
Combines	6,861	6,345	108.1%
Forage Harvesters	730	1,007	72.5%
Tillage Tools	11,099	13,813	80.4%
Planting/Seeding Equipment	5,301	12,306	43%
Fertilizer Spreaders	126	7,417	1.7%
Hay Tools	12,049	16,402	73.5%
Balers	1,263	1,711	73.8%

Table 1. Except for combines, Russian manufacturing lacks the capacity to meet CIS farmers' expanding needs for new ag equipment.

Source: GKN Walterscheid Germany



While Russian production of tractors rose by nearly 27% between 2004-06, the manufacturing of combines fell nearly 16%.

investing in the development of new models with more options and modern features," says Lyubimov. "At the same time, they are also working to build and strengthen partnerships with their dealer network."

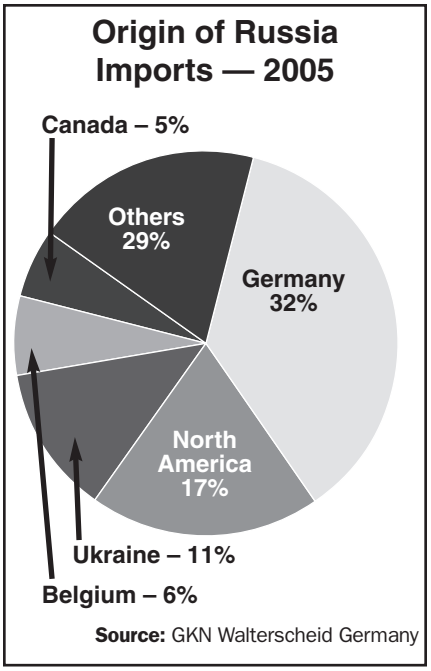
He adds that expansion efforts will go beyond just meeting the growing needs of CIS farmers, and will target world markets.

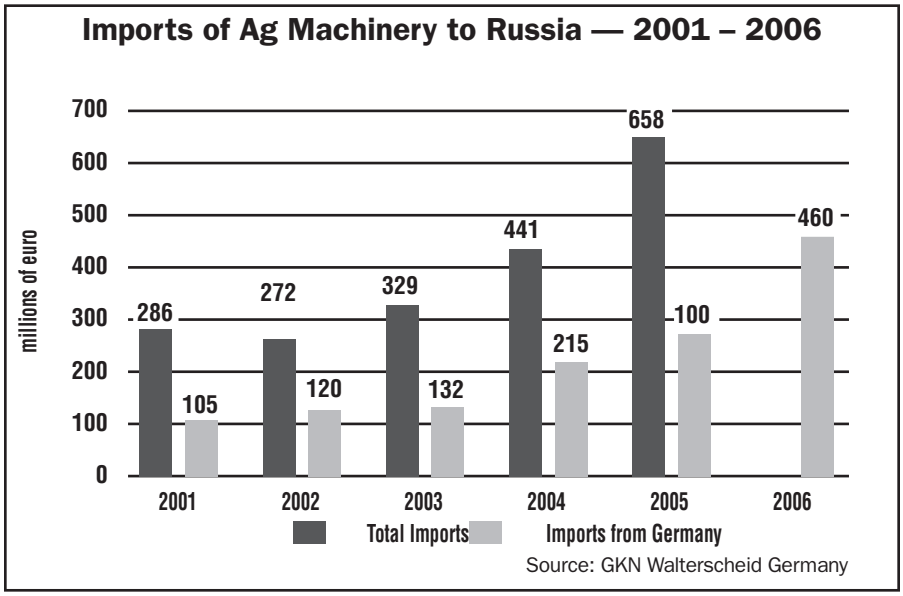
Lyubimov explains that Russian manufacturers are using two expansion strategies to meet growing domestic needs. In one case, Russian company Kamaz acquired the McCormick plant in the UK from ARGO and moved the production line to Russia.

"They will use Kamaz engines and components and they did this to first serve the Russian market," says Lyubimov.

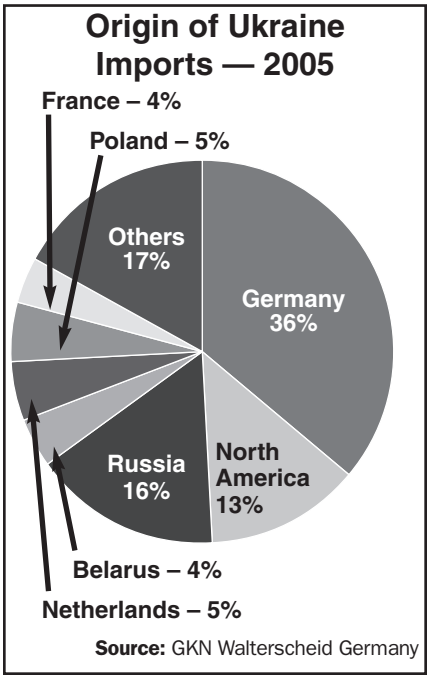
On the other hand, he says, "the Rostselmash strategy was the acquisition of Buhler Industries, but Rostselmash is focused on global expansion, not just growing in Russia. We will build Buhler tractors in North America for a global market and this will help meet the demand for tractors in Russia."

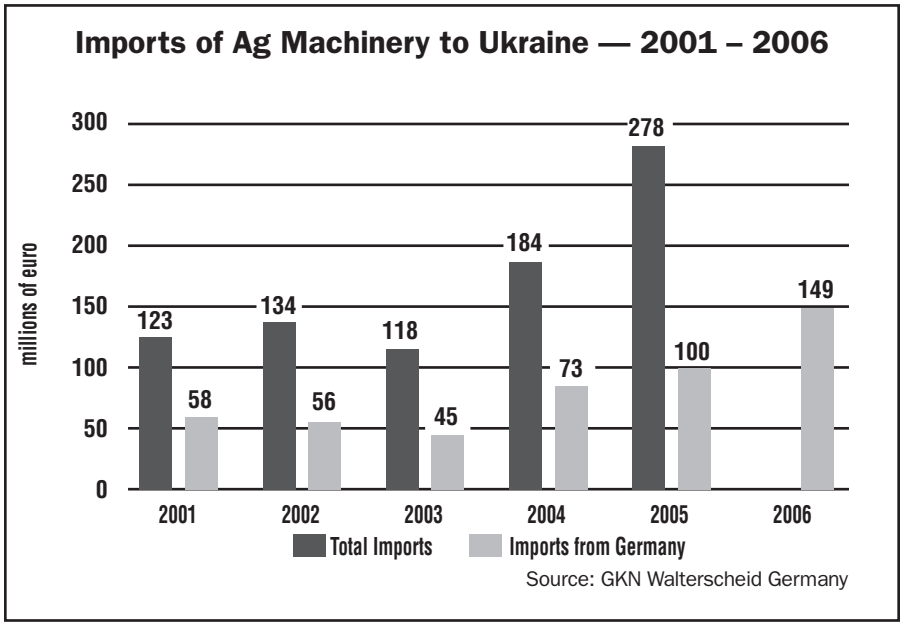
Even with CIS manufacturers' efforts to grow their manufacturing





Nearly half of all the farm equipment imported into Russian in 2005 was manufactured by German and North American manufacturers. That year, Russian growers purchased machinery valued at 658 million euro.





In 2005, Ukrainian growers purchased an estimated 278 million euro worth of ag equipment from foreign manufacturers. Chief among these were machinery makers in Germany and North America.

capabilities, the demand for farm machinery in the CIS countries isn't expected to slow for some time to come.

Olga Hall, international marketing manager for Titan Machinery LLC, a 42-store dealership group headquartered in Fargo, N.D., has been heading up the company's efforts in the CIS, particularly in exporting equipment to the Ukraine, since 2004. She describes the current demand for equipment in the CIS as "unbelievable."

Hall maintains that, "Factory production here is sold out mostly because of the CIS countries. This year alone, the dealer we're working with in the Ukraine is bringing in 200 new combines to meet market demand."

While the technology of the equipment manufactured in Russia, particularly combines, have improved significantly in recent years, Hall says, growers are still heavily dependent on European and American-made machinery.

"Compared to the Ukraine and Kazakhstan, Russia is still quite protective of their local industry," says Hall. "They allow imported equipment into the country, but they still emphasize local production."

The Evolving Distribution Network

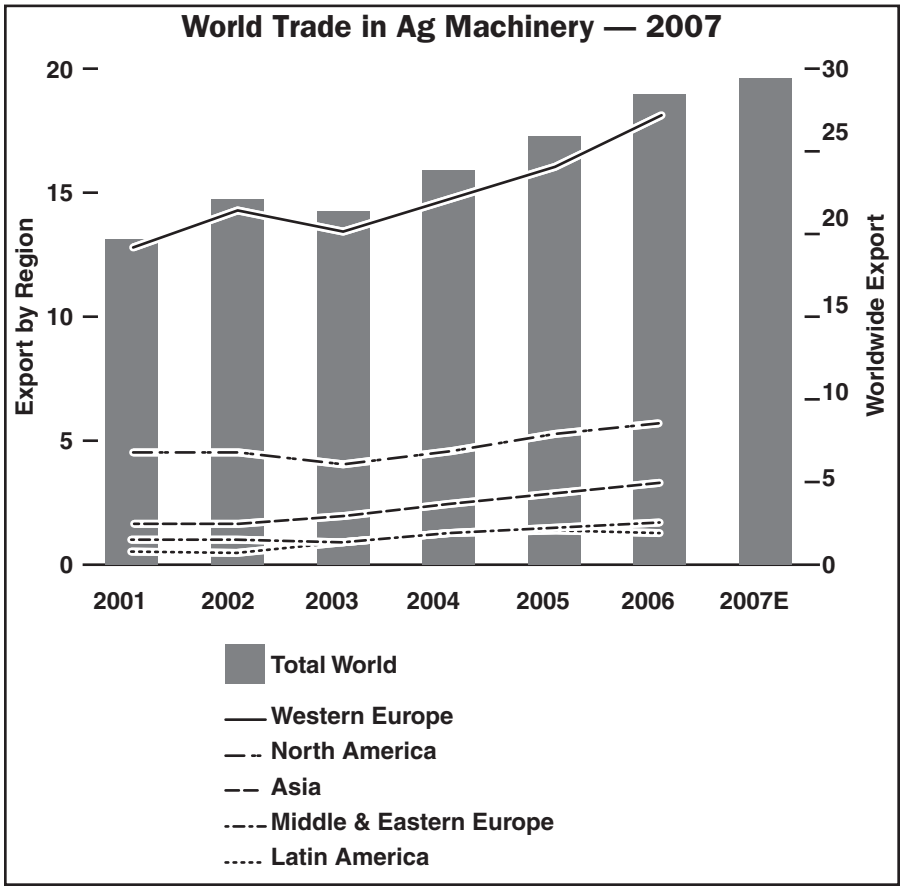
Titan Machinery's direct involvement in the Ukraine dates back to 2004 when it began exporting used combines through a distributor. Titan, the largest dealer of Case IH equipment in North America, was initially looking for new markets for its larger, used machinery.

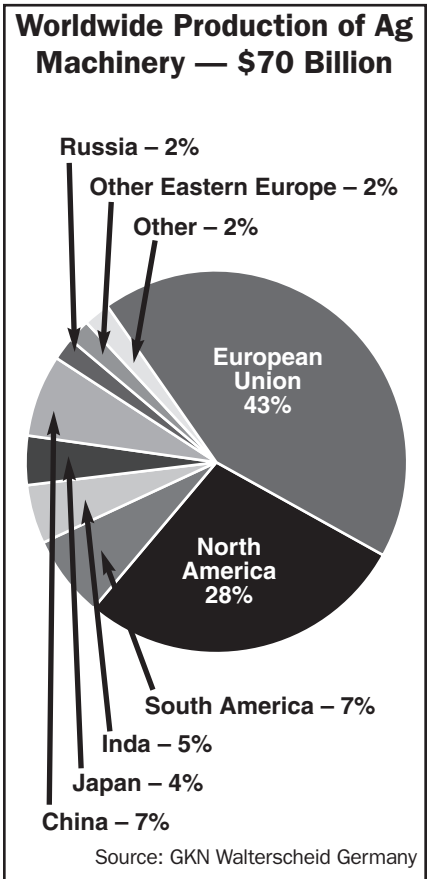
That's the same year that Hall joined Titan. She is a native of Siberia in the eastern part of Russia, received her Master's degree in international business from Texas Tech Univ., and worked for John Deere for 4 years before joining Titan Machinery.

As the Ukrainian economy rapidly developed and expanded, its farming operations grew just as quickly. Today, Ukraine farms typically span 25,000 to 50,000 acres, with some over 250,000 acres.

As a result, Ukraine growers put a lot of hours on the equipment they purchased a few years ago and are now looking for new, even more productive machinery.

The distributor Titan was working with has since become a full-fledged dealer handling Case IH equipment. "They originally distributed all kinds of equipment and we were full suppliers to them," says Hall.





Source: GKN Walterscheid Germany

In 2006, it is estimated that worldwide manufacturers of farm equipment produced $70 billion of product. Equipment makers in the European Union and North America accounted for over 70% of all shipments.

According to Peter Rottgen of GKN Walterscheid Germany, a major manufacturer of components and systems for farm machinery, the value of worldwide exports of ag equipment grew at annual rate of 11% between 2001 and 2007. The value of exports during that period rose to $40 billion from $23.5 billion.

"Since they've become a Case dealer, they are able to purchase major equipment —combines, tractors, etc. — straight from the company.

"In the meantime, we've provided them with support in terms of farming techniques and in managing their dealership. They continue to purchase shortline equipment and parts along with some used Case IH equipment from us. Their service technicians have come here and we've helped train them."

Dealer Networks Taking Shape

In large part, the ability of CIS growers to live up to the potential that their fertile land offers will be dependent on the evolution of the equipment distribution network, not only for its ability to meet product demands, but to supply parts and service as well as to impart agronomic knowledge.

According to Hall, the market in the CIS is now passing through the initial stages of its natural development.

"When the market was ready to purchase agricultural equipment, distributors emerged to sell combines and tractors, collected their money and the transaction was considered finished. This was what was happening in Russia, Ukraine and Kazakhstan for awhile," Hall explains.

Most of the larger farming operations in the CIS are moving into the second stage of distribution development and are asking for more than just a sale.

"In this stage," Hall says, "customers are asking for a good price, but more importantly, for aftermarket support. This is where we've started seeing independent dealers stepping into the picture.

"What we're seeing in the Ukraine — I don't think they're seeing it as much in Russia or Kazakhstan yet — is the third level, where they are ready for customer trade-ins. This is happening because the market has enough used machinery — not worn-out equipment ready for the junkyard — and customers are willing to trade and dealers are willing to take trades. We are now working with our partner in the Ukraine to help them assess the value of used machinery."

Hall adds that dealer networks are now developing in the CIS, where Case IH, New Holland and John Deere have begun to develop their distribution channels in Russia and the Ukraine. For the most part, equipment is retailed in Kazakhstan through exclusive distributors of Case IH and John Deere equipment.

"The ability of CIS growers to live up to the potential that their fertile land offers will be dependent on the evolution of the equipment distribution network."

She also notes that European manufacturers have made dealership inroads, particularly in Russia, where companies like Claas have established a network of dealers.

Nonetheless, Hall points out that dealers remain few and literally far between in the CIS countries.

"There are still only two Case IH dealers in the Ukraine and they're just beginning to understand competition," she says. "Sometimes our partner complains about fighting with the other Case dealer in the country. We have to remind them they need to focus on providing value to their customers and focusing on their competitors selling other colors rather than worrying about other dealers of the same brand. They're not used to competition yet."

Aftermarket Support Under Pressure

The evolution of the dealer networks throughout the agricultural regions of the CIS is bringing additional pressure to bear on equipment manufacturers as growers expect a much higher level of after-sale support.

"With wholegoods in such demand, there is tremendous pressure for parts and service support. The biggest challenge is that dealers are still being trained on how to properly service the newer equipment," says Hall.

But with today's more sophisticated machinery, Hall says getting dealers in the CIS up to speed takes a concerted effort.

"Most dealers have people who are mechanically talented," she says. "But with today's advanced technology with sensors and computer diagnostics, it will take some time."

For this reason, in some cases, manufacturers will provide CIS customers with equipment that is no longer offered in North America or Western Europe.

"Case IH still manufactures the 2388 combines because they've been very dependable and reliable combines in that part of the world but it is a model that has not been offered in the States for a while," Hall says. "Right now, those growers don't need all the bells and whistles that customers here want or are required to run because of emission control requirements, but they're catching up with us."

Lyubimov says that prior to the collapse of the Soviet Union, servicing farm machinery was not an issue.

"In the USSR, the service was very good, but in the last 20 years, some of the service stations have closed because of lack of investment. Because it's a big country, it could take weeks to deliver some parts, so the service and parts network has not met the demand."

He believes manufacturers will need to play a major role to support CIS dealerships in developing aftermarket services.

"Today, farm equipment manufacturers must partner with dealers to provide better service and parts availability. For example, the Rostselmash support program expects no more than a 24-hour delay in getting service and parts to the field. To do this, Rostselmash expects dealers to invest in service vehicles and parts supplies. At the same time, Rostselmash is also investing in its dealerships by sharing some of the costs."

Farming Practices in the CIS: Miles to Go

When Peter Christianson, president of Titan Machinery, first visited the Ukraine in 1998, he noted that its farmers were using equipment that dated back to the 1950s. That may have been a positive compared with the accepted farming practices throughout the CIS countries.

Despite the obvious richness of the soils, decades of intensive tillage and an absence of modern agronomic practices has left CIS growers well behind the benchmarks of productivity, yield and land stewardship that are being achieved by North American and Western European growers.

CIS Farming: Getting Back to Agronomy 101

Farm equipment manufacturers with the aim of establishing a long-term presence in the CIS will need to provide more than equipment. Describing the current knowledge of cropping practices in the CIS, Titan Machinery's Hall says, "Many of those guys don't know what they don't know."

"Farm equipment manufacturers with the aim of establishing a long-term presence in the CIS will need to provide more than equipment."

Titan, which last year hosted a 5-day event for 45 Ukrainian growers in North Dakota, has taken on the role of consultant, teacher and mentor to not only its dealer-partner there, but many of the dealership's customers as well.

In a gesture of reciprocity, Titan has also attended field-day events in the Ukraine during the past few years and seen first-hand how many of the farmers there are starved for knowledge of modern agronomy practices.

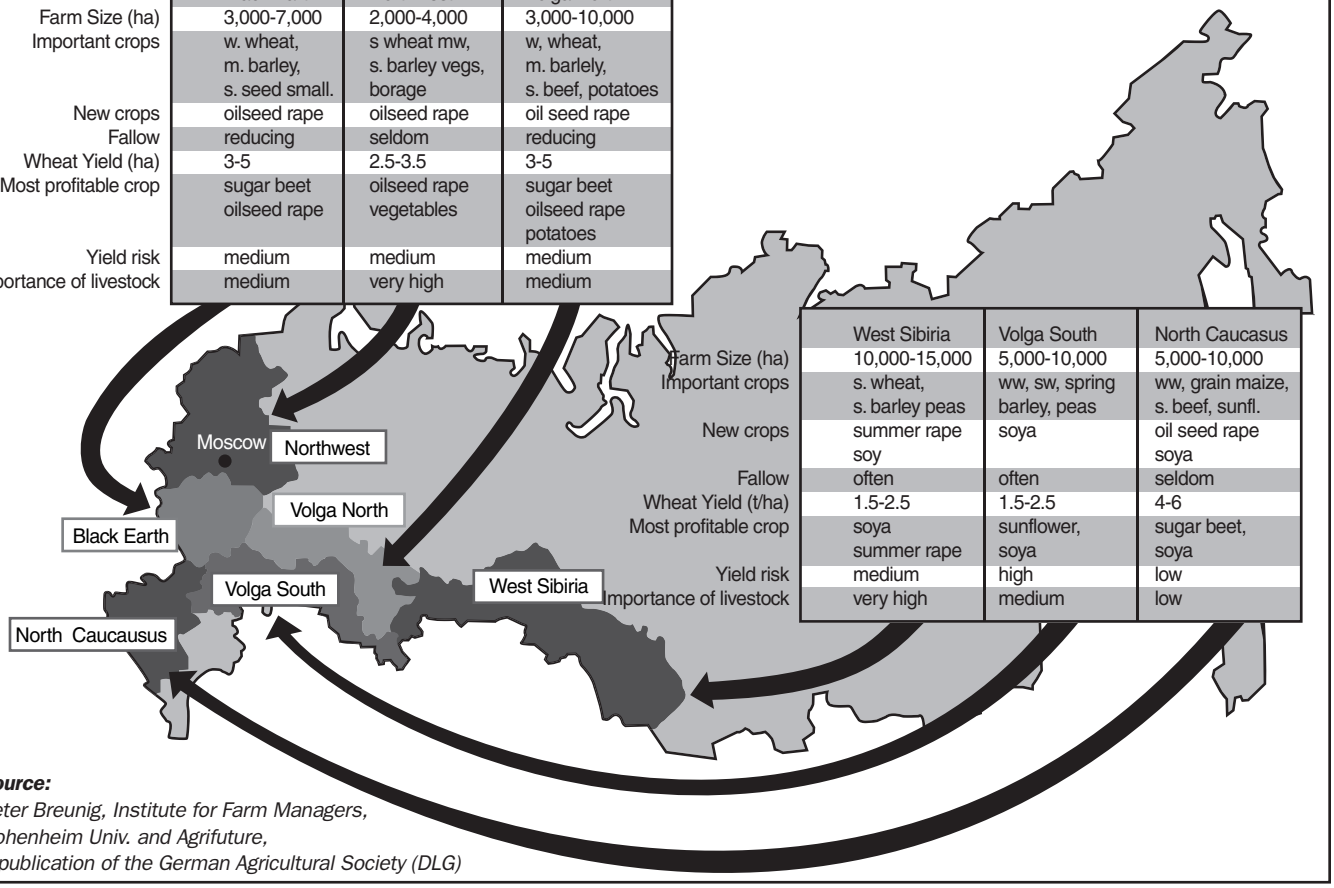
Hall says, "They come over here and start grabbing a little from here and a little from there and it takes time to put everything together when they get back. It's like Agronomy 101. They're starving for knowledge. They're learning and we can see the results of the changes they're making already. They're going in the right direction."

Of the farmers in the three countries, Hall says those in the Ukraine

MAJOR AGRICULTURAL REGIONS OF THE CIS

	Black Earth	Northwest	Volga North
Farm Size (ha)	3,000-7,000	2,000-4,000	3,000-10,000
Important crops	w. wheat, m. barley, s. seed small.	s wheat mw, s. barley vegs, borage	w, wheat, m. barlely, s. beef, potatoes
New crops	oilseed rape	oilseed rape	oil seed rape
Fallow	reducing	seldom	reducing
Wheat Yield (ha)	3-5	2.5-3.5	3-5
Most profitable crop	sugar beet oilseed rape	oilseed rape vegetables	sugar beet oilseed rape potatoes
Yield risk	medium	medium	medium
Importance of livestock	medium	very high	medium

	West Sibiria	Volga South	North Caucasus
Farm Size (ha)	10,000-15,000	5,000-10,000	5,000-10,000
Important crops	s. wheat, s. barley peas	ww, sw, spring barley, peas	ww, grain maize, s. beef, sunfl.
New crops	summer rape soy	soya	oil seed rape soya
Fallow	often	often	seldom
Wheat Yield (t/ha)	1.5-2.5	1.5-2.5	4-6
Most profitable crop	soya summer rape	sunflower, soya	sugar beet, soya
Yield risk	medium	high	low
Importance of livestock	very high	medium	low



Source:
Peter Breunig, Institute for Farm Managers, Hohenheim Univ. and Agrifuture, a publication of the German Agricultural Society (DLG)

Virtually all of the significant agricultural activities in CIS countries centers on eastern Russia, Ukraine and Kazakhstan.

are considered to be slightly more advanced and open to new ideas and techniques than are growers in Russia and Kazakhstan. "Kazakhstan is more like a true Soviet country in terms of culture, systems and education than the Ukraine, and are typically more resistant to change," she says.

"The old habits and techniques are very embedded in their farmers."

Correcting Sins of the Past

One of those "old habits" is that of moldboard plowing and other poor tillage methods that some estimate has severely affected more than 300 million hectares (740 million acres) because of wind and water erosion and 170 million hectares (420 million acres) by soil compaction.

Land degradation has resulted in the loss of soil nutrients and organic matter, and is a significant factor adversely affecting crop yields and overall agricultural growth throughout the CIS.

In 1999, the International Center for Agricultural Research in the Dry Areas (ICARDA) arrived at the following conclusions in its research of CIS agricultural practices:

"Inflexible tillage operations and a short window for tilling and harvesting, coinciding with extreme weather, often result in tilling and plowing operations during wet periods. Ineffective machinery needs to make, on average, several passes over the soil to prepare it for seeding. Estimated production losses as a result of soil compaction differ. Conservative estimates calculate a production loss of 15 million tons of grain, 2 million tons of sugar beets and 500,000 tons of maize. Others calculate a 16-27% decrease in production as a result of soil compaction, with a loss of 50 million tons in grain production alone."

Making Progress

Hall says CIS farmers have plowed the land for generations and it's difficult to get them to understand that "deeper is not better."

She adds that the belief that they

USDA'S PROJECTIONS FOR RUSSIA'S WHEAT AND BARLEY PRODUCTION AND USE — 2006 – 2017

RUSSIA WHEAT — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	23700	1.895	44900	861	10790	36400	2380
07/08	24500	1.959	48000	1000	12000	37200	2180
08/09	24472	1.950	47733	1000	12200	36579	2134
09/10	24472	1.955	47839	1000	12700	36085	2188
10/11	24373	1.969	47983	1000	13200	35802	2168
11/12	24334	1.985	48299	1000	13699	35611	2157
12/13	24388	2.003	48861	1000	14200	35638	2181
13/14	24481	2.022	49498	1000	14700	35762	2217
14/15	24583	2.041	50184	1000	15200	35940	2262
15/16	24692	2.061	50899	1000	15700	36149	2313
16/17	24810	2.082	51650	1000	16276	36329	2357
17/18	24933	2.104	52447	1000	17012	36407	2385

RUSSIA BARLEY — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	10000	1.810	18100	200	1547	16400	1226
07/08	9800	1.735	17000	200	1600	16100	726
08/09	10047	1.762	17704	200	1600	16129	902
09/10	10057	1.776	17856	200	1600	16202	1155
10/11	10128	1.785	18081	200	1600	16677	1160
11/12	10147	1.795	18217	200	1600	16807	1169
12/13	10102	1.801	18193	200	1600	16783	1180
13/14	10026	1.806	18106	200	1600	16698	1189
14/15	9961	1.812	18049	200	1600	16640	1198
15/16	9890	1.818	17977	200	1600	16567	1209
16/17	9805	1.823	17872	200	1600	16462	1218
17/18	9720	1.829	17777	200	1600	16368	1227

Source: *USDA — Units are 1,000 hectares for area; metric tons per hectare for yield; and 1,000 metric tons for other variables.*

need to plow is so ingrained in farming practices that it has taken Titan some years to get them to even consider other methods.

For example, when Titan first started working in the area, combines didn't have spreaders or choppers. They just assumed they could deal with the residue by plowing it up, says Hall.

"It has taken us quite a while to retrain some of the bigger customers that deeper is not better. When we held our field days here we discussed compaction and we've done the same kind of training in the Ukraine.

"We explain that when they plow, they're creating another compaction layer, but with equipment like rippers, they can achieve the same result without the compaction created by plowing.

"We've done soil profiles to show them the layers of natural compaction and man-made compaction," she says. "We demonstrate that the shank should not go any further than a couple of inches below the compaction layer. We tell them, 'You'll save on fuel, go faster and achieve much higher efficiency. The result is as good or better than deep plowing.'"

Hall says Ukraine growers are starting to understand. "The last couple of years the sales of rippers have been unbelievable in the Ukraine. This is a good example of people learning to use more efficient and modern practices."

And this, she believes, is what equipment manufacturers will need to do if they're to establish themselves as viable suppliers to growers throughout the CIS.

Big Land, Big Equipment

Another trend that bodes well for American and European manufacturers is the trend toward larger equipment in the major agricultural regions of the CIS.

"The farmland there, especially in the Ukraine, is unbelievable," says Hall. "There are thousands and thousands of hectares of rich, black soil and arable land. They need and want high horsepower equipment and wide implements."

USDA'S PROJECTIONS FOR RUSSIA'S CORN & SOYBEAN PRODUCTION AND USE — 2006 – 2017

RUSSIA SOYBEANS — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	815	0.908	740	33	3	782	10
07/08	850	0.918	780	20	5	790	15
08/09	881	0.966	851	29	3	874	18
09/10	894	0.972	868	59	3	924	18
10/11	899	0.988	888	18	3	903	18
11/12	905	1.001	906	0	9	897	18
12/13	913	1.016	928	0	16	911	18
13/14	922	1.028	947	0	8	939	18
14/15	925	1.038	960	2	3	959	18
15/16	927	1.049	973	12	3	981	18
16/17	929	1.061	986	19	3	1002	18
17/18	931	1.072	999	25	3	1020	18

RUSSIA CORN — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	1000	3.600	3600	150	100	3600	194
07/08	1300	2.692	3500	200	100	3600	194
08/09	1264	3.120	3944	190	150	3886	292
09/10	1294	3.303	4275	180	200	4154	393
10/11	1307	3.341	4368	180	250	4250	441
11/12	1290	3.370	4346	180	300	4232	436
12/13	1269	3.400	4315	180	350	4172	409
13/14	1255	3.429	4302	180	400	4110	381
14/15	1250	3.460	4323	180	450	4069	365
15/16	1246	3.491	4349	180	475	4056	362
16/17	1239	3.521	4362	180	500	4045	360
17/18	1233	3.554	4383	180	525	4038	359

Source: *USDA — Units are 1,000 hectares for area; metric tons per hectare for yield; and 1,000 metric tons for other variables.*

According to Hall, Russia, Kazakhstan and Ukraine are similar as far as moving toward the use of large, high horsepower equipment. When Peter Christianson made his first trip to the Ukraine in 1998, the largest tractor he saw was a 200-horsepower Case IH Magnum.

During the past 4 years, they've seen a decided trend toward the 500-horsepower STX model units. "Now they're asking for 550 and 600 horsepower tractors," Hall says. "And they want really wide implements, like 70-foot harrows, to justify the horsepower."

Despite their appetite for new and bigger machinery, first and foremost, CIS farmers "need to catch up on all the modern farming techniques," says Hall. "Their basic needs still center around proper farming methods: how to properly rotate their crops, what equipment to use and how to use it efficiently.

"It's like a chain," she adds. "You need every link attached properly. As soon as they learn about good farming practices, they realize what they were lacking and what needs to be corrected. This is where good dealers and equipment suppliers can help by providing them with good and proper equipment, and teaching them about correct settings is essential.

"Results from utilizing the good, new, hi-tech equipment will only be as good as the support they get from their dealers and suppliers."

Farmland in the CIS

"It's the sheer size of Russia on the world map that hits you in the eye," says Peter Breunig of the Institute for Farm Managers of Hohenheim Univ. in Germany.

Writing in the Spring 2008 issue of *Agrifuture*, a publication of the German Agricultural Society (DLG), Breunig points out that despite the sheer size of the CIS, only about 200 million hectares (495 million acres) of a total of 1.7 billion hectares is able to sustain farming at some level. Of this, only 120 million hectares (less than 300 million acres) is considered arable. For comparison purposes, this is about 10 times the area currently farmed in Germany.

USDA'S PROJECTIONS FOR UKRAINE'S WHEAT, CORN PRODUCTION AND USE — 2006 – 2017

UKRAINE WHEAT — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	5500	2.545	14000	80	3366	11700	1428
07/08	6000	2.300	13800	10	1500	12200	1538
08/09	6187	2.624	16236	11	4059	12065	1661
09/10	6251	2.661	16630	12	4506	12024	1773
10/11	6367	2.696	17162	13	5125	12041	1782
11/12	6467	2.731	17663	14	5660	12011	1787
12/13	6555	2.766	18131	15	6193	11951	1790
13/14	6664	2.797	18636	16	6761	11889	1793
14/15	6744	2.823	19039	17	7226	11827	1797
15/16	6816	2.845	19391	19	7636	11769	1801
16/17	6891	2.865	19745	20	8062	11700	1804
17/18	6962	2.884	20079	22	8474	11624	1807

UKRAINE CORN — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	1700	3.765	6400	0	1000	5250	1072
07/08	1900	3.684	7000	0	1500	5600	972
08/09	2035	4.220	8586	0	3000	5541	1017
09/10	2112	4.267	9012	0	3500	5514	1014
10/11	2157	4.296	9267	0	4000	5288	994
11/12	2218	4.330	9603	0	4500	5119	978
12/13	2301	4.368	10050	0	4999	5056	972
13/14	2396	4.406	10556	0	5500	5056	972
14/15	2486	4.442	11044	0	5935	5105	976
15/16	2568	4.473	11485	0	6071	5387	1003
16/17	2659	4.507	11984	0	6237	5716	1034
17/18	2754	4.543	12512	0	6457	6028	1062

Source: USDA — Units are 1,000 hectares for area; metric tons per hectare for yield; and 1,000 metric tons for other variables.

Despite its size — the CIS stretches across two continents and 10 time zones — nearly all of its major agricultural activity centers around six regions to the east and southern areas where Breunig says 90% of the crop and livestock products originate.

He describes these as the Northwest, Central Black Earth, North Caucasus, Volga North, Volga South and West Siberia. These are shown in the map on page 11.

According to Lyubimov of Buhler Industries, there are different types of farming practices in Russia due to geography and this impacts the type of farm machinery that is used.

"The southern regions of Russia, along with the Ukraine and Kazakhstan are the most successful areas because it's warmer and there is less risk of crop failure. Because it is less risky, there is more investment in modern equipment there," he says.

"There is less investment in the northern part of Russia where it is harder to grow successful crops and many farmers use equipment that is 20 years old and older."

Farming Units

Differing descriptions have applied to the various types of farming units that have evolved since the collapse of the Soviet Union.

In a 2002 report from the USDA's Economic Research Service, entitled, "Agricultural Productivity and Efficiency in Russia and Ukraine: Building on a Decade of Reform," by Stefan Osborne and Michael A. Trueblood, the authors categorize farm units in the CIS into three types:

1. Corporate Farms — These originally referred to the state ("sovkhozi") and collective ("kolkhozi") farms from the Soviet era. After privatization efforts in the 1990s, these farms were legally reorganized and turned over in their entirety to the farmers and pensioners.

These farms continue to operate largely as they did previously under the Soviet system.

Today, the term "corporate farm" is an all-inclusive phrase describing the various forms of privatization that did

USDA'S PROJECTIONS FOR UKRAINE'S BARLEY AND SOYBEAN PRODUCTION AND USE — 2006 – 2017

UKRAINE BARLEY — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	5200	2.183	11350	20	5103	6500	960
07/08	4400	1.409	6200	20	1000	5700	480
08/09	4360	1.904	8303	22	2747	5578	481
09/10	4429	2.013	8917	23	3298	5641	481
10/11	4466	2.020	9022	24	3521	5522	484
11/12	4478	2.030	9090	25	3761	5352	487
12/13	4487	2.046	9178	27	3857	5346	488
13/14	4495	2.065	9285	28	3906	5406	490
14/15	4496	2.088	9388	30	3907	5508	492
15/16	4487	2.113	9481	31	4030	5479	496
16/17	4481	2.147	9623	33	4208	5444	499
17/18	4475	2.192	9808	34	4420	5419	502

UKRAINE SOYBEANS — 2008 USDA BASELINE

Crop year	Area harvest	Yield	Production	Imports	Exports	Total cons	Ending stock
06/07	710	1.254	890	0	420	478	20
07/08	630	1.032	650	0	300	350	20
08/09	640	1.273	815	0	339	476	20
09/10	675	1.310	884	0	491	393	20
10/11	705	1.341	945	0	557	388	20
11/12	740	1.376	1019	0	618	401	20
12/13	773	1.408	1088	0	659	429	20
13/14	805	1.440	1158	0	719	439	20
14/15	837	1.470	1231	0	772	459	20
15/16	870	1.500	1305	0	832	473	20
16/17	905	1.531	1386	0	897	489	20
17/18	943	1.564	1474	0	966	508	20

Source: USDA — Units are 1,000 hectares for area; metric tons per hectare for yield; and 1,000 metric tons for other variables.

not involve breaking parcels of land off from the original farm.

2. Subsidiary Plots — This is the name for the small plots of land (on average about 0.4 hectare or 1 acre) owned by the corporate or "mother" farm that workers were allowed to cultivate in their spare time. After privatization, the workers were granted limited ownership of these plots.

3. Private Farms — In Russia and Ukraine, these are the equivalent to family farms in the U.S. where one farmer is the sole owner of land parceled off from the previously state-owned farm.

On the other hand, Breunig breaks the farming units into four categories based on size, extent of capital investment, form of ownership and organization structure. He says these developed through "massive political involvement and socio-political collapse of the last century."

1. Small Holdings — These were the underpinning of the rural food supply during Soviet times and remain the backbone of agriculture throughout much of the CIS. They number 16 million units and are operated by part-time farmers plots that average 0.7 hectares (1.8 acres).

2. Family Farms — As the name implies, single families, in some cases with the help of hired hands, operate these. They were created by collective workers taking over fields or complete farming units of up to thousands of hectares.

The main characteristic of the farmer-run units is that they are managed by a main shareholder, and such farms can be organized as a limited or stock company. Government statistics indicate that there are 260,000 of these operations.

3. "Kolkhoz/Sovkhoz" Successor Farms — "Time has stood still" for these operating units, according to Breunig. While the legal organization has changed, the organization structure, including staff size, rotation, machinery and production intensity, have not. Still shared between the former collective workers, these units range between 3,000 to 20,000 hectares (7,400 to 50,000 acres).

4. Agroholdings — This is the term applied to the newly emerging "mega farms" of the CIS. According to Breunig, these newcomers emerged after the economic crisis in 1998. These operating units range from 50,000 to 400,000 hectares (123,500 acres to 1 million acres), though most are divided into units of 5,000 to 20,000 hectares (12,350 to 50,000 acres). Planning, purchasing and sales remain centralized under these arrangements.

"Despite its size, nearly all of the major agricultural activity in the CIS centers around six regions to the east and southern portions of the area where 90% of the crop and livestock products originate."

In addition to their size, what sets these operations apart is that they're attracting investment from outside agriculture and tend to be vertically integrated.

"Since investors are in many cases active in the food industry, their involvement can lead to integrated enterprises covering the supply chain from field to finished product," says Breunig.

Potential vs. Production

In their 2002 USDA study, the authors concluded that, "If the necessary reforms are made and agricultural production improves in Russia and Ukraine, the impact on world grain markets could be significant."

In a variety of scenarios, they project that exports of wheat and barley from Russia and Ukraine could increase from 10.4 million metric tons in 2001 to 34 million by 2011.

The greatest potential for increased grain production in the major CIS agricultural regions will come in the expansion of acres and improving yields of wheat and barley. Corn and oilseeds (soybeans and rapeseed) will also show some expansion, but at a much slower pace.

According to the USDA's most recent projections (USDA Agricultural Projections to 2017 — OCE-2008-1) released in December 2007, most CIS gains will come from increasing production and yields in the Ukraine.

Wheat Exports Growing — According to the USDA's analysis, Ukraine, Russia, and Kazakhstan have become significant wheat exporters in recent years. Low costs of production and new investment in their agricultural sectors have enabled their combined world market share to climb to about 20% in the last 2 years.

Exports from Ukraine and Russia are projected to continue gaining market share, more than offsetting a slight decline in the share held by Kazakhstan. However, because of the region's highly variable weather and yields, year-to-year volatility in production and trade can be expected.

Also, continued real appreciation of these countries' currencies, caused mainly by strong foreign exchange earnings and domestic inflation, could moderate the rise in exports.

Ukraine Gains in Corn — Corn exports from some countries of the FSU, primarily Ukraine, are expected to double to 7 million tons by 2017.

Favorable resource endowments, increasing economic openness and greater investment in their agricultural sectors will stimulate corn production. Combined with increasing meat imports, this leaves a corn surplus available for export.

Dominant in Barley Exports — The FSU will remain a major barley exporter throughout the coming decade as exports surpass 8 million tons. Together, the FSU and EU will account for nearly 65% of world barley exports by 2017.

Slower Going in Oilseeds — Russia and Ukraine respond to higher international market prices for oilseeds by increasing production of rapeseed and soybeans. Although rapeseed production will be most affected, soybean exports are projected to increase somewhat.