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Uralkali Market **Analisys Report**

Key Element

April
2014

Q1 potash market highlights

Results of research project on K fertiliser in Russia

Report on the annual meeting for agriculture producers and operators

Report on the IPI symposium in India

RICH WITH POTASH

URALKALI®

Dear friends,

2014 started positively both for Uralkali and the potash industry as a whole. In January, contracts were concluded for deliveries to China in H1 2014 and spot markets saw considerable activity. At the beginning of Q2, India also agreed potash contracts for this year.

A positive market environment enables Uralkali to operate at a high utilisation rate, as well as sell its products in all key geographies.

At the same time, we continue to implement our agronomy programmes in various countries, including domestically.

In Russia, potash is mainly applied as part of compound fertilisers, which do not always provide plants with the necessary nutrition. Therefore, the optimisation of potash fertiliser application levels and examination of current soil testing methods was made a foundation for the research project jointly organised by the International Plant Nutrition Institute (IPNI) and the D. Pryanishnikov All-Russian Research Institute of Agrochemistry, which started in autumn 2012. In the current issue of “Key Element” we present the results of the first year of the research.

We would welcome your feedback, comments and questions and will try to address them in our next issues. Please contact us at **pr@msc.uralkali.com**

Kind regards, **Oleg Petrov,**
Uralkali Director of Sales and Marketing

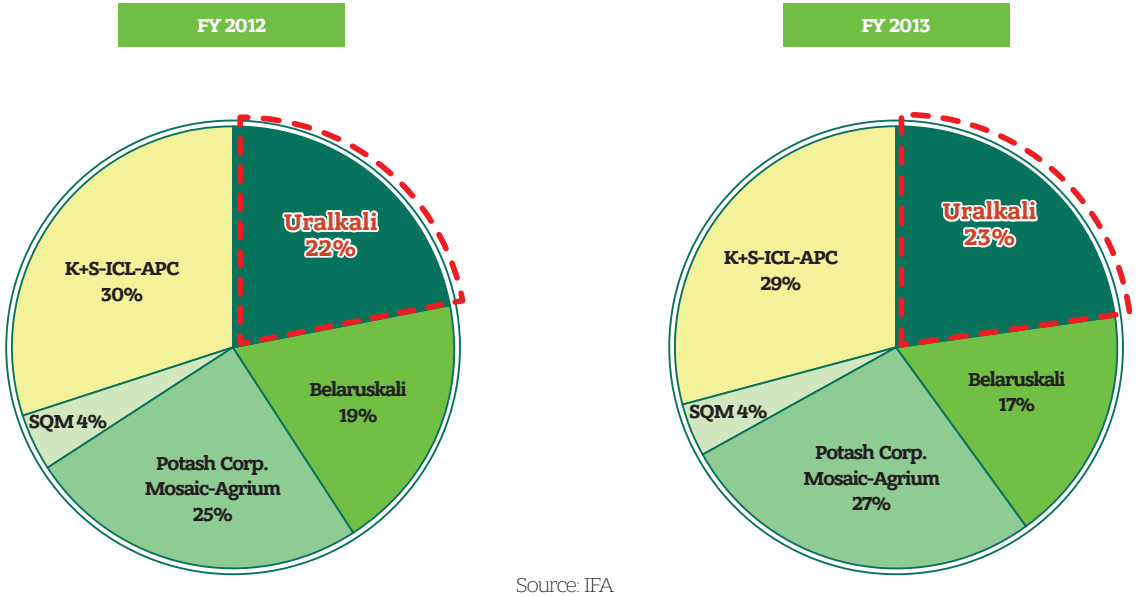
Potash market overview Q1 2014

In Q1 2014, the resumption of contract shipments to China set the stage for a rebound in potash demand. Potash shipments picked up following the contract settlement. Customers who chose to delay or defer H2 2013 potash purchases in anticipation of lower spring prices returned to the market in H1 2014 and this led to a significant increase in potash sales. Strong potash demand growth and improved overall agriculture commodity prices translated into higher prices in major markets. In addition, a combination of such high demand, unfavourable weather conditions in North America and labour disruptions led to lower potash availability in Q1 2014.

The signing of H1 2014 contracts with China was the key catalyst for the global market, which is now looking stable. In China, the total quantity agreed for H1 2014 delivery was approximately 3.0 million tonnes, while higher prices in Brazil have also meant that there is limited supply of granular products in the Chinese market.

In Brazil, shipments continued at a record pace in the first quarter. According to ANDA data, Brazil imported approximately 1.1 million tonnes of potash in the first two months of this year, a 47% y-o-y increase. Demand growth was supported by increased soybean acreage, while granular potash remained in short supply. Very strong demand and limited availability of granular products prompted producers to raise their prices. By the end of the Q1 2014, potash prices had risen to USD 340/t CFR for granular products compared to USD 310–320/t CFR at the start of the year. Customers' commitments for H2 2014 deliveries demonstrate their confidence in the prospects of the Brazilian market for 2014.

North America also had a very strong quarter. Domestic potash sales for the first three months of 2014 increased to 2.8 million tonnes, up from 1.9 million tonnes in the same period last year. In the second half of March, delayed rail deliveries from Canada due to unfavourable weather and logistical problems have caused some



Source: IFA

US buyers to turn to the barge-delivery market in order to secure tonnage for the approaching spring season. As a result, potash barge prices rose to USD 335–340/t FOB NOLA at the end of March compared to USD 318–320/t FOB NOLA at the end of February 2014. Potash demand is expected to be strong this year as farmers replenish declining nutrient levels in their soils after record crop production in 2013.

In Q1 2014, spring season demand was strong in many European markets. Distributors in the region began actively purchasing to replenish their inventories which were largely depleted due to low purchasing activity in the second half of 2013. Suppliers to European markets have seen a positive response to lower prices, so much so that they have struggled to fulfill sales commitments. Granular product availability remained limited and many European customers reported difficulties in sourcing products. Potash prices have been moving up with further increases likely, capitalising on supply availability issues. Strong demand for granular potash caused the price

Potash market overview Q1 2014

gap between granular products and standard products to widen. Overall, European demand is expected to stay robust in 2014, with Central & Eastern European markets demonstrating strong potash demand growth.

In Southeast Asia, markets were steady. Oil palm growers have been continuing to invest heavily in fertilisers to maximise returns. The region is expected to have a y-o-y demand increase from 8.1 million tonnes to approximately 8.4–8.7 million tonnes in 2014. At the end of Q1 2014, India cut potash subsidies by 2000 rupees/t to 9400 rupees/t for 2014/2015. In early April, Uralkali was the first potash producer to announce an agreement with IPL, securing sales volumes of 800,000 tonnes through to March 2015. Buyers in India are expected to book a total of approximately 3.5–3.8 million tonnes from suppliers for 2014/2015. The demand environment in India this year should be supportive, at least in comparison to recent years. The Department of Fertilisers has announced that it expects total potash demand for the Kharif season to reach 1.52 million tonnes, up from 1.19 million tonnes over the same period last year. In addition, the rupee appreciated to 60 INR/USD, providing a modest boost to sentiment and upside potential for potash.

In summary, there has been a strong potash demand recovery in major markets this year due to favourable crop prices and distributor restocking. New contracts with China and India enabled this rebound in demand and a lower potash price than last year should also spur demand. It is estimated that global potash deliveries in 2014 will fall in the range of 56–58 million tonnes, up 3-7% y-o-y.

Benchmark fertiliser prices

		Annual averages			Quarterly averages	
		Jan-Dec	Jan-Dec	Jan-Dec	Jan-Mar	Jan-Mar
	Unit	2011	2012	2013	2013	2014
DAP[1]	($/t)	618.9	539.8	444.9	491.6	476.1
Phosphate rock[2]	($/t)	184.9	185.9	148.1	173.0	104.4
Potassium chloride[3]	($/t)	435.3	459.0	379.2	390.8	314.0
Urea[4]	($/t)	421.0	405.4	340.1	396.6	337.5

Source: World Bank

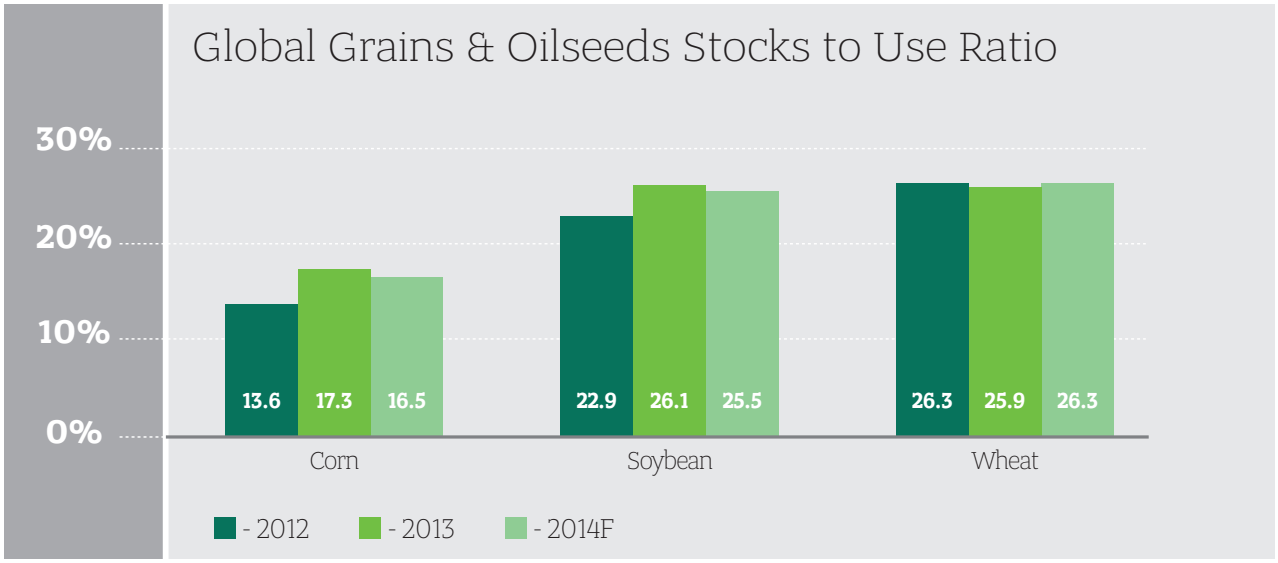
[1] Standard size, spot FOB US Gulf.
[2] Phosphate rock (Morocco), contract F.A.S. Casablanca.
[3] Standard grade, spot FOB Vancouver.
[4] FOB Eastern Europe.

Potash prices

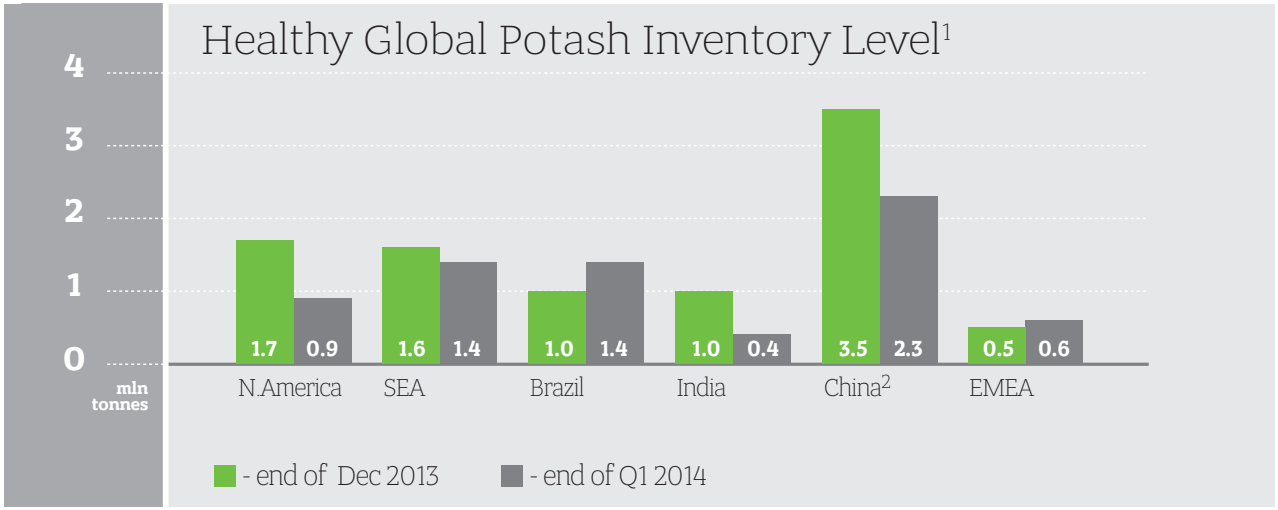
	31 March 2014	3 January 2013
	Potash – CFR Standard Bulk	
Southeast Asia Spot (US$/t)	290–350	300–330
India contract ((US$/t)	–	369–375
China contract (US$/t)	305	–
	Potash – CFR Granular Bulk	
Brazil CFR Spot (US$/t)	340–360	310–330
Europe, CFR (€/t)	275–285	250–275

Source: FMB

Potash market overview Q1 2014



Source: USDA's April WASDE report



Source: Uralkali's estimators

Notes:

[1] Inventory does not include domestic potash producers' stocks, excl. China.

[2] Including domestic producers' stocks, port stocks, pile channels stock, NPK warehouse stocks.

First results of research project on the improvement of K fertiliser recommendations in intensive cropping systems in Russia

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The level of K fertilizer use is an indicator of intensity in crop production. Unfortunately, potash fertiliser application rates in Russia have decreased in the last 10–15 years to 1-2 kg K_2O per hectare of cropped area; with long-term removal of K exceeding K inputs the negative K budgets are being observed in various agricultural zones of the country from –16 to –30 kg K_2O/ha (Shafran, Sychev, 2013).

Currently in Russia, potash is mainly applied as part of compound fertilisers, which do not always ensure a balanced potassium supply for plants.

The continuous removal of potassium by crop and the incomplete return of the element with fertilisers lead to a slow but permanent decrease in the content of plant-available potassium in arable soils; its mobility in soil decreases, as well as the capacity of soil to restore the initial content of plant available potassium. The final result is a loss of yield and decreased crop quality.

Moreover, the negative K balance might lead to increased soil fixing capacity, and the low rates of potassium applied as part of compound fertilisers then have almost no effect on crop yields.

It is well-known that regular potash application in agro-ecosystems is necessary for them to function effectively. Nonetheless, the issue of optimizing of the potassium status of arable soils in Russia still receives insufficient attention. This attitude is largely related to the imperfect diagnostics of arable soil fertility in terms of potassium supply, which to a large extent depends on the routine method used to measure the content of plant available K in soil. It is preferable to use a combination of different methods, which will allow more accurate predictions of crop response to potash fertilisers and determining scientifically-based application rates.

Photo 1. *Research plots with sugar beet, Lipetsk region, Russia, 2013*

Therefore, the optimisation of potash application rates and verification of currently used routine soil K test methods are priority issues for the research project jointly organised by the International Plant Nutrition Institute (IPNI) and the D. Pryanishnikov All-Russian Research Institute of Agrochemistry, which started in autumn 2012.

Agropage: Research project in Russia

The project is focused on optimisation of potash fertiliser rates in current intensive cropping systems for crops with high demand to K (sugar beet, corn, rape and soybean), as well as checking the measurement potential of routine soil test methods depending on the regional soil properties and adjusting the current soil K test interpretation classes based on the results obtained from short-term field experiments executed on large industrial farms. The complex approach has been used for the project design included the following issues:

- Determining crop response to potash fertilisers and their effect on crop quality and yield in high-yield crop systems;
- Determing the residual effect of potash applied to the crop with highest demand in potash;
- Evaluating the validity of routinely-used soil K test methods, and corresponding interpretation classes ;
- Assessing of crop removal and nutrient balance in trials;
- Assessing potash fertiliser economic efficiency.

The methodological basis of the research is three-year field experiments with increasing K rates applied to crops with high demand in K such as sugar beet, grain corn, soybean and rapeseed, which are grown intensively on large industrial farm in the Central Russia and North Caucasian regions.

Experiments are being carried out in the Lipetsk, Voronezh, Belgorod, and Rostov regions by the regional centres of the Russian State Agrochemical Service. The soil types being investigated are leached chernozem (Voronezh region), typical chernozem (Belgorod and Voronezh regions), podzolized chernozem (Lipetsk region), calcareous ordinary chernozem (Rostov region) and dark grey forest soil (Lipetsk region).

All industrial farms that participated in the project have much higher yields than the regional average. For example, all farms chosen for the sugar beet trials have average root yields above 55 t/ha. It is important to highlight that there are currently no potash fertiliser recommendations in Russia for obtaining such high yields. Therefore, the aim of the project is to be a unique source of information targeted first and foremost at agricultural producers, enabling them to obtain high yields.

The project's first year results are very promising for all crops studied. However, this article only covers data obtained from sugar beet and grain corn trials in Central Russia after the first growing season (2012–13).

Sugar beet. Experimental plots in Lipetsk and Voronezh regions have been launched on chernozem soils with "increased" (higher than medium) content of plant available potassium routinely extracted by Chirikov method (0.5M CH_3COOH).

Photo 2. *Research plots with sugar beet, Lipetsk region, Russia, 2013*

The treatments included:

Absolute control (without fertilisers);
Background treatment — nitrogen and phosphate treatment with optimal rates to planned high yield according to the each farm practice (NP);
NP+ K_{70} (NPK1);
NP+ K_{140} (NPK2);
NP + K_{210} (NPK3);
NP + K_{280} (NPK4).

Potash fertilisers have been applied in the form of potassium chloride (KCl). The rates of K fertilisers to be applied were calculated taking into account the possible residual effect on the two subsequent crops. Each trial utilised crop management technology.

In the sugar beet trials the aim was to obtain a high sugar beet root yield with an acceptable sucrose concentration in the roots (not less than 14%).

In the experiment conducted in the Voronezh region, the application of K fertilisers led to very high yields (more than 80 t/ha) combined with an acceptable concentration of sucrose in the roots (more than 14%).The highest yield of sugar beet roots and sucrose was achieved when applying 140 kg K_2O/ha (NPK2). Yields therefore increased by 21% or 14 t/ha due to the application of potash compared to the background treatment. Moreover, potash fertilisers increased not only root yields but the sucrose concentration in roots as well. As a result, the sucrose yield increased by 2.5 t/ha, equivalent to 25% (Table.1, Fig. 1). The same rate provided the best economic efficiency of K application.

An evaluation of economic efficiency of potassium fertiliser application showed that for the treatment (NPK2) with the highest achieved yield (80 t/ha) the maximum increase in profitability due to K was 23%, which resulted in a net profit increase due to K of 22,000 roubles per ha and a decrease in production cost by 130 roubles per tonne of root yield (Table 2).

In the Lipetsk region, the sugar beet root yield was slightly lower than in the Voronezh region at approximately 57 t/ha. However, yield increase due to the application of different K rates was observed in all treatment categories. The maximum root yield was achieved by applying 280 kg K_2O/ha (NPK4). At this rate, the root yield increase was 12.4 t/ha or 22% higher than in the background treatment. The sucrose yield increased by 2.5 t/ha, equivalent to a more substantial yield increase of 28%. The same rate provided the best economic efficiency.

An evaluation of economic efficiency of potassium fertilisers application showed that for the NPK4 treatment with the highest achieved yield (57 t/ha) the increase in profitability due to K was 23%, which resulted in a net profit increase of 12,000 roubles/ha and a decrease in production cost by 142 roubles/t root yield (Table 2).

As part of the sugar beet experiment in the Voronezh region, the dynamics of sugar accumulation in the roots were studied during the vegetation period until harvesting in autumn 2013. This period was characterised by intensive rainfall (for the majority of September) which resulted in delays to sugar beet harvesting. Sucrose concentration in the roots was measured starting from 7 August 2013. Analysis of the sugar accumulation dynamics (Table 3) showed that the sucrose concentration in roots in treatments with potassium chloride (KCl) increased by 0.2–0.9% at the end of August compared to the background treatment and then decreased substantially by 1.9–2.9%. Sucrose concentration in the roots was still above the acceptable level of 14% (Table 3).This decrease in sugar content in September was a result of the intense growth of the sugar beet plants during the period of abundant rainfall.

	Root yield, t/ha	Sucrose yield, t/ha	Root yield, t/ha	Sucrose yield, t/ha
Region	Voronezh region		Lipetsk region	
Yield in NP treatment (background)	66.21	9.82	56.91	8.97
Maximum yield in treatments with potassium(NPK)	80.39	12.30	69.31	11.44
Maximum yield increase due to potash	14.18	2.48	12.40	2.47
LCD 0.05	9.59		1.16	

Table. 1 *Effect of K application on sugar beet root yield and sucrose yield*

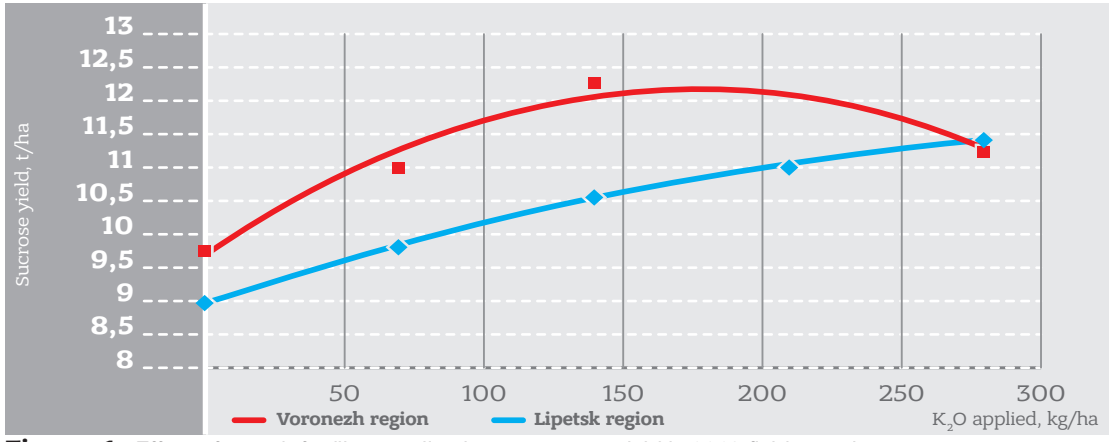

Figure. 1 *Effect of potash fertiliser application on sucrose yield in 2013 field experiments.*

The highest values were observed on 27 August for the K_{280} treatment. The growth of sugar beet plants led to a reduction in the difference in sugar accumulation between the treatments, which explains the maximum sucrose concentration being achieved with the K_{140} treatment at harvesting (beginning of October).

These results demonstrate that it is possible to increase sugar concentration in the roots to more than 16% by applying potash fertilisers at the same time as achieving high yields. Therefore, both weather conditions and the harvesting timing are important factors that influence the accumulation of sugar in the roots and sucrose yield. This must be taken into account for crop management planning.

Grain corn. In the grain corn experiment, the following treatments were used:

- Absolute control (without fertilisers);
- Background treatment –NP at optimal levels to achieve high yields;
- Background +4 increasing K rates (K_{60}–K_{280}).

Potash fertilizers have been applied as potassium chloride. The rates of K fertilisers were calculated taking into account the possible residual effect on the two subsequent crops.

In the field experiment in the Voronezh region, the maximum grain yield was achieved at K_{120}, a yield increase of 1.4 t/ha, or 14% compared to the background treatment alone (Table 4). Therefore, every 1 kg K_2O resulted additional12 kg of grain. The same level of application provided the best economic efficiency. The net profit increase amounted to 7,974 rubles per hectare, profitability increased by 27% and production costs decreased by 70 rubles per tonne of grain (Table 2).

Treatment	Profitability increase due to K, %	Profit increase due to K, roubles/ha	Profitability increase due to K, %	Profit increase due to K, roubles/ha
	Voronezh region, sugar beet		Lipetsk region, sugar beet	
NPK1	14	10,619	10	5,298
NPK2	34	22,297	16	8,757
NPK3	16	11,874	20	10,774
NPK4	17	12,701	23	12,401
	Belgorod region, grain corn		Voronezh region, grain corn	
NPK1	10	2,344	2	2,111
NPK2	7	2,763	27	7,974
NPK3	5	3,182	–9	3,184
NPK4	1	3,335	–37	–534

Table 2. *Economic efficiency of potassium fertiliser application in comparison with the background treatment (NP)**

Treatment	Date of measurement			
	8 Aug 2013	27 Aug 2013	9 Sept 2013	26 Sept 2013
Control	15.1	16.1	14.0	14.3
Background (NP)	15.6	16.6	13.5	14.7
Background +K_{140}	14.6	16.8	13.7	14.9
Background +K_{280}	15.7	17.5	12.2	14.6

Table 3. *Dynamics of sucrose concentration in roots (%)*

Treatment	K_2O rate, kg/ ha	Yield, t/ha	Yield increase due to K, t/ha
		9.1	–
NP	–	9.8	–
NPK1	60	10.2	0.4
NPK2	120	11.2	1.4
NPK3	180	10.6	0.8
NPK4	240	10.2	0.4
LCD 0.05	0.93		

Table 4. *Grain corn yield in the field experiment in the Voronezh region*

* Costs were calculated based on the price of potassium fertilisers of 7,700 rubles per metric tonne of KCl.

In the field experiment on grain corn in the Belgorod region, the maximum grain yield (9.4 t/ ha) was achieved at a K_2O rate 280 kg/ha. In this treatment, yields increased by 1.9 t/ha, or 25% compared to the background treatment alone (Table 5).

Potash application led to an additional 7 kg of grain production per 1 kg of K_2O. The same level of application provided the best economic efficiency. The net profit increase amounted to 3,300 roubles per hectare, profitability increased by 10% and production costs decreased by 100 rubles per tonne of grain (Table 2).

Based on the project's first-year results with regard to sugar beet and grain corn, one can conclude that the substantial yield increases at all levels of potash fertiliser application in comparison to the background treatment show that there can be significant yield losses when potash fertiliser is not applied, even on soils with increased and high content of plant available K.

Treatment	K_2O level, kg/ha	Yield, t/ha	Yield increase due to K, t /ha
Control	–	6.4	–
NP	–	7.5	–
NPK1	70	8.4	0.9
NPK2	140	8.7	1.2
NPK3	210	9.1	1.6
NPK4	280	9.4	1.9
LCD 0.05		1.2	

Table 5. *Grain corn yield in the field experiment in the Belgorod region*

Photo 3. *Demo plots with grain corn, Voronezh region, Russia, 2013. The corn cob on the left is from plot K280, the cob on the right is from plot NP. You can see that if potash is applied, the corn grains are round and there is room for more grains to ripe, which ultimately leads to higher yields.*

Literature

V.G.Sychev, S.A. Shafran. Agrochemical soil properties and the efficiency of mineral fertilisers. M. VNIIA, 2013. Pg. 96 (In Russian).

Annual conference for operators and agriculture holdings takes place in Moscow

For the second time Uralkali brought together heads and representatives of leading agricultural holdings and operators at the “No-tie meeting” in Moscow on 24 January 2014.

The Conference was opened by Uralkali CEO Dmitry Osipov. In his speech, Mr. Osipov stressed the importance of cooperation of the Company and the largest Russian agricultural enterprises with the scientific community and the need to use advanced technology. During the conference, the most reputable experts of the agricultural market provided our guests with an overview of the situation in the agricultural market in general and for key sectors in particular.

During the scientific session, the theoretical part dedicated to the role of potassium in plant nutrition was complemented with results of the field research, conducted by the International Plant Nutrition Institute, as well as scientific and field experiments, conducted by LLC Petrokhleb-Kuban together with the Kuban State Agrarian University.

In addition to the highly topical information program, the participants also had an opportunity to discuss business issues with the sales department. The questions on changes in logistics, which occurred in 2013, production plans and interaction of operators and agricultural holdings were answered by Oleg Petrov, Uralkali Director of Sales and Marketing, Andrey Blokhin, Sales Manager, and Olga Presnyakova, Head of Sales Department.

“Potassium nutrition & crop quality” international symposium

On 4-5 March 2014, the “Potassium Nutrition & Crop Quality” international symposium took place in Ranchi, India. The Symposium was organised by East Indian, Bangladeshi and Sri Lankan International Potash Institute (“IPI”) coordination bodies, in collaboration with Birsa Agriculture University, Ranchi, India.

Over 150 researchers and agriculture administrators and extension workers from different countries participated in the Symposium and shared their findings.

The inaugural session was chaired by Dr M P Panday, Vice Chancellor of Birsa Agriculture University. The Symposium’s Chief Guest was Sri Yogendra Saw ji, Honourable Minister of Agriculture & Sugarcane Development for Jharkhand State. He was joined by the Guests of Honour: Dr Anil Kumar Singh, Ex DDG (NRM) Indian Council of Agriculture Research and Vice Chancellor, RVSKVV, Gwalior, India; and Hillel Magen, Director of the IPI from Horgen, Switzerland.

Dr M P Panday’s speech drew the participants’ attention towards the historical importance of chemical fertilisers. These played a vital role in making India self-sufficient in grain production, particularly during the 1960–1970 Green Revolution, in which the country’s grain production grew by over 50%. However, he expressed concerns about the wide gaps in NPK usage and called on the industry professionals to educate farmers on the modern approach to balanced fertilisation. He pointed out that fertilisers play the key role in increasing food production:

– replenishing nutrients to maintain and enhance soil fertility
– enabling adoption of High Yielding Varieties (HYV), which can lead to a manifold increase in cereal production
– increasing crop yields, and sustaining soil fertility and productivity in the nutrient-poor soils of the tropics

Neeraj Kumar Awasthi, Co-Chairman of the Organising Committee and Senior Agronomy Expert at Uralkali, also addressed the attendees. He focused on the achievements of the IPI-BAU Project, which studies the response of potassium nutrition and its value addition in economics of vegetable growers and maintaining soil fertility from successive exploitation. Mr Awasthi emphasised the benefits of balanced nutrition to the farmers in the areas where the Project experiments had been conducted and elaborated on the positive effect of balanced nutrition, and especially of potassium application, on the small and marginal farmer economics.

Photo 1. *Chief guest Sri Yogendra Saw Ji, honourable minister of agriculture & Sugarcane development for Jharkhand State*

Photo 2. *Neeraj Awasthi, Co Chairman of Organizing Committee and Uralkali Senior Agronomy Expert, delivering his introductory remarks*

Hillel Magen raised the issue of growing global food demand and spoke on addressing it with balanced fertiliser use. He noted that IPI is partnering with research and extension agencies in the developing world to provide solutions to increasing food consumption.

During the two days of the Symposium, the scientists of several institutions from across the Indian subcontinent presented a number of papers on potash application for various crops in the different regions of the country.

Research presentations were followed by an interactive session where the farmers could share their experiences of IPI-BAU Project with the audience.