South Africa: leading the way with 60 years of salt iodization

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Background
South Africa historically had widespread iodine deficiency, and endemic goiter was first reported in the country in 1927. Voluntary iodization of table salt was introduced in 1954 at a level of 10-20 ppm of iodine. But for nearly four decades there was no monitoring or reporting of its effects - it could be said that the South African scientific literature was iodine deficient during this time!

In the early 1990’s, a Medical Research Council (MRC) review of the availability of iodized salt in the country indicated that less than 30% of table salt was iodized, its accessibility was uneven with little iodized salt available in rural areas, and that the low socio-economic strata had poor access to iodized salt. Salt iodization was failing. These studies led to the introduction of mandatory table salt iodization at a higher level of 40-60 ppm in December 1995.

An active and energetic coalition of stakeholders, including the Department of Health, salt producers, UNICEF, MI, GAIN and iodine scientists, have coordinated a range of iodine activities strengthening the salt iodization program in the country. As a compromise to accommodate technological difficulties of salt producers to achieve the required iodization level, the Regulation was revised in 2007 to allow a bigger acceptable range of 35-65 ppm.

Impact of introducing mandatory salt iodization
A 1998 national survey, commissioned by the National Department of Health, showed a national median urinary iodine concentration of 177 µg/L in school children with persisting iodine deficiency in a few areas. At the same time, a MRC national study showed that 62% of households were using adequately iodized salt containing more than 15 ppm of iodine, determined by titration. A subsequent 5-year information, education and communication program increased the salt producers’ knowledge of iodine nutrition and improved the accuracy of iodization. Repeated external monitoring of the iodine
content of salt through a constructive mutual interaction with salt producers, particularly in the case of the five large producers in the country. Reaching out to salt producers by conducting titration training workshops at their iodization plants improved their internal quality control.

Measurable proof of improved accuracy of salt iodization in the country was demonstrated in a 2005 national survey: the coverage of adequately iodized household salt increased to 77% and the national median urinary iodine of school children further increased to 215 µg/L. This study also showed sufficient iodine status in adult women with a median UIC of 177 µg/L. Although some geographic variation in iodine status still exists in the country, the overall indicators suggest iodine sufficiency in the population.

**Other key factors**

Besides the crucial role salt producers have played in the success of the program, several other process factors are also important. These include:

**Iodine in processed foods:** The earlier version of the iodized salt regulation did not call for the use of iodized salt in the production of processed foods, whereas this point is ambiguous in the revised version. Despite this, even before the regulation was revised in 2007, a study showed that a third of bread bakers, margarine producers and producers of salty snack flavorants unknowingly used iodized salt in their products, despite unfounded concerns about the cost, potential ill-health effects or effects on the quality of their products.

**Iodine in the drinking water:** The iodine concentration in drinking water, measured in the 2005 national survey, was generally low in all of the nine provinces except for two provinces where it was moderately elevated in one province (Limpopo Province) and strikingly elevated in another (Northern Cape Province). This data explains the excessively high urinary iodine concentrations observed in children and women in the Northern Cape and partly compensates for a poor coverage of adequately iodized salt in Limpopo.

**Knowledge of iodine nutrition amongst the general population:** A national survey showed very low knowledge about iodine nutrition in the general population. This information strengthened the motivation for mandatory salt iodization because the general population does not appear to have sufficient knowledge to make sensible decisions about procuring iodized salt for household use or for creating a public demand for iodized salt.

**Sources of household salt:** Nationally 78% of the population obtain their household salt from typical food stores selling iodized salt, while the balance, 22%, obtain it via unconventional channels often selling non-iodized agricultural salt. Around 30% of low socioeconomic households obtain their salt from unconventional sources compared to less than 5% in high socioeconomic households, emphasizing the vulnerability of low socioeconomic groups to the use of non-iodized salt.

**Summary**

Over the years, beginning with introduction of voluntary salt iodization in 1954 at a low level, followed by mandatory salt iodization at a higher level, the South African salt iodization program evolved into a nationally successful program providing sufficient iodine to women and children. However, there is still room for improvement, particularly in increasing the coverage of adequately iodized salt at the household level to the international goal of 90% and addressing the geographical variation seen in some key indicators.

**ABOUT THE AUTHOR**

Pieter Jooste received his PhD from the University of Stellenbosch (South Africa). He is an iodine scientist and worked at the Nutrition Research Unit of the Medical Research Council of South Africa for more than 30 years until his retirement in 2013, the last 5 years as Director of the Unit. He is the ICCIDD Iodine Network Regional Coordinator for Southern Africa.