

Iodine Market Situation

Briefing Note for Universal Salt Iodization Program Stakeholders Prepared by GAIN, MI and UNICEF
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1. Summary

Iodine in the form of potassium iodate is the crucial source for salt iodization. After the March 2011 earthquake and tsunami in Japan, the Network for Sustained Elimination of Iodine Deficiency (the Iodine Network)¹ received a written request from the Indian Potassium Iodate Manufacturers Association asking for assistance in relation to a significant increase in iodine raw material prices affecting their ability to produce potassium iodate (KIO₃). GAIN and UNICEF² were tasked to investigate the causes of the price increase and the consequences it may have for salt iodization.³ While both potassium iodate (KIO₃) and potassium iodide (KI) are affected by this recent development, this review has principally focused on KIO₃.

The purpose of this note is to share recent developments and provide a future outlook of the prices and market mechanisms that determine global supply and price of KIO₃. This information is intended to guide decision-makers from the countries which are responsible for ensuring universal salt iodization on how they might track and mitigate adverse impacts of price increases on iodized salt availability and consumption.

The key messages produced from this research are:

- a) KIO₃ prices are driven significantly by the input cost of iodine raw material which makes up approximately 60% of the cost of KIO₃. **A rise in iodine raw material price levels has resulted in a rise in the market price of KIO₃ to US\$50-60/kg at the time of publication.**⁴
- b) **Salt iodization constitutes only a small portion of the market for raw iodine.** Market factors driving up the cost include the **rising demand for iodine in other industrial applications**, and the **long lead-times for producers to expand iodine production capacity** in line with unexpected increases in demand. This situation combined with the supply disruption in Japan has constrained supply capacity resulting in a high market price of iodine.
- c) **Iodine prices are not expected to stabilize until mid-2012**, and therefore it is also expected that the current high market prices for KIO₃ will persist for at least the next 12 months. **Program managers** working on salt iodization therefore **need to consider the impact of these factors on their programs and devise mitigating solutions** and tactics to maintain continuity of salt iodization activities until iodine prices stabilize.
- d) **Universal Salt Iodization targets may be put in jeopardy unless action is taken.**

2. Global Iodine Market Overview

The global crude iodine market is about 31,000MT⁵ and about 70% of crude iodine is traded internationally. The four largest direct export flows are from Chile to the USA, Europe (through Belgium), China and India. China and India are the main destination markets for iodine exported from Turkmenistan,⁶ Azerbaijan, Indonesia, Iran, China, and Russia.

¹ The Network for Sustained Elimination of Iodine Deficiency is an alliance of public, private, scientific and civic organizations whose goal is to harmonize support activities that assist countries in reaching the goals of optimal iodine nutrition and sustained IDD elimination mainly through universal salt iodization.

² In 2008, as part of the global efforts GAIN and UNICEF formed a partnership to sustain elimination of iodine deficiency, which specifically highlighted the need for a greater business and market orientation, in which salt producers and salt traders take on a more significant leadership role in salt iodization programs.

³ Information for this briefing note has been collected from the following sources: the UNICEF Supply Division, UNICEF and GAIN country staff, interviews with KIO₃ suppliers, the Micronutrient Initiative, and the Roskill Information Services report, "Iodine: Global industry markets and outlook, tenth edition, 2010."

⁴ Market price is according to the UNICEF Supply Division and GAIN Premix Facility cost survey. However, there are cases of KIO₃ being purchased for roughly \$42/kg as per the Micronutrient Initiative, 24 August 2011.

Salt iodization accounts for only 4% of the iodine market. Over 50% of the market is used in areas related to human health: x-ray machines (20%), biocides (14%), pharmaceuticals (13%) and salt iodization (4%); and the remainder in industry: optical polarizing film (12%), heat stabilizers (9%), animal feeds (8%), catalysts for production of plastics and other synthetic materials (6%), fluorine derivatives (6%) and other (7%).

Demand for iodine is forecast to rise between 3% and 5% per year through 2014, mainly driven by use in LCD screens. In the same period iodine capacity is expected to rise 2.7% per year.⁷

Iodine Supply Chain

Iodine sources are concentrated in Chile (55% of global production) and Japan (33% of global production). Estimated total reserves of iodine exceed 14 million tons, enough to support hundreds of years of production. In Chile, iodine is found in caliche ore, while in Japan and the rest of the world, iodine is mainly found in brines near oil and gas reserves. Nine companies in Chile, Japan, and USA produce 83% of the world's iodine.

In Chile, calcium iodate deposits in caliche ore are mined at or near the surface. Iodine is extracted from calcium iodate through a simple chemical process. In Japan and all other iodine-producing countries, iodine is extracted from brines (and to a lesser extent from seaweed mainly in China), which is a more complicated and expensive process. Brines are taken from wells that can be 1,800-3,000m in depth and have to be replaced on a regular basis. A number of different processes have been developed to extract iodine from brines.

The cost of crude iodine makes up about 60% of the production cost of KIO_3 used in salt iodisation and is therefore the most significant factor affecting the market price.

3. Outlook on Iodine Supply and Potassium Iodate Prices

According to the Roskill Information Services study on the global iodine market, historic average prices of iodine rose steadily from a low of US\$13/kg in July 2003 to around \$30/kg in 2009 as published by Industrial Minerals. Given normal market conditions the price of iodine has been forecasted to reach \$35-40/kg by 2014. The value of Chilean and Japanese exports were similar to one another until 2004 when Chilean export values rose at a higher rate (\$25/kg) than Japanese values (\$21/kg). The average price of iodine on the global market is mainly driven by Chilean iodine because Chile is the world's largest exporter.

According to one KIO_3 producer, current prices levels are mainly due to a global supply shortage which is expected to continue into 2012. Iodine producers slowed production during the economic downturn in 2008/2009, then received customer forecasts lower than actual demand during the economic turnaround in 2010. This led to an inability to maintain reserve stocks and meet demand from late 2010. The earthquake, infrastructure damage and subsequent shortages in electricity supply in Japan has further depressed iodine output in the country and exacerbated the situation. Prices are expected to stabilize in 2012, however it is difficult to predict when and where the market price will settle with certainty due to the many external factors involved.

The current average global market price of KIO_3 is \$50-60/kg (UNICEF Supply Division and GAIN Premix Facility), which depending on existing contracts, stocks, or subsidies, may vary by country. The most recent price paid by MI at the time of this note was \$42/kg. Some producers have acknowledged that production of KIO_3 will continue to be constrained by the limited availability of iodine raw material in the global market in the next 12 months, and therefore it is likely that the high prices will persist at least until mid to late 2012.

⁵ This is the most recent estimate according to available sources.

⁶ While China and India are the main export markets for Iodine from Turkmenistan, this may not include KIO_3 .

⁷ Roskill Information Services, Ltd. (2010). Iodine: Global industry markets and outlook. Tenth Edition, 2010. London, UK.

4. Implications for USI Programming

Given that the price of iodine is not expected to stabilize before mid to late 2012, interim solutions should be devised to ensure that salt iodization programs are not interrupted.

The following are recommendations for actions at the country level:

- a) Inform national coalition and stakeholders of the increase in KIO_3 price that could impact USI programs;
- b) Encourage governments to monitor KIO_3 price and availability issues which may result in elevated prices for iodized salt being passed onto consumers as well as monitor changes in iodized salt consumption;
- c) For program managers, suggest options to stakeholders about what can be done to avoid interruption or reduction in the production of iodized salt in country including: building reserves of supply or financing models, outlining the support that GAIN or UNICEF can provide (e.g. obtaining up-to-date information on prices and developments in the iodine market, negotiating as low a price as possible for KIO_3 , making limited resources available to provide technical assistance or other support); and
- d) Approach GAIN, MI, or UNICEF to seek further clarification.

Certain supply mechanisms are available for companies, program managers, and government agencies who are procuring KIO_3 : the GAIN Premix Facility, UNICEF Procurement Services, and Micronutrient Initiative programs.

- a) The GAIN Premix Facility (GPF) is an initiative launched by GAIN to facilitate the reliable supply of affordable, quality certified vitamin and mineral premix for large scale food fortification projects and food producers. Orders are subject to a competitive tender process by a group of prequalified premix manufacturers. The GPF is also open to any organization or company producing nutritious food products for people vulnerable to malnutrition. Customers can send a request for a quotation through the GAIN premix facility website: premixfacility@gainhealth.org. For more information, contact Greg Garrett at ggarrett@gainhealth.org
- b) UNICEF Procurement Services combines global reach with local knowledge. It is managed from UNICEF's Supply Division in Copenhagen, in collaboration with the organization's country offices covering 158 countries and territories. UNICEF Procurement Services assists development partners in the procurement of quality, value-for-money supplies from reliable manufacturers at an affordable price and according to international standards. The following entities are eligible to procure from the UNICEF Supply Division: Governments, Non-Governmental Organizations, United Nations Agencies, International Financial Institutions, and Philanthropic Organizations. For procurement service enquiries, contact psid@unicef.org. For more information, contact Jan Komrska at jkomrska@unicef.org.
- c) MI supports USI programs in Asia and Africa including limited procurement of KIO_3 . For more information, contact Pankaj Jain pjain@micronutrient.org.

Iodine deficiency is the world's leading cause of preventable mental impairment. It is especially damaging during the early stages of pregnancy and in early childhood. In their most severe form, iodine deficiency disorders include cretinism, stillbirth and miscarriage, and increase infant mortality.⁸ Even mild deficiency can cause a significant loss of learning ability – about 13.5 intelligence quotient points at population level – as well as other symptoms such as goitre, an abnormal enlargement of the thyroid gland.⁹ These consequences of iodine deficiency threaten the social and economic development of many countries. Since 1994 the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have recommended universal salt iodization (USI) as a safe, cost-effective and sustainable strategy to ensure sufficient intake of iodine by all individuals.¹⁰ Over the past 20 years, a worldwide effort has been under way that has dramatically raised the proportion of people consuming iodized salt – from less than 20 percent to about 72 percent.¹¹

⁸ Hetzel, B. S. (1983). "Iodine deficiency disorders (IDD) and their eradication." *Lancet* 2(8359): 1126-9, and Hetzel, B. S. (1996). "Iodine deficiency: a global problem." *Med J Aust* 165(1): 28-9.

⁹ Bleichrodt, N. and M. Born (1994). A meta-analysis of research into iodine and its relationship to cognitive development. New York, Communication Corporation.

¹⁰ United Nations Children's Fund, World Health Organization (1994) World Summit for Children - Mid-decade goal: Iodine Deficiency Disorders. In Joint Committee in Health Policy. UNICEF and WHO. Geneva: UNICEF/WHO.

¹¹ UNICEF (2011). The State of the World's Children 2011: Adolescence - an age of opportunity. New York, NY, The United Nations Children's Fund.