

IPI 60 ANNIVERSARY

IPI Then and Now - The Story of 60 Years of Scientific Work for Balanced Fertilization with Potash

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History

The International Potash Institute (IPI) is celebrating its 60th anniversary (1952-2012). For many decades, our agronomists and soil scientists have carried the message of “Balanced Fertilization”, demonstrating and disseminating the role of potash in yield performance and quality, in stress tolerance and in bringing more value to the farmer.

IPI was founded by German and French potash producers almost 100 years after the discovery of potash-bearing salts in Staßfurt, Germany. The aim of the Institute was to “*foster the application of scientific and practical methods for the amelioration of the soil in general and the use of fertilizers, especially of potash*”. Its headquarters was located in

Bern, the capital of Switzerland, and after a few months, a Scientific Board with scientists from 16 European countries was established to provide IPI with the necessary scientific guidance.

With Switzerland hosting the Institute, two distinguished politicians - Paul Chaudet and Nello Celio - who had both served as President of the Swiss Confederation, led the Institute till the 90s. Alexander von Peter, IPI Director from 1970 to 1991 reflects that “one of the assets the Institute had during these days was the open and productive exchange of views among the agronomists of the member companies, which allowed the Institute to establish missions in Africa, Asia, Latin America and more.”

In 1957, after five years of IPI operation, the first new member joined the German and French founders (Dead Sea Works Ltd., a potash producer in Israel) soon followed by other potash producers in Spain, UK, GDR, USSR and Jordan. With this expansion, the Institute became the scientific hub for potash producers across Europe and the Middle East.

IPI veterans and current team

Celebrating IPI’s 60th anniversary provides an excellent opportunity to hear about the Institute’s past activities from previous members and leaders of IPI. During the last few months (early in 2012) I had an opportunity to meet with some of them whilst traveling to Germany and Israel.

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IPI Presidents from 1970 till today (R. Gallay - not shown - was the President 1966-1970)



Paul Chaudet
1970-1977



Nello Celio
1977-1991



Erich Wyss
1991-2009



Prof. Dr. Christian Brückner
2009-today

Ever since his meeting Dr. Alexander von Peter in 1974, Prof. Iossif Bogdevitch from Belarus has been closely involved in IPI's work. In 1990 he was instrumental in organizing the first IPI symposium in the Former Soviet Union on "Development of K-Fertilizer Recommendations". The conference was held in Soligorsk, the city closest to the large potash deposits from which JSC Belaruskali, an IPI member, produces its potash. In the 1990s, Prof. Bogdevitch joined the IPI Scientific Committee, where he, and other leading scientists, influenced and provided valuable guidance on IPI's activities. In 1998, he became the IPI coordinator for Belarus, the Baltic States and Ukraine which, he says, was "the most satisfying time in my professional life."

Abraham Cohen and Meir Bazelet are veteran IPI coordinators, working for more than 30 years as coordinators and members of the IPI Technical Secretariat. A. Cohen joined IPI in 1971. After a few years, he was posted to IPI missions in South Africa and Latin America as an IPI coordinator, before returning to work at the head office in Bern. M. Bazelet joined IPI as a coordinator for Turkey in 1966. Later he held coordination positions in China, South Africa, Argentina, amongst others. Both veteran coordinators admit that satisfaction came predominantly from the opportunity to assist in developing sound research work on K nutrition in countries with local scientists, many of whom they stayed in contact with over the years.

Dr. Alexander von Peter served as IPI Director at the Bern headquarters from 1970 to 1992. I met him at his home in Heidelberg, and we greatly enjoyed reviewing his rich history with IPI. An economist by training, Dr. A. von Peter was always very conscious of the economical use of potash fertilizers. He recalls that the technical meetings at IPI, with so many agronomists from the member companies, always provided fruitful brainstorming. During his time as director, IPI changed its focus in activities and moved from mostly organizing symposia to active coordination in regions, which assumed that an impact in this field of operation could be gained. In 1992, after more than 20 years living in Bern, he retired and returned to his home in Heidelberg.



Marshal Tito (third from left) visits and examines potash bags at an agri exhibition in Novi Sad, 1974 (photo courtesy of A. von Peter).



Dr. Alexander von Peter.



Prof. Dr. Iossif Bogdevitch.



Abraham Cohen (left) and Meir Bazelet (right).



Dr. Adolf Krauss (center); Martha Vacano, IPI's Office Manager (left), and Hillel Magen, IPI Director (right).

Dr. Adolf Krauss served as IPI Director from 1994 to 2004. In 2002, at IPI's 50th Jubilee Symposium, he wrote that, "very early on, IPI also looked beyond Europe and established missions around the world, either on its own or in collaboration with what is now the Potash and Phosphate Institute, PPI/PPIC headquartered in the USA. The most comprehensive mission was the POTASCHHEME in India (1957-1962), which had both expatriates and a large number of local staff. Other missions were founded in subsequent years in Argentina, Brazil, Peru, Uruguay, East Africa, South Africa, former Rhodesia, Hong Kong, Iran, Japan, Korea, Singapore, Taiwan, and in Montpellier, France for the Mediterranean region." During his tenure, IPI focused strongly on the term "Balanced Fertilization". Data presented in Fig. 1 shows how consumption of nitrogen fertilizers expanded in comparison to P and K, leading to severe nutrient imbalances in many regions, with

ill-consequences on productivity, quality of products, declining soil fertility and environmental degradation.

Mr. Erich Wyss, former IPI President served the Institute for almost 20 years (1991-2009). This period was fundamental in forming the new identity of IPI as a result of the adjustments made at the end of the 80s following the demise of the Former Soviet Union. Mr. Wyss provided valued leadership during changing times and allowed the Institute to maintain and increase its scientific activities worldwide. He also participated in various symposia held in parts of the world, and inaugurated the IPI Golden Jubilee Congress in Basel, "Feed the Soil to Feed the People - The Role of Potash in Sustainable Agriculture", with many of IPI's research partners attending. The first Five-Year Plan (2009-2013) for IPI was completed during his service.

Prof. Dr. Christian Brückner joined IPI as President in 2009. With strong support from its members, Prof. Brückner provides critical guidance for the Association as we face new challenges and opportunities. IPI's current portfolio of activities spans nine regions with research and dissemination projects led by six coordinators (see photo), overseen by the head office in Horgen, near Zurich. All coordinators are experienced field agronomists with IPI member companies. Nominated by the General Assembly of the IPI Members, IPI coordinators operate on a long-term basis in regions worldwide in accordance with the strategic framework of the Five-Year Plan.

Publications and dissemination

In the 1960s and 1970s, IPI invested heavily in producing scientific literature on the role of K in agriculture. With its first proceedings published in 1954, IPI has continued to publish new proceedings every year up to the present. All these publications have been scanned and are now available on the [IPI website](#).

For almost 40 years between 1956 and 1995, IPI published the **Potash Review**, a collection of more than 1,000 themed scientific papers, with many of the papers dealing with potash use in international agriculture. These legacy documents were also recently made available on the IPI website, and can be searched by title, author, year and theme. Prof. (Emeritus) Uzi Kafkafi, a veteran of IPI's Scientific Committee said, "this transformation of the practical reports, published in **Potash Review** for over 40 years, is once again bringing to life the basic agronomical knowledge accumulated over almost a century of advanced agricultural research". Basic information for agronomists and growers can now be retrieved quickly and accurately with the proper references. In this new format, **Potash Review** replaces old plant nutrition books that are no longer easily accessible. In these modern times where most agricultural research centers



IPI Coordinators 2012.

Editorial	
Dear readers,	2
Economics of fertilizer use has always been of high concern. The issue that the present, when farming conditions and produce markets become difficult, some advice farmers that the best way to weather the storm is to cut costs: savings can be made on the matter of fertilizers. They say that yield increases over the years have not matched the increase in fertilizer use; that yield targets have been set too high, that when product prices fall, lower yields are acceptable especially as higher yields will lower price, that it is not necessary to hold on to soil fertility and that advice to do so leads to over-use of fertilizers. In the article printed in South Africa is summarized, these ideas are false. Although this sentiment is familiar to us today, this sentiment from South Africa is taken from IPI's Potash Review report dating back to 1956 and much is still relevant today.	2
"There is no doubt of the great importance of the price in shaping the use of fertilizers. However, of even greater importance is the dissemination of technical knowledge. The better the farmer, the higher the level to which they lift the farming yield curve". This is also concerned, just a quote from IPI's Potash Review published in 1956 - now over 56 years ago.	2
Clearly the question of the benefit-to-cost ratio of fertilizers has always been an issue, and more so during times of high fertilizer price and economic constraint. The question of the benefit-to-cost ratio may always exist (and even just because climate is so unpredictable), so knowing more about efficient fertilizer use is crucial.	2
As always, reducing fertilizer rates will impact on yield. But these days, farmers can employ better tools to make fertilizer use more efficient, including using more efficient delivery systems, measuring nutrients in soil and plant, and using remote sensing images - and decision support systems. Doing these will increase the benefit-to-cost ratio of fertilizer application. And so we reach the same conclusion as in 1956 stated above, the more knowledge, the higher the farming yield curve can be lifted.	2
I wish you all an enjoyable read.	2
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Potash Review

Monthly communications by the International Potash Institute, Berne (Switzerland)

Subject 2

Farm Management, Advice and Information **December 1956**

4th suite

The dependence of the use of fertilizers on the costs of the means of production and on the prices of the agricultural products

A theoretical investigation

By **H. Ruthenberg**
Agrarwirtschaft 5, No. 8, 225 (1956)

are concentrating on genetic research, such basic agronomic knowledge is neglected and the current generation of students has no real contact with the old accumulated wisdom. IPI deserves deep appreciation for the resurrection of this real basic knowledge in fertilizers and plant nutrition that otherwise would have been lost forever."

In 2006 IPI initiated a new electronic newsletter (*e-ifc*), sent out quarterly to more than 2,000 email recipients. In each edition, three to four research items and a collation of events, new publications and an update of recently published papers with relevance to potassium fertilization are included. Edited by Dr. Ernest A. Kirkby, the newsletter provides scientific reports from IPI research projects in more than 20 countries spanning across Latin America, Europe, Africa and Asia. More than 80 research papers have already been published, and each year more are added.

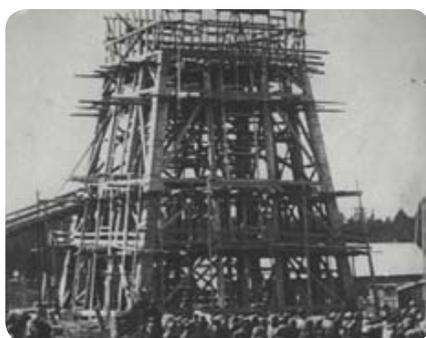
Providing "crop specific" information has been achieved by inviting eminent scientists to compile data on nutrient management for a specific crop. The first Crop Bulletin published by IPI in 1974 was on wheat, by Dr. G. Kemmler from the Bünthof Agricultural Research Center Station in Germany. More than 30 crop bulletins are now available, covering field crops, fruit and vegetables, and fiber



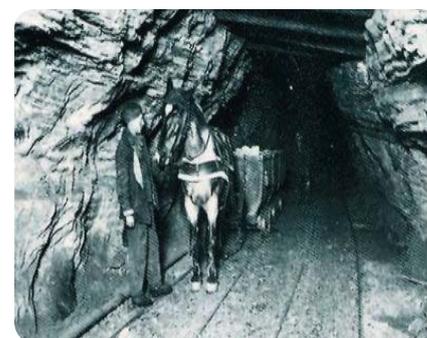
Early days for potash production at Dead Sea Works, Israel.
<http://www.iclfertilizers.com/Fertilizers/Pages/OurHistory.aspx>



Early days in Soligorsk, Belarus.
<http://www.kali.by/english/history.html>



1930: "Soyuzkali" decided to construct the Second Potash Mining Complex in Berezniki, later to become Uralkali's Berezniki 1.
<http://www.uralkali.com/about/history/>



Photograph showing the removal of ore using a horse to pull a train of wagons loaded with salt and potash. Alsace, France.
http://www.geowiki.fr/index.php?title=Les_Mines_de_Potasse_d'Alsace_au_fil_du_temps

crops, amongst others, with the Sugarcane Crop Bulletin to be released in the near future.

The need to highlight a specific issue such as fertigation, or potassium requirements of crops, led to the evolution of another series of publications known as “Research Topics”, produced every two years, to which IPI invites prominent scientists to contribute on relevant topics.

IPI has not only been involved in creating scientific findings, but also in disseminating them. Recent developments in information technology provide enormous opportunities for developing new, innovative dissemination tools. IPI is developing several Apps which will run on Apple and Android systems to allow users to: view a set of pictures demonstrating the effect of potash on a large variety of crops and illustrating typical deficiency systems (K gallery); read and search through the IPI e-newsletter (*e-ifc*); or calculate nutrient removal rates from various crops. The excellent resolution, search and sharing tools makes these Apps on either Apple or Android smart phones and tablets very useful to smallholder farmers, extension experts as well as researchers.



Screen shot from IPI's K gallery App. [View in App Store.](#)

Projects and activities

Worldwide, more than fifty ongoing field experiments and demonstration plots are executed each year, together with seminars, workshops and farmers' field days. International symposia are regularly conducted in countries where we operate, to demonstrate the essential role of potassium in optimized crop nutrition to various target audiences. IPI makes a major investment in reaching out to farmers, their suppliers and advisors and believes in field-level promotion and outreach to farmers, as well as in fundamental and applied research. We also work hand-in-hand with organizations that include extension services, universities and those willing to take part in farmers' gatherings, field days, open seminars, training courses and other learning-related activities.

Potash consumption during the last 50 years (1961-2010)

The first deliveries of potash fertilizer date back to 1880 (Table 1), with high growth rates recorded during 1880-1910 when we know that some deliveries were already crossing the Atlantic from Europe to the East coast of the US. In 1935, more than 60 percent of global potash sold originated from Germany, followed by supplies from the potash mines in France, Russia, Spain, Poland, US and Israel (Fig. 2).

The potash market (and all other agri inputs) recovered after the Second World War and in 1954, total deliveries were more than 5 million mt K₂O. From 1954 to 1961 (this period is not covered by the FAOSTAT database) growth was maintained at high level, and in 1961, total deliveries reached more than 9 million mt K₂O (FAOSTAT).

From the FAOSTAT database which also covers crop and nutrient data from 1961 till today, and with supplementary data from the International Fertilizer Association (IFA), various developments can be assessed:

Table 1. Global potash deliveries in the early years 1880-1938.

Year	Potash deliveries
	----mt K ₂ O----
1880	69,000
1890	122,000
1900	304,000
1910	858,000
1920	914,000
1930	2,000,000
1938	2,460,000

Source: Cowie, 1951 and Turrentine, 1943.

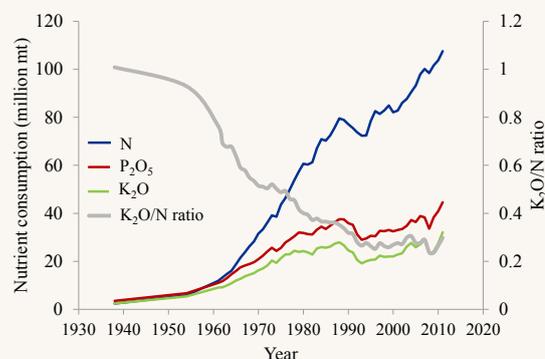


Fig. 1. N, P₂O₅ and K₂O consumption 1938-2010; K₂O/N ratio. Source: Cowie, 1951; FAOSTAT; and IFA for data from 1960.

- During the last 50 years, global crop production markedly grew (Table 2) with cereal production increasing by 177 percent, and some other crop groups by more than 300 percent (e.g. oil crops, vegetables and melons).
- Nutrient consumption grew steadily (Fig. 1), and that of N outstripped that of P and K (Fig. 1 and Table 2), with potash demonstrating the smallest increase of 203 percent from 1961 to 2010.
- The fall of the former Soviet Union (FSU) caused the most significant reduction in consumption of all nutrients (1988-1992; Fig. 1). Since 1992, no crisis has matched the magnitude of this time.
- The huge increase in N consumption also caused a sharp decline in the K_2O/N ratio (Fig. 1). While in the 1940-1950s, the use of N and K were similar, N use in 2010 is more than three times higher than K. Consequently the K_2O/N ratio declined sharply till after the demise of the FSU, but from the mid-90s, K_2O/N ratio has been stable (~0.28) and slowly improved. This development can be explained by the composition, or the change in growth rates, among the various crop groups: more oil crops, sugarcane, vegetables and fruit are grown in comparison to the composition in the 1960s. All these crop groups require more K than cereals.

A closer look at the development of potash consumption shows the following:

- Potash consumption grew steadily from 1961 to 1989 and from 1993 till today (Fig. 3), reaching more than 32 million mt of K_2O .
- The only period when consumption was reduced for more than one year in succession (except a single event of two years reduction in 1980 and 1981) was from 1989 to 1993, during the demise of the FSU.
- During this 50 year period, negative growth only occurred during 12 years, all of which were single year declines (except for 1980-1981 and 1989-1993).
- The average annual increase in potash consumption for the 1961-2010 period is three percent, but when separated into three distinctive periods, we see an average annual increase of 4.4 percent (1961-1988), -7.2 percent (1989-1992) and 3.22 percent (1993-today).
- This shows the resilience of consumption trends and the continued need for potash in global agriculture.

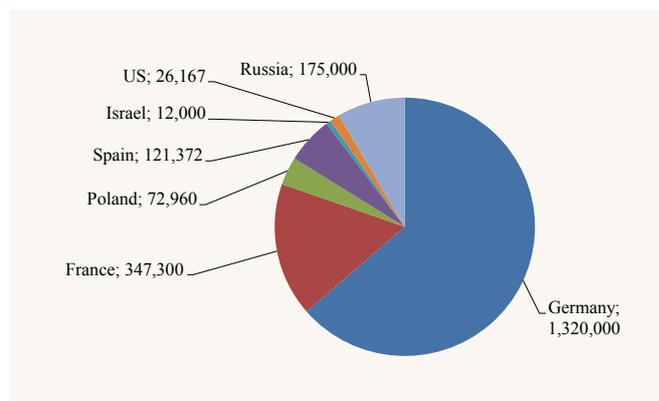


Fig. 2. Global potash sales (mt K_2O) in 1935. Source: Turrentine, 1943.

Table 2. Crop production and nutrient consumption (metric tonnes) during the last 50 years.

	1961	2010	Increase
	-----mt-----		%
<i>Crop production</i>			
Oil crops	25,752,797	168,444,789	554
Vegetables and melons	222,591,949	965,650,533	334
Sugarcane	447,977,518	1,685,444,531	276
Fruit (excl. melons)	175,029,853	609,213,509	248
Cereals	876,874,902	2,432,236,739	177
Pulses	40,783,485	67,652,942	66
Roots and tubers	455,331,211	727,303,077	60
<i>Nutrient consumption</i>			
Nitrogen (N)	11,851,000	103,700,000	775
Phosphorous (P_2O_5)	11,037,000	40,900,000	271
Potassium (K_2O)	9,068,000	27,500,000	203

Source: FAOSTAT.

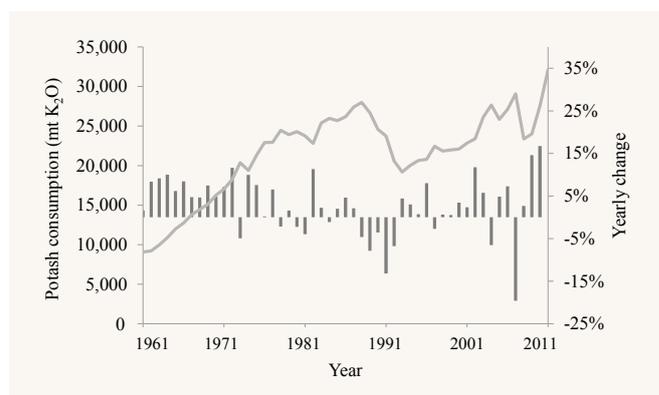


Fig. 3. Potash consumption (line, mt K_2O) and yearly change (bars, %) from 1961 to 2011. Source: FAOSTAT and IFA.

Members of the Board of IPI



From left to right: P. Losson, Vice President, Tessenderlo Kerley International, Belgium; I. Goldstein, Senior Vice President Marketing, ICL Fertilizers, Israel; C. Brückner, IPI President, Switzerland; O. Petrov, Director Sales and Marketing, JSC Uralkali, Russia; V. Ivanov, Director General, JSC Belarusian Potash Company, Belarus.

Conclusions and way forward

The vision of the IPI founders in 1952 is still valid today. Our principles of cooperation have lasted through many years in many regions and crises as farmers, and those who assist them, value a constant flow of science and partnerships to enable progress. Römheld and Kirkby (2010) describe the needs and prospects for research on potassium, and highlight the need for advanced and effective dissemination of knowledge. The rapid development of ICT provides many new tools to allow much faster and more effective dissemination of practical knowledge to farmers using smartphones and web connections. We, at IPI, believe that advanced dissemination is one of the first tools necessary for increasing agricultural productivity.

Römheld and Kirkby (2010) summarized and highlighted the needs for future potassium research:

- The relation between K and nutritional quality.
- Role of K in mitigating biotic and abiotic stresses (also in relation to climate change).
- The relation between K intake and human and animal health.

Other fields which require future research include:

- Developing online tools to identify in-field potash requirements.

- Developing models for better potassium recommendations based on soil, plant and environmental factors.
- Increasing the efficiency of potassium use by plants (Rengel and Damon, 2008; White, 2013, in press).

The practice of intensive fertilization to support massive food production for an increasing global population with higher dietary requirements has a short history. During the last 50 years, food production has hugely increased. However, consumption of nutrients N, P and K has been much skewed towards N, causing potassium depletion in soils and reduction in yields in many regions. Therefore, to enable closing yield gaps and allow for a much higher productivity in many regions, a significant increase in K fertilization is required (Mueller *et al.*, 2012).

Meeting the future demand for food is a huge challenge. By 2050, food production needs to have doubled, but achieving this will be very different to the past, depending on crops with a much higher demand for K than cereals, such as oil and sugar crops, fruits and vegetables, and roots and tubers. Considering the need for additional intensification, as well as environmental stewardship, soil fertility management and sustainable production, the term “Balanced Fertilization” should be revived, as one of the simplest to implement yet sound and appropriate measures farmers need to use in the future.

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For more about the history of potash and IPI go to the
[IPI website](#)