

## Research Findings

### Soluble Fertilizers in China: A Report from the 2<sup>nd</sup> International Forum on Soluble Fertilizers

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More than 200 delegates gathered at the 2<sup>nd</sup> International Forum on Soluble Fertilizer held in Urumqi, the capital of Xinjiang autonomous region, China, on 13-15 of June 2011. The event was co-organized by the China Agri-Production News (CAPN), the China Co-operation Times, the Institute of Fertilizer Application and Engineering and the Chinese Academy of Agricultural Sciences (CAAS). Around 20 experts from CAAS, the National Agrotech Extension and Service Center (NATESC), the National Center for Quality Supervision and Testing of Chemical Fertilizer (Beijing and Shanghai), China Agricultural University and South China Agricultural University joined a large number of participants from the fertilizer industry.

"The soluble fertilizer industry is facing new opportunities for development. Technology innovation, combined with enabling state agricultural policies to develop marketable products, is the main challenge for the soluble fertilizer industry today. CAPN is willing to provide comprehensive services to industries, not only enterprise promoting, but technological support and marketing programs as well. And this top forum is a second try on soluble fertilizer after the success of the event last year," said Mr. Zha Yingxin, Chief Editor of the China Co-operation Times.

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At the conference. Photo by Zhou Wenjun, CAPN.

Since drip irrigation was first introduced to China from Mexico in 1974, much attention has been paid to micro-irrigation systems (MIS). However, fertilizer application using MIS in China was not widely used until the 1990s and then only on a very small scale. Fertigation was more widely adopted in China in the early 2000s, as a result of five extensive annual training courses held during 2000-2004, sponsored and conducted by NATESC in partnership with the International Potash Institute (IPI), and the first International Symposium on Fertigation in China in 2005.

In recent years, billions of yuans have been invested by the government in the research and production of fertigation devices, fertigation demonstration and extension projects, and fertilizer development for fertigation. China now has more than 30 manufacturers who produce a wide variety of fertigation equipment including drips and douches, pipes and fittings, filters and valves - for all types of irrigation users. Xinjiang Tianye Water Saving Irrigation System Company Ltd. is one such company, which has 200 production lines producing 1.5 billion meters of drip irrigation tapes annually.

The area under MIS has also expanded in recent years in China. For example, Xinjiang now has 24 million mu (equal to 1.6 million hectare) of drip irrigation,

mainly under plastic mulching, and predominantly for cotton, potato and wheat crops. Most importantly, all drip irrigation is combined with fertilization (fertigation).

The first soluble fertilizer was produced in China during the mid 1980s, which coincided with the development of compound fertilizers in China. At the time, soluble fertilizer was known as foliar fertilizer as it was mainly applied by spraying on plants' leaves. Since the 1990s, farmers have applied fertilizers by dissolving them in the flow of irrigation water provided to flood greenhouses, especially in Shandong province, the main region for vegetable production in China.

After 2006, the Ministry of Agriculture (MOA) released four soluble fertilizer standards, namely water-soluble fertilizers containing nitrogen, phosphorus and potassium (NY1107-2010); water-soluble fertilizers containing humic acids (NY1106-2010); water-soluble fertilizers containing micronutrients (NY1428-2010); and water-soluble fertilizers containing amino-acids (NY1429-2010), as well as other related technical standards for soluble fertilizer package (e.g. determination of nutrient content). The main standards have been amended almost every year since first introduced in 2006. Up to May 2011, there are 180 water-soluble fertilizers containing

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macronutrients that have passed the MOA registration procedure.

In recent years, the soluble fertilizer industry has boomed because of its advantages in reducing fertilizer, water, labor and cost, and increasing yield and quality, accompanied by favorable policies for modern agriculture development and substantial investment in fertigation technology expansion. For example, in Xinjiang, 300,000-400,000 tons of soluble fertilizers are used annually. Application of soluble fertilizer has changed from foliar fertilization or flood irrigation in greenhouses to partial wetting and fertigation. Producers have also shifted from modest small-scale companies to large-scale enterprises. What's more, manufacturing techniques have evolved from simple blending to higher value soluble compounds. It is clear that soluble fertilizer was the fastest developing sector in the chemical fertilizer industry during the last decade in China.

Despite this increasing trend, it is still early days for soluble fertilizer producers, especially for fertigation purposes. There is much potential to develop this sector further. Some key recommendations can be drawn from the Forum discussion. Firstly, fertilizer companies, and related research institutes, should study and develop new types of soluble fertilizers suitable for the fertigation system. Secondly, the industry should create new assembly lines and produce high quality products which cater to the demand for fertigation development. Thirdly, it requires collaboration between fertilizer producers, irrigation companies and the agro-tech extension system. The fertilizer industry should know more about the fertigation system and its management, especially the requirement for soluble fertilizers. Companies should provide farmers with advanced packages of products and services. Support from the Chinese extension sector is vital. Fourthly, the

administrative department needs to establish special technical standards for soluble fertilizers used for fertigation, as a practical tool for registration and quality evaluation. Finally, government should make favorable policies to encourage farmers to use fertigation and soluble fertilizers, and strengthen market supervision for quality control of soluble fertilizers.

"Irrigated land is approximately 50 percent of the total arable land of 130 million hectares in China. According to the overall planning made by the government, irrigated land will increase by 25 percent by 2030. Meanwhile, soluble fertilizer usage in China is less than 1 percent of total national fertilizer consumption. And yet fertigation can save 60 percent water, 5 percent land, 40 percent fertilizers,

reduce labor costs by 70 percent and increase yields under normal conditions by 30 percent. Fertigation offers a great opportunity to bring policy-makers, academics, promoters and producers together," said Professor Wang Daolong, the director of soil and fertilizer institute, CAAS. "I strongly believe this forum will boost the rapid development of water-saving agriculture and fertilizer-saving technology in China, and advance the science and technology of soluble fertilizer production and application." ■

**The paper "Soluble Fertilizers in China: A Report from the 2<sup>nd</sup> International Forum on Soluble Fertilizers" appears also at:**

[Regional Activities/China](#)

### IPI-NATESC Activities to Assist in Developing Fertigation in China

From 1999 to 2005, IPI and NATESC invested in various activities to introduce and demonstrate fertigation use in China. The main stay of this cooperation was the annual training course on fertigation, with theory and "hands on" experience of fertigation systems. Hundreds of technicians and policy-makers at the provincial level participated in these courses.

Through this activity and other projects, the following publications, some in Chinese, are available on the IPI website:

- Fertigation: Optimizing the Utilization of Water and Nutrients. Fertigation Proceedings: Selected Papers of the IPI-NATESC-CAU-CAAS International Symposium on Fertigation, Beijing/China, 20-24 September 2005, 182 p. ISBN 978-3-9523243-8-7. Edited by P. Imas and M.R. Price. Available on <http://www.ipipotash.org/publications/detail.php?i=269>.
- Presentations from the IPI-NATESC-CAU-CAAS International Symposium on Fertigation appear on the IPI website at <http://www.ipipotash.org/speech/index.php?ev=54>.
- Fertigation. Chenglin Zhang, College of Resources and Environment, South China Agricultural University, Guangzhou, 510640, PR China. Published by the China Chemistry and Industry Press. 2006. This publication was supported by IPI. For a hardcopy, please contact Dr. Chenglin Zhang, Tel: 86-20-85281822.
- Fertigation and its Practice in China. Eds. T. Youguo (NATESC) and H. Magen (IPI). 115 text pages (in Chinese) and 8 color pages with pictures. Published by NATESC. 2003. For copies please contact Dr. Tian Youguo ([tianyouguo@agri.gov.cn](mailto:tianyouguo@agri.gov.cn)). See also at <http://www.ipipotash.org/publications/detail.php?i=79>.
- A leaflet on Technical Aspects of Fertigation. 2010. Edited by P. Imas, Tian Youguo and H. Magen. 8 pages. DOI: 10.3235/978-3-905887-04-4. Download at <http://www.ipipotash.org/publications/detail.php?i=312>.
- Fertigation Management in Young Apple Trees in Shandong, China. 2008. *e-ifc* No. 18. <http://www.ipipotash.org/eifc/2008/18/2>.