Salt iodization stalls in Mozambique

Iodine and wage benefits in Tanzania

Mother-baby iodine project

Salt iodization in Madagascar

IODINE GLOBAL NETWORK is a nongovernmental organization dedicated to sustained optimal iodine nutrition and the elimination of iodine deficiency throughout the world.
Mozambique struggles to improve iodized salt quality

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Mozambique borders Tanzania, Malawi, Zambia, Zimbabwe, and South Africa. Its long Indian Ocean coastline of 2,500 kilometers faces east to Madagascar. About two-thirds of its population of more than 31 million live and work in rural areas.

Iodine deficiency continues to effect the population of Mozambique. An estimated 3.5 million children between the ages of 6 and 12, and more than 1.5 million women suffer from iodine deficiency in Mozambique. Because of its large-scale effects on cognitive capacity, iodine deficiency is a serious threat to the overall development of the country (1).

Universal salt iodization programs have been adopted all over the world, in view of achieving IDD elimination. Mozambique joined the program through Decree No. 9/2016 of April 18th of the Council of Ministers which approved the regulation of fortification of industrially processed food with micro-nutrients, which defined that the salt intended for human consumption must contain iodine in the proportion of 25mg to 55mg per kilogram of the product.

UNICEF has supported the National Salt Iodization Programme since the nineties. The Ministry of Industry and Commerce and the Ministry of Health agreed to establish working groups to support, coordinate and oversee the implementation of a national salt iodization with the primary role of advocacy, including communication, education and formulating recommendations. The support included supply of KIO3, supply of test kits for rapid check of the iodization process, training on salt iodization techniques and testing. But these activities have been slowly fading in Mozambique partly because of a lack of support, resources and financial backing. As consequence, Mozambique remains on the list of countries with insufficient iodine intake with a median urinary iodine concentration (UIC) of 97 µg/L (data from 2011-2012) (Iodine Global Network, 2021).

What was planned?
Since the introduction of the Universal Salt Iodization program, the supply of KIO3 has been fundamental to the fight against problems arising from iodine deficiency. For many years, in developing countries where significant parts of the population suffer from IDD, KIO3 was distributed free of charge to salt producers with the purpose of encouraging them to produce affordable iodized salt. In recent years this model has been losing sustainability as the capacity of financiers and their willingness to continue providing donations of the fortifier has been decreasing.

This is the case of Mozambique, where donations of KIO3 offered by UNICEF ceased in 2015. Until that time, KIO3 donations were made by UNICEF to the Ministry of Industry and Commerce and then sub distributed by the provincial directorates from where KIO3 reached the salt producers. Producers have been using the remaining KIO3 found in some provincial directorates, but this stock is running out quickly and, in some districts, there is no longer any available KIO3.

What failed?
The lack of sustainable contribution models by the donors often results in situations like the one currently affecting the salt sector in Mozambique, in which the replacement of the free distribution model with another alternative model was not made in a timely way to avoid discrepancies in access to iodate.

After the discontinuity of the supply from UNICEF, the producers did not have viable alternatives to acquire the fortificant. In this context, the implementing authorities are unable to perform systematic monitoring and law enforcement. The National Directorate of Industry at the Ministry of Industry and Commerce believes that the reluctance of small producers to comply with iodized salt legislation is one of the main obstacles on the road to successful USI in Mozambique.
The forecasting and distribution of KIO3, procured by UNICEF, presents another challenge that also contributes to the irregular fortification (2). Our recent study, described below, confirmed these reasons for failure.

**What are the specific problems?**

We determined the iodine content of iodized salt at the production stage in different salt plants around the country, assessed the perceptions and knowledge of salt producers about the health benefits of iodized salt, and examined the internal quality control procedures used during iodization.

To accomplish this aim, we visited more than 200 salt producing plants in five of the six salt producing provinces; where 122 salt samples were collected and interviewed 98 chief executive officers or senior managers closely involved in salt iodization.

For iodine determination in salt samples, we used titration, the standard method. The results of iodine determination in salt samples, indicate that, in general, salt is not iodized in accordance with the legal requirement or is not iodized at all in many salt plants at the production stage. Out of the 122 samples analyzed, only 4 comply with the legislation.

There were shortcomings in perceptions and knowledge about iodine deficiency disorders and in the internal quality control procedures of a substantial proportion of the producers. Only 20% of the interviewed producers knew the concept of universal salt iodization, 40% knew the name of the disease resulting from iodine deficiency, and the most worrying is the fact that only 18% knew the name of the compound required by law for salt iodization, and only 14% correctly answered the question in regard to the final iodine concentration in salt required legally in the country.

Additionally, we found that consistently the small-scale salt producers, of which the majority are not licenced, are challenged by the lack of available KIO3 supply in the local market. Also, the low quality of salt produced hinders the establishment of a fair price and reduces the financial capacity. Some of the challenges that remain include KIO3 procurement mechanisms, which need to be simplified for salt manufacturers, quality control, as well as awareness and promotion of iodised salt to encourage demand.

**How to undo the knot?**

To achieve optimal iodization there should be an information, education and communication strategy aiming at improving knowledge of iodine deficiency disorders among consumers and salt producers. Also important is national regulations, and solid technical advice for the producers in the procedures needed to acquire the premix and to correctly iodize salt to meet the values required. Regular supervision visits and external monitoring should be implemented.

**Acknowledgements**

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**References**

Iodine benefits education, career choice and long-term wages in Tanzania


This paper presents the first evidence on long-term economic consequences of iodine deficiency in Africa. People exposed to increased iodine intake are less likely to work in agricultural self-employment and more likely to hold skilled jobs that typically demand higher levels of education.

This paper shows the clear impact of a large-scale iodine supplementation program in Tanzania on individuals’ long-term economic outcomes. Exploiting the timing and location of the intervention, the data show that in utero exposure to the program increased completed years of education and income scores in adulthood. There was no increase in total employment, but a significant change in the occupational structure. Together, these results demonstrate that iodine deficiency can have long-run implications for occupational choices and labor market incomes in low-income regions.

Existing research on the long-run impacts of iodine deficiency has focused nearly exclusively on the United States and Switzerland. However, the highest prevalence of iodine deficiency is in Sub-Saharan Africa and Asia, where many children grow up in conditions of extreme poverty. Though the biological benefits of iodine and other nutritional interventions are well known, it is unclear whether such interventions can improve individuals’ long-term economic prospects in low-income settings. In the presence of credit constraints and the absence of a well-functioning public education system, even relatively large changes in cognitive capacity may have limited or only short-lived impacts on human capital.

While some studies have examined the short-term impacts of iodine deficiency on student outcomes such as test scores, they do not speak directly to the question of whether such gains are sustained or whether they will ultimately have long-term impacts on the subsequent success of children in the labor market later in life.
This paper sheds new light on this question by examining whether and to what extent iodine supplementation early in life affects completed education, employment outcomes, and occupational attainment in one of the poorest regions in the world. In 1986, the government of Tanzania launched a large-scale iodine supplementation program to control the high prevalence of iodine deficiency in the country. The program distributed iodized oil capsules (IOC) in afflicted districts, giving high priority to women of childbearing age and young children. Depending on the dosage, supplementation with IOC can offer protection against fetal iodine deficiency for approximately four years, so children conceived just before or around three years after the campaign are likely to have received some fetal protection. Distribution campaigns were scheduled to begin in 1986, with additional doses taking place in subsequent years. However, there were several delays in many districts due largely to administrative issues — i.e., the time required for the central government and local offices to coordinate a distribution system. Between 1986 and 1994, approximately 5 million mothers and children received supplementation with IOC, and follow-up surveys suggest that prevalence rates of goiter fell by more than half soon after program implementation.

Depending on the date of the distribution campaign, some cohorts were exposed in utero to the program, whereas others were exposed only after birth. Individuals exposed in utero or even during the first years of life had more to gain from the program in comparison to those who were already “too old” at the time of the campaign. This study compares cohorts based on their place of birth, and their year of birth relative to the IOC campaign to identify the long-run impacts of the program. The variation in the timing of the campaigns and date of birth allowed to calculate the impacts of the program at different ages of exposure — i.e., from in utero to the first years of life.

The authors began by estimating the impact of the program on completed education. They found that individuals who were exposed in early life to IOC acquired an additional 0.17 years of education and are 2 percentage points more likely to complete secondary school, effects that represent respectively about 2.5 and 12 percent relative to the baseline. Examining the timing of these impacts, they found that the results are driven by exposure during the in utero period, with little to no differential benefits from exposure after birth.

They then examine the effects of the program on labor market outcomes. Their estimates suggest that in utero exposure to IOC increases occupational skill scores, increases the probability of being employed in a position belonging to a skilled occupation, and reduces the likelihood of self-employment in agricultural activities. This suggests that iodine supplementation affected individuals’ labor market outcomes by shifting employment shares from agriculture towards jobs that typically demand more skilled labor and have higher economic returns. The estimates indicate that skilled employment rates increased by about 1.1 percentage points (or 5 percent).

To provide estimates of program impacts on potential income wages and place their results in perspective, the authors predict income for an individual in the main sample based on his/her occupation, gender and location of residence. They find significant gains in this occupation-based income score. Exposed cohorts have occupational-income wages that are about 2.1 percent higher relative to unexposed individuals. For comparison, one of the most successful interventions targeting explicitly education in the context of a developing country impacts wages by 1.5 to 2.7 percent.

Overall, these results suggest that the improvements in occupational attainment induced by the IOC program translate into statistically meaningful differences in income wages. This suggests that the program affected individuals’ occupational status in adulthood by shifting employment shares from lower-paid occupations towards jobs that typically demand more skilled labor and have higher economic returns.

These data provide new evidence on the relevance of iodine for long-term development in the context of the pervasive prevalence of iodine deficiency. The results therefore may be particularly relevant for many countries in the developing world which still struggle to reduce the prevalence of iodine deficiency. The findings of this study suggest that underconsumption of iodine is an additional barrier to economic growth in developing countries, as it deters many individuals from acquiring human capital.
Pandas, bamboo and risk of iodine deficiency


The giant panda (*Ailuropoda melanoleuca*), is a world-famous species for wildlife conservation, and is well known for its small population. The giant panda, as a species of bear, still retains the simple digestive system of a carnivore. However, under the pressure of a specific habitat, pandas had to adapt to a monotonous plant diet consisting of bamboo with different species and growth stages around the year. The low reproductive rate of giant pandas, which likely contributes to their limited population density, might be related to their low iodine status (1). Ultrasound examinations of four captive giant pandas with reproductive dysfunction revealed two had thyroid cysts; given the close relationship between iodine and thyroid function, determining the iodine nutrition of captive giant pandas is likely to prove invaluable in the captive management of the species. Blood thyroid hormone levels of captive adult giant pandas were 64 % and 46.9 %, respectively, of the expected values for eutherian mammals of a similar body weight.

Moreover, the giant panda is an endemic species that lives in the typically iodine-poor mountains of Sichuan, Gansu and Shanxi Province, PR China. Giant pandas are highly specialized for a bamboo diet, however the abundant thiocyanate level in giant pandas, as the metabolite of cyanide derived from cyanogenic glycosides of bamboo, may compete with iodide for entry into the thyroid and mammary gland in giant pandas. Considering their low thyroid hormone status and the presence of thiocyanate, the iodine household of giant pandas may be very critical.

Therefore, the aim of this study, at the Chengdu Research Base of Giant Panda Breeding in China, was to investigate the iodine content of bamboo with different plant parts/vegetation stage and species, and the response of pandas’ iodine status in different age groups and to consuming different parts of bamboo.

Bamboo leaves had the highest iodine content (453 µg/kg dry matter (DM)), followed by the shoots (84 µg/kg DM, p < 0.05), while bamboo culm had the lowest value (12 µg/kg DM, p < 0.05). Urinary iodine concentrations (UIC) in giant pandas of different ages groups varied, with older pandas having lower UIC (Figure 1). As shown in Figure 2, in adult giant pandas, the median UIC during the bamboo shoot stage was 9 µg/L, which was significantly lower than that during the bamboo leaf-culm stage 40 µg/L (p < 0.05).

The authors concluded that different bamboo parts had different iodine content and as a result likely affected the urinary iodine of giant pandas. They generally suggest that captive giant pandas should be fed different parts of a variety of bamboo species to ensure that proper iodine levels are maintained throughout the year. Specific feeding strategies should be considered for each giant panda age group to address the issue of potential iodine deficiency.

**References**


**Figure 1** Urinary iodine levels in giant pandas of different ages groups. A dot represents one individual.

**Figure 2** Urinary iodine levels in 19 adult giant pandas during the shoot stage and leaf-culm stage of bamboo consumption.
Salt iodization in Europe and Central Asia Region (ECAR) countries has a long history and traces back to mid-1950’s. Universal Salt Iodization (USI) strategies were introduced in the ECAR countries in the mid-1990s and gained strong momentum during the 2000-2009 decade when the goal of optimum iodine nutrition was reached in 9 countries, with 6 other countries quickly approaching this goal. By 2010, the population’s access to adequately iodized salt in the region had risen to 55% - a quantum leap improvement compared to a previous decade but still short of the internationally recommended 90% target [1].

The objective of the present review was to document USI achievements and challenges in the ECAR countries during the decade of 2010-2020 and formulate recommendations for actions to sustain the national salt iodization programs.

Legislation and normative base:
According to the previous review conducted in 2009 [1], mandatory USI legislation and/or a normative base for iodized salt had already been enacted in all ECAR countries, except Russia and Ukraine. In these 2 countries, the use of iodized salt still remains voluntary despite decades of advocacy efforts, but governments of both countries are presently working on the adoption USI legislation to mandate the use of iodized salt.

Post 2010, changes in policy and legislation were reported in several ECAR countries. In Bosnia and Herzegovina, the use of only potassium iodate (KIO3) in iodized salt was made compulsory (the less stable KI was previously also permitted) and the required iodine level in salt was increased to 20-30 mg/kg. In Moldova, the salt iodine standard was lowered in 2011 to 20-35 mg/kg and the provision of iodized salt was made obligatory in restaurants and public catering. In 2015, the Parliament of Uzbekistan adopted an amendment, which abolished the previous requirement to provide non-iodized salt to people with a “contra-indication” to iodized salt; now all the salt intended for human consumption must be iodized. In Tajikistan a more comprehensive Food Fortification Law was adopted in 2019 that replaced the previous Iodine Deficiency Disorders (IDD) Prevention Law of 2002. Montenegro, in 2020, updated its standard for iodized salt and increased the iodine level to 20-30 mg/kg (from 12-18 mg/kg previously). In Albania the existing salt iodization law was revised by the Parliament in 2020 to require the use of iodized salt for human and animal consumption and the food industry. Some countries, such as Moldova, Russia and Turkmenistan, mandate the use of iodized salt in public (state-funded) catering, such as school lunches. In terms of the iodization standard, all former USSR countries, except Moldova, share a common standard of 40+/−15mg/kg. The Balkan countries apply lower iodization levels (20-30 mg/kg), with the lowest (12-18 mg/kg) still being in Serbia.

USI stand-alone programs versus integration in nutrition or non-communicable disease (NCD) related programs: Before 2010, dedicated stand-alone USI programs operated in the majority of the countries of the region. However, by 2021 no such dedicated programs were identified in ECAR countries; in 4 countries (North Macedonia, Montenegro, Tajikistan, Uzbekistan) USI was integrated into food/nutrition programs. The majority of countries (Armenia, Georgia, Moldova, Ukraine, Azerbaijan, Kyrgyzstan, Turkmenistan, Albania,
Children in Moldova have adequate iodine due to the iodized salt program

Bosnia & Herzegovina and Russia) salt iodization is incorporated within NCD prevention programs, which, however, focus on salt reduction and often do not include explicit USI objectives or targets.

Iodized salt production and supply: In the former USSR, salt production was highly centralized in a few large mines in Ukraine, Belarus and Russia. After the dissolution of the USSR, several former Soviet republics (Azerbaijan, Tajikistan and Uzbekistan) started domestic salt extraction/mining operations by engaging a large number of small cottage producers. Moldova and Georgia continued importation of iodized salt (mainly from Ukraine) while Kyrgyzstan imported both iodized salt and raw salt (for domestic iodization) from Kazakhstan. In the Balkan area, the Tuzla Solana company in Bosnia & Herzegovina, has remained the major supplier of iodized salt to the domestic market and for export to many former Yugoslav states (Serbia, North Macedonia, Montenegro and others) that lack their own salt production. Large salt producers in Bosnia & Herzegovina, Ukraine, Belarus, Kazakhstan, Azerbaijan, Armenia and Russia have established rigorous quality assurance and quality control (QA/QC) procedures and achieved ISO and HACCP certification. In Azerbaijan, a new modern salt factory started operations during the 2010-2020 decade for the production of quality iodized salt which replaced the low-quality salt that had been previously manufactured by many small producers.

Food industry role: Industrially processed food accounts for an increasing proportion of total salt intake in many populations. IGN developed a guide on “The Use of Iodised Salt in Industrially Processed Foods”, recently piloted in the three countries of the ECA region (Armenia, Moldova, North Macedonia). This assessment found a significant contribution from processed foods to the populations’ overall iodine and salt intakes. The modelling also demonstrated that, if universally iodized, salt used by households and for commercial bread production could ensure adequate iodine intake in the adult population [2].

Monitoring and surveillance of USI impact: In the period of 2011-20, national or subnational iodine surveys were conducted in many countries in the region (Table 1). In the remote Tuva region of Russia, formerly known for severe iodine deficiency, effective IDD prevention program resulted in 95% coverage of the population with iodized salt and median urinary iodine concentration (mUIC) of 153 mcg/L in school-age children.

A few countries in the region, such as Georgia and Turkmenistan, have recently moved away from survey-based monitoring to the facility-based sentinel surveillance based on the Fortification Monitoring and Surveillance (FORTIMAS) approach, inclusive of mUIC status of the population. Given the almost universal access to primary health care in the former USSR countries, and relatively lower cost of the FORTIMAS approach compared to that of typical population surveys, justifies further adaptation of the methodology in those countries.

Impact of the COVID-19 pandemic on salt iodization in ECAR: Overall, there were no reports of substantial or long-term shortages of iodized salt in countries of ECAR, even though specific information was not available for several countries.

Progress towards the USI goal. The goal of sustainable and equitable elimination of iodine deficiency through USI as part of the Agenda 2030 is achievable for the majority of countries in the ECAR based on the following indicators (Table):

Group 1. USI at scale: 11 countries (Armenia, Azerbaijan, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, Serbia, Turkmenistan, Kazakhstan, Kyrgyzstan and Georgia) sustained adequate iodine status among their populations. This included use of adequately iodized salt by >90% of households, although in Serbia and Montenegro the required salt iodine content (at the time of assessment) was below international recommendations. This group of countries should, in future, focus on ensuring an uninterrupted supply and universal use of iodized salt by households and food/bakery industry while ensuring implementation of salt reduction targets.

Group 2. USI at scale but risk of slippage: 3 countries (Albania, Moldova and Kyrgyzstan) maintained an adequate iodine status but household use of iodized salt remained low and the use of iodized salt in processed foods is patchy, and linked to a weak regulatory monitoring and enforcement system. Recommendations for this group of countries are to secure strong regulatory monitoring and enforcement aimed at consistent and high (>90%) household coverage of iodized salt as well as the use of such salt in the production of commercially processed staple foods (especially bread).
Group 3. USI – more efforts needed: Four countries (Russia, Tajikistan, Ukraine and Uzbekistan) and the region of Abkhazia continued to suffer from inadequate iodine status, particularly, the most vulnerable groups. In Tajikistan and Uzbekistan, the quality of iodized salt remains low as QA/QC at production and regulatory monitoring of the many small salt producers is inadequate. In Ukraine and Russia, voluntary salt iodization results in low population coverage of the product; yet, adoption of mandatory USI legislation continues to face political challenges. This group of countries will need to enhance and expand their existing USI effort by better engaging with salt producers and private sector and identifying resources for improved regulatory monitoring. Adoption of USI legislation is paramount to reaching high iodized salt coverage and optimum iodine nutrition in Russia and Ukraine.

### Country or territory

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<th>mUIC (µg/L) 2010–2020</th>
<th>Current Iodine intake status</th>
<th>HH use of IS (Total/Adequate) before 2010</th>
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**References**

Meet Prof. Elizabeth Pearce, the IGN Regional Coordinator for North America


You could say that Elizabeth Pearce was meant for endocrinology. Both her parents were in academic medicine, serving as professors at the University of Minnesota. In medicine, Pearce found intellectual excitement in “working out mechanisms and pathways based on lab results”. She also appreciates how endocrinology is “a whole-body specialty that allows for long-term relationships with patients”. A recent past-president of the American Thyroid Association, she serves as a Professor of Medicine in the Endocrinology, Diabetes and Nutrition section at the Boston University School of Medicine, where she also directs the endocrinology fellowship programme.

Raised in Minneapolis, she headed to Boston for her higher education, obtaining her bachelors and medical degrees from Harvard University and also earning a masters degree in epidemiology from the Boston University School of Public Health. In 2003, she completed her endocrinology fellowship at Boston University under the guidance of renowned thyroid specialist Lewis Braverman, who led her to focus on the thyroid as a sub-specialty.

The origins of many thyroid problems are still a mystery. Pearce says the causes are “likely complex, resulting from interactions between genetic susceptibility and environmental factors”. Also remaining unclear are the reasons why females are five-to-eight times more likely than males to encounter thyroid problems. However, thyroid issues arising from iodine deficiency have a well-established pathology. Also evident is the level of disaster which such issues have unleashed. Fortunately, recent years have seen a general worldwide decline in iodine deficiency: Pearce—who serves as North America’s regional coordinator for the Iodine Global Network—says the planet currently has 21 iodine-deficient nations, which is less than one-fifth the amount in 1993, when 110 nations met the criteria.

Despite such major improvement, iodine deficiency still remains the most widespread preventable cause of intellectual impairments on a global level. Also, Pearce expresses concern about how the pandemic, with its corresponding lockdowns and travel restrictions, has “disrupted food supply chains and the ability to monitor food fortification programs”. She adds how such circumstances, especially in low and middle-income countries, might impact salt iodisation, which is the preferred method of enhancing iodine intake on a large scale.

Pearce relates how the USA has actually seen a decline in the use of iodised salt. And, strangely enough, the USA has never mandated salt iodisation, so the choice to iodise or not still remains with individual salt producers. Pearce wishes to see the USA adopt salt iodisation legislation “similar to what currently exists in 124 other countries around the globe”. About a century ago, much of the northern USA was referred to as the “goiter belt”, owing to the prevalence of iodine deficiency. In many of these regions, the majority of school-aged children showed perceptible thyroid enlargement. The introduction of iodised salt eradicated this problem by the 1940s. Over ensuing decades, Pearce believes “there has been a loss of awareness of the effects of iodine deficiency on the part of medical providers, policy-makers, and the general public”. Alarmed by these circumstances, she advocated for the inclusion of iodine in prenatal multivitamin preparations in the USA and for greater awareness of the importance of iodine nutrition for vulnerable groups.

Aside from her ongoing involvement with iodine nutrition in the USA and globally, Pearce—who received the 2011 Van Meter Award for her contributions to thyroid research—maintains interests in hypothyroidism, hyperthyroidism, the effects of subclinical thyroid dysfunction on the cardiovascular system, and thyroidal issues due to environmental endocrine disruptors.

When she is not occupied with mentoring endocrinology fellows at work, there is a good chance she is busy endeavouring to combat iodine deficiency. About as well as anyone, she knows the consequences: “Because of the importance of adequate thyroid hormone for fetal brain development, even mild iodine deficiency in pregnancy has been linked to lower IQ in children”. As she points out, it is “astonishingly inexpensive” to iodise salt – between 0·02 and 0·05 US$ per person per year. The costs of deficiency, however, can range from high to catastrophic.
A global awareness campaign on iodine for moms

L. Linda Henderson, Board Member, Thyroid Federation International

Thyroid Federation International, a global patient organization came together with six important leaders – IGN, Nutrition International, World Iodine Association, Global Alliance for Improved Nutrition, European Medical Association and European Association for Predictive, Preventive and Personalized Medicine – to bring attention to the extent and consequences of IDD on women. IDD continues to affect women in both developed economies and countries in development.

Not enough awareness has been brought to the public and to women, especially pregnant & lactating women (PLW) on the importance of adding iodine (in various forms) to their diets to eradicate IDD. This is why an awareness campaign is a vital channel to bring attention to this public health problem.

The project leaders visualize building a coalition of cross-sectored, like-minded stakeholders who are sympathetic to the mission of raising awareness around IDD, its causes and solutions.

Iodine Deficiency during pregnancy results in adverse health effects not only to the mother but more so to the child during its first 1000 days of life beginning from conception. The mother with IDD and consequent hypothyroidism will give birth to a child threatened with cretinism and growth retardation. Severe iodine deficiency can slash IQ by 10-15 pts.

This year, the MotherBabyIodine (www.motherbabyiodine.org) project jumpstarted in Indonesia, a country that remains affected by iodine deficiency.

With Unilever support, space was given to the local NutriMenu campaign geared to educate the public on the safety and efficacy of the use of iodized salt to prevent iodine deficiency. The aim is to reach a target of at least 1.5 million mothers and teenagers.

During the International Thyroid Awareness Week (ITAW 2021) in the Philippines, a 6-day series of webinars was organized by Dr. Teofilo San Luis Jr (IGN National Coordinator) on the theme: “Mother-Baby-Iodine: The Importance of Iodine on the Woman and her Baby. International and national speakers took part with Michael Zimmermann (IGN Chair) giving a comprehensive lecture entitled “The Scourge of Iodine Deficiency on the Woman & her Child”.

In the meantime, the project has received strong interest from several other countries in Asia: Bangladesh, Thailand, Taiwan, Sri Lanka, Vietnam, Papua New Guinea, Cambodia, South Korea, as well as in several African countries and European countries. TFI is looking forward to working with their representatives.

It is of note that IDD in pregnant and lactating women has not been eradicated in most European countries. For this reason, the goal is to complement ongoing advocacy efforts undertaken by various organizations directed to policymakers to generate a wider momentum for the promotion of iodine and iodized salt during and after pregnancy. TFI’s goal is an increased awareness of IDD and the importance of iodine fortification of foods and iodized salt. Women of reproductive age, particularly pregnant & lactating women should be made aware where iodine can be sourced from in terms of food. TFI anticipates that healthcare workers, policy makers, as well as family share/spread this knowledge with their target population.

For more information: www.motherbabyiodine.org
FROM IODINE TO INTELLIGENCE

Iodine good for growth and development

There are different ways to get enough iodine. Beer is a popular choice. Knowing where to get the right amount of iodine is important.

Breastfeeding is the best way for young babies to get enough iodine from their mothers. Young children need iodine, but salt should be limited.

While taking care of the child, the mother must make sure she gets enough iodine. Other sources of iodine are fish, seaweed, spinach, dairy and eggs.

MOTHER & BABY

IODIUM UNTUK KECEMERDASAN

Iodium baik untuk pertumbuhan dan perkembangan.

Ada bantuan masca cara untuk memenuhi kebutuhan iodium. Semua bahan makanan yang mengandung iodium ada yang baik dan yang buruk.

Semua orang harus tahu bahwa iodium penting untuk pertumbuhan dan perkembangan. Semua bahan makanan yang mengandung iodium baik untuk kesehatan.

Anak-anak membutuhkan iodium, namun bahan makanan yang diberikan harus memiliki iodium yang cukup.

Iodium penting untuk perkembangan otak dan sistem pernapasan. Bahan makanan yang mengandung iodium harus dimakan rutin.
Revitalizing USI in Madagascar: The IGN-UNICEF Partnership

Festo P. Kavishe, IGN Regional Coordinator for Eastern and Southern Africa; Isiye Ndombi, Senior Public Health Specialist and IGN Consultant; Bodo Rakotomalala, UNICEF Nutrition Specialist, UNICEF Madagascar; and Marie-Claude Desilets, UNICEF Chief of Nutrition, UNICEF Madagascar

After suffering a major resurgence of IDD due to political crisis, Madagascar has taken major steps to improve iodine nutrition

Introduction
This is an 8-year-old story on how UNICEF and IGN worked together with the Madagascar Government, the Food Fortification Alliance, the salt industry, USAID and other partners to revitalize the USI program that had collapsed during the 2009-2015 political crisis. It is also an example on how investing in strategic solutions that produce actionable data and deliver high-quality technical assistance can promote and mobilize both upstream and downstream large-scale action for the adoption of sustainable solutions.

Great early USI success
Madagascar, an island country of a population of about 28.2 million as of 2021, is a net self-sufficient salt producer for human, animal and industrial consumption with 85-90% of the salt being produced by the large and medium scale producers. Early progress towards USI in Madagascar started on a good footing with mandatory legislation for the iodization of all food-grade salt since 1995, a strong national coalition for USI and a functioning network of quality assurance laboratories. The enabling set-up led to rapid gains and great initial progress and improvements in universal salt iodization leading to reduction of IDDs. The goiter rate among school-aged children (6-12-year-olds) dropped from 46% in 1992, to 6% in 2001 and further to 3.4% in 2004. The median urinary iodine concentration (MUIC) among school-aged children rose from 70 µg/L in 1995 to 157 µg/L in 1998, a situation consistent with optimal iodine nutrition.

The USI program collapses
From 2006 to 2015, the national food fortification coalition broke down and the QC/QA mechanisms were discontinued, leading to almost total collapse of the salt iodization program. Several factors contributed to the collapse. These included (1) a 5-year protracted political crisis that began in 2009 and caused budget cuts and limited funding affecting nearly all sectors, and especially the social sectors; (2) weakened coordination of the USI/IDD program by the Ministry of Health; (3) the appearance of false allegations that associated the intake of iodized salt with the increased incidence of hypertension and related cardio-vascular accidents; (4) disruptions in the potassium iodate supply chain; and (5) weakened monitoring, quality control/enforcement as well as advocacy and communication mechanisms.

Map of adequately iodized salt coverage in Madagascar 2020

- < 20%
- 20–60%
- > 60%
Reinvigorating Madagascar’s USI program: time for action
Concerned about the situation, in 2013, Mr. Pieter Jooste, then IGN Regional Coordinator for Southern Africa, visited Madagascar and met with UNICEF. Recommendations focused on the need to take immediate action to revitalize the USI program. Subsequently, IGN, UNICEF together with the Government, organized two workshops for key stakeholders to consult and strategize on how to reinvigorate the Madagascar USI program. The first workshop strategized on doing a national IDD survey to understand the status of the iodine content of household salt, drinking water, and the UIC in school-aged children and in women of reproductive age. The second workshop addressed concerns physicians had raised about the promotion of iodized salt in the face of the salt reduction campaign to reduce blood pressure. It also discussed the dentists’ keen interest to double fortify salt with iodine and fluoride (leading to the 2014 decree on double fortification with iodine and fluoride). During this second workshop, the challenge of considering potassium iodate as a mineral, hence subjecting it to mineral taxes and restrictions was also discussed.

A national IDD survey
Following the 2013 consultation workshops, the first nationwide IDD survey on the iodine status of the population and the level of sodium intake in Madagascar was undertaken in 2014. The survey results showed that the proportion of households in Madagascar with adequately iodized salt had fallen from 75% to between 17% and 26% (mean of 21.3%) while the national median UIC had fallen from 157 µg/L to 46 µg/L, and for pregnant women to 53 µg/L and for non-pregnant women to 46 µg/L. These MUIC levels indicated moderate to severe iodine deficiency, putting at risk the survival, development and learning capacity of children and the intellectual and productive capacity of the population, consequent to deficient iodine nutrition. From a public health perspective, this could be considered a public health emergency.

The peace dividend for USI
Following the end of the political crisis in 2015/16, UNICEF, IGN and other partners saw the opportunity. At a strategic level, several steps were taken. Salt iodization was included as a component of the wider nutrition plans, specifically the National Nutrition Action Plan of 2017-2021 and the Madagascar Nutrition Investment Case (NIC). In 2017, USAID funded the Government through UNICEF for a 2-year program and then a 5-year program called “Toward Universal Salt Iodization (USI) in Madagascar” to the tune of US$ 900,000. This was a major financial boost that greatly supported operationalization of planned strategies.

Trends of adequately iodized salt samples in 2018, 2019 and 2020 in Madagascar

<table>
<thead>
<tr>
<th>Year</th>
<th>Large producers</th>
<th>Medium producers</th>
<th>Large producers</th>
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</thead>
<tbody>
<tr>
<td>2018</td>
<td>36.00%</td>
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<td>2019</td>
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<tr>
<td>2020</td>
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The potassium iodate challenge
Since one of the challenges was the availability of potassium iodate (KIO3), UNICEF procured 850 kg of KIO3 in 2018. This was supplemented by another 850 kg organized by Dr. Minoru Irie, who is a Japanese IGN national coordinator, and a member of the Foundation for Growth Science and the Japanese Iodine Industries Association. Dr. Irie mobilized the Japanese private salt producers to donate the KIO3. In 2020, the Japanese private salt producers sent a second in-kind donation of 850 kg of KIO3 to the Ministry of Health who distributed it to the Comptoir de Sel Iode de Morondava (COSIM), who sold it to five other producers in Menabe region, who have their own iodization machines. The quantity sold was based on the production volume expected by all producers. This step was essential in the initiation of a revolving fund system that would help develop a business model to ensure a rolling income for COSIM to absorb regular expenses (production and quality control supplies, maintenance of equipment, etc.) using revenue generated by selling KIO3 to producers. COSIM was also registered as UNICEF’s partner to benefit from wholesale purchase of these essential inputs at low price compared to international market, through the Partner Procurement Service located in UNICEF Supply Division in Copenhagen (Denmark). Through the income generated by the sale of KIO3, in 2020, COSIM was able to procure a first order of 15 drums of 25 kg (for a total of 375 kg) of KIO3. This first purchase by COSIM from UNICEF was received and used in 2021.

The 2019 USI advocacy mission
With the necessary elements and preparations for relaunching the USI program in place, IGN fielded an Advocacy Mission to Madagascar comprising Dr. Festo Kavishe (IGN ESA Regional Coordinator) and Dr. Isiye Ndombi (IGN Consultant) in February 2019 to support UNICEF’s advocacy efforts for USI. This highly successful mission, coordinated by the UNICEF Madagascar Country Office (Marie-Claude Desilets and Bodo Rakotomalala), made advocacy visits to key Government partners, the National Food Fortification Alliance and USAID Madagascar.

As part of the USI reinvigoration effort, the Principal Advisor in the Prime Minister’s Office officially opened the joint iodization outfit for medium-scale producers in Morondava at the Comptoir de Sel Iode de Morondava (COSIM) compound. The opening was marked by the hand-over of salt iodization machines to COSIM; a visit to the COSIM salt production site; and a visit to their laboratory.
Madagascar develops a 5-year USI country action plan
IGN and UNICEF supported Madagascar to participate at the November 2019 USI/IDD Mombasa Consultation, where each country developed a Country Action Plan (CAP). The participation of Madagascar built on the outcome of the 9-14 February 2019 IGN/UNICEF Advocacy Mission, when strategic elements of a CAP were articulated, and broad consensus reached on specific elements with UNICEF agreeing to facilitate the preparation of an USI CAP.

The impact of strategic partnerships
Data for 2020 shows an improvement of the household availability of adequately iodated salt, doubling to about 42% in 2020 from a baseline of 21% in 2016. Coverage in the south-western regions is still in the low 20%, while that in the north-eastern tip has reached over 60% (see map). The main drivers of this progress were: (a) increased production of iodized salt, (b) increased availability of potassium iodate, (c) expanded advocacy, (d) improved government coordination and advocacy, and (e) improved monitoring and quality control.

Remaining challenges
1. The Covid-19 pandemic and the related travel restrictions negatively affected the QC and other travel-related activities and slowed the gains.
2. A food security crisis in the southern region delayed the planned WFP- and UNICEF-supported micronutrient survey, earlier scheduled for 2020/2021, which will likely be implemented in 2022 depending on funds.
3. There is yet no sustainable modality of supplying potassium iodate nor required quality control inputs. USAID and UNICEF are supporting a consultant to assist in the formulation of a business plan to explore how medium-scale salt producers can eventually sustain potassium iodate supply, operational aspects of salt iodization (and fluoridation) and QC.
4. The recent landscape analysis on salt producers in the country revealed significant additional numbers of medium scale producers around Toliara in Southern Madagascar, which calls for review of advocacy, support and QC monitoring along the new minor and major supply routes.
5. While double fortification of salt with iodine and fluoride has been made mandatory by the Government decree, fluoridization has not attracted regular funding and has not developed at the same pace with that of iodization.

The way forward: sustaining the gains
1. The WFP/UNICEF will support a micronutrient survey in 2022 (which will include a status study on iodine nutrition) and this will enable reflection and refocus.
2. The potential USAID/UNICEF 4 to 5-year collaborative strategy (2022 and beyond) to support the Government of Madagascar to achieve and sustain USI will substantially bolster and register progress.
3. The business plan, developed to explore sustainable approaches to ensure that medium-scale producers have constant access to potassium iodate and can productively manage operational costs of USI, will be tested and strengthened in the coming 5 years.
4. A regionally anchored QC through strong and sustainable iodine teams, and effective regional lab infrastructure will be established.
5. A web-based salt monitoring system will be rolled out by the end of this year and scaled up to the key stakeholders involved in salt production (including national and regional salt committees).
6. Exploration of modalities for consolidation support of the small-scale producers will be considered once quality salt iodization is stabilized in the large and medium scale producers.
7. A review of the policy to potentially decouple the double fortification of salt with iodine and fluoride will need to be considered since fluoridization is not attracting sustainable funding.

Acknowledgements
The development of this story has been made possible by UNICEF ESARO through a Program Cooperation Agreement (PCA) with the Iodine Global Network (IGN) within the context of implementation of the 2020 – 2024 Regional Multi-partner RAMP UP USI/IDD roadmap for Eastern and Southern Africa.
Developing a national salt iodization road map: Using a food systems approach in Morocco

Amal Tucker Brown, Iodine Global Network, Laila El Ammari, Head of Nutrition Department, Ministry of Health, Morocco; Nawal Bentahila, Consultant, ASAP consulting, Morocco

Morocco enacted national legislation mandating compulsory salt iodization in 1995. During the last 35 years, several activities have been led by the Ministry of Health (MoH) to try and reach 90% of households with adequately iodized salt by 2021. However, a recent study by the MoH revealed that among women of reproductive age, the national median urinary iodine content (mUIC) was 71 µg/L, and over 30% of the samples had a UIC <50µg/L (1), suggesting deficiency. Furthermore, only 7% of households used adequately iodized salt, with no difference by socioeconomic status, place of purchase or between urban and rural households.

Considering this, the MoH wished to revitalize the USI programme. In late 2019, the MoH reached out to UNICEF and IGN to support the formulation of a fresh approach to the USI programme in Morocco.

In April 2021, as part of the National Nutrition Programme, the Ministry of Health launched their 5 years (2021-2025) Roadmap to accelerate the reduction of iodine deficiency in Morocco (Figure 1). This article explores the steps taken to develop this landmark roadmap using a food systems approach.

**Situational Analysis**

In 2018, with UNICEF funding, the MoH evaluated the USI programme in Morocco (2). Based on this evaluation and a literature review, the project team identified and interviewed key stakeholders that influence policy and operational decisions, such as policymakers, food industry officials, academicians, health workers and salt conditioners, to conduct a situation analysis and gain a deeper understanding of the iodine problematic in Morocco.

The situational analysis revealed the following programmatic issues, but more importantly, it raised many questions. These questions were used to design a series of studies with the hope of obtaining some answers.

**Legislation, standards, and regulations on USI:** The legislative framework for salt iodization is satisfactory regarding both the authorization in the production of salt and the definition of manufacturing standards. But the legislation does not include iodized salt for processed foods or animal feed and there seems to be conflicting information between the legislative texts.

**Monitoring and Enforcement:** Office National de Sécurité Sanitaire des Produits Alimentaires (ONSSA) is responsible for inspecting and regulating salt and salt iodization; however, their mandate is limited to the formal sector with limited scope to control the informal sector.

**Production/importation and distribution of iodized salt:** The salt industry is fragmented and made up of many small, resource-poor actors, many of whom operate in the informal sector.

**Utilization and awareness-raising:** There are numerous brands of table salt available on the market. All salt packaging in Morocco has the iodized salt logo, irrespective of iodine presence and level, and there is no noticeable difference in the price of salt.

**Situation assessment**

The MoH conducted a national micronutrient survey of 3,600 households in 2019 and found that the national mUIC was 117.4 µg /L among school-age children.
However, the proportion of children with mUIC <50µg/L was 21.6% which exceeds the 2018 UNICEF/IGN recommendations (3), therefore despite iodine sufficiency at the national level, a small but significant proportion of children in Morocco remain at risk for IDD.

IGN pushed for a deeper equity-focused analysis, which revealed no statistically significant differences in mUIC between urban vs rural areas or by socioeconomic status, but mUIC was significantly lower in the central (high-altitude non-coastal) zones (4). Stratification of iodine status by household access to iodized salt also found an improved iodine status by salt iodine content at the household level; however, SAC had optimal iodine status even in a household with non-iodized salt, begging the question; where does the iodine come from?

The disaggregated data analysis was vital in highlighting the inequity in iodine nutrition and the need for continued support for this pressing public health issue.

Salt supply chain assessment
An in-depth review of the salt supply chain, including a value chain analysis, was conducted and helped dispel myths about Morocco’s salt industry. The study found that 97% of all the salt in Morocco comes from just two zones, with 80-90% of the salt coming from the south, namely Laayoune (Photo 1).

There is a relatively small number of salt producers, but there are many salt conditioners, of which only 40 are formally registered companies. A total of 50 different salt brands are sold in Morocco. However, 51% of these brands are from formal companies.

The food industry does not procure iodized salt. Many formal companies sell uniodized salt to the food industry, leaving the untapped table salt market to be met by the informal salt producers. The poor quality of the salt and low selling price of salt in Morocco limit the margin that could be made; however, the export potential is huge (particularly in West and Central Africa), which could attract investment to improve the value chain. However, the salt association is weak, and fragmented.

Legislative framework review
The decree for mandatory salt iodization was first drafted in 1995 and revised in 2009. IGN conducted an in-depth review of Morocco’s legislative framework for iodized salt. The review concluded that USI’s legislative framework in Morocco is complex but complete; however, the current decree does not include iodized salt for processed food or animals. Therefore, not all salt for human and animal consumption is iodized as stipulated in the definition of USI.

The Office National de Sécurité Sanitaire des Produits Alimentaires (ONSSA), the regulatory body responsible for the control of salt, is mandated to inspect only the formal sector; therefore, the informal salt conditioners, catering establishments and sales outlets are not covered by ONSSA control but under the authority of the Ministry of the Interior.

Contribution of processed foods to salt and iodine intake in Morocco
The consumption of processed foods, like many countries, is becoming increasingly important in Morocco. In 2018, IGN developed a guidance note (5) to help countries estimate the contribution of iodized salt from the most widely consumed processed foods. This guide was used in Morocco to model the contribution of iodized salt in processed foods. More specifically, it helped facilitate the identification of the primary sources of salt in industrially processed foods; to estimate the contribution of these processed foods to salt intake and their potential contribution to iodine intake (if only adequately iodized salt is used in their production); as well as to encourage the commitment of food industries and institutional entrepreneurs to use only quality iodized salt.

The results of the modelling showed that the use of iodized salt in all processed products is necessary to meet the iodine needs of the population, particularly in pregnant women.
The review highlighted one big institutional catering contractor that supplies over 75% of the institutional catering establishments. The catering contractors procure salt only from formal salt conditioners based on their client's specifications, so if the client requests iodized salt, they will procure iodized salt. Most institutional catering establishments are government-led, such as schools, universities, hospitals, creches, orphanages, armed forces, and transport (planes and trains). Encouraging the relevant government sectors to request iodized salt (and other fortified foods) will meet its clients’ iodine needs, increase the demand for iodized salt, and improve its supply.

Stakeholder engagement and advocacy

Seven workshops and meetings were conducted to improve the understanding of the important stakeholders’ position and advocate for their engagement in the USI programme (Photo 2). These encounters highlighted a lack of knowledge of iodine's importance by the government, salt producers/conditioners, health, and non-health professionals. Several actions were proposed by the workshops’ participants as measures to be taken into consideration or to be put in place in the development of a roadmap to accelerate the elimination of iodine deficiency disorders in Morocco.

Theory of change for the USI programme in Morocco (Figure 2)

If the food industry is engaged in the USI program and the legislation includes the use of iodized salt in processed foods and if there is better control of iodized salt at the food production level, then more food industries in Morocco will require quality iodized salt from authorized salt conditioners.

If the food industries demand and procure more quality iodized salt, then there will be an increase in the production of iodized salt by formal salt conditioners and by spill-over effect there will be an increase in the production of table salt.

If there is an increase in demand from the food industry and the public for quality iodized salt and there is support at the local level, then more informal salt packer will formalize and obtain authorization from ONSSA and produce quality iodized salt for food industry and household use.

If there is an overall reduction in salt intake (from table salt and processed foods) and the salt is adequately iodized, then there will be a decrease in diet-induced hypertension and in iodine deficiency disorder.

If the animal feed of laying hens and dairy cows is supplemented with iodine, then there will be an increase in iodine in eggs, milk and dairy products and there will be an additional source of iodine in the Moroccan diet and a reduction in iodine deficiency disorder.

The Roadmap

The final draft of the Roadmap consisted of strategic axes as follows:

- **Strategic Axis 1:** Quality control and standardization
- **Strategic Axis 2:** Improving the supply of iodized salt
- **Strategic Axis 3:** Increasing the demand for iodized salt
- **Strategic Axis 4:** Monitoring and evaluation

Good progress is being made in the implementation of the Roadmap following the development of a yearly 2021 plan. The process of drafting the final Roadmap took just over 1 year (during the COVID pandemic), and the systematic steps and full engagement of all the key stakeholders along the way were vital in the engagement and development of the Roadmap. Furthermore, strong situational analysis, targeted studies and sharing of global best practices were essential in identifying context-specific programmatic actions.

References

Abstracts

High Ingestion Rate of Iodine from Povidone-Iodine Mouthwash

Iodine-based mouthwash and throat sprays contain povidone iodine (PVP-I) for disinfection. Prolonged use of PVP-I mouthwash can induce transient hyperthyroidism.

To assess the amount of iodine ingested from an oral rinse, 22 healthy adult volunteers (mean age: 48.1, 29–70 years) were recruited for the study. The subjects were instructed to rinse for 15 or three times with 20 mL of commercially available PVP-I mouthwash diluted into 0.23% or pure water. This method is a standardized method of gargling recommended by the manufacturers. Although the 7% PVP-I mouthwash contains 7 mg of effective iodine/mL, 24.3 mg/mL of iodine was detected in the solution. The median value and ratio of the total iodine ingested were 5.0 mg (range: 2.6–10.8 mg) and 20.5% (range: 10.6–44.5%), respectively. PVP-I mouthwash should be used carefully since around 5 mg of iodine could theoretically enter the body with one gargle which exceeds the tolerable upper intake level of iodine for adults.

Fuse Y et al. Biological Trace Element Research https://doi.org/10.1007/s12011-021-02978-7

Iodized salt consumption and thyroid cancer incidence

This China study aimed to explore the correlation between population-based iodine intake from iodized salt (iodine-IS) and thyroid cancer (TC) incidence. The TC incidence data were collected from the annual reports issued by China’s National Central Cancer Registry. The iodine-IS data were obtained from National Iodized Salt Surveys and National Iodine Surveys (NIDS). Iodine-IS consumption peaked in 1999, declined to approximately 60% of 1999 in 2018, but remained close to 142.2 µg/person/day. After 2000, TC incidence increased notably on an annual basis. Iodine-IS and the age-standardized rate adjusted to the world population of TC incidence were significantly negatively correlated (p<0.05). The authors concluded that iodine-IS is unlikely to be a major risk factor for TC because universal salt iodization is maintaining adequate iodine nutrition in the population. However, the increasing TC incidence may reduce public willingness to consume iodized salt.

Li T et al. Asia Pac J Clin Nutr 2021;30(2):311-315

Iodine status among school age children in the Republic of Seychelles

Iodine status was quantified in children from the Seychelles Child Development Study (SCDS) Nutrition Cohort 2. The Seychelles population has a high fish consumption and iodized salt is widely available. The aim of this study was to evaluate iodine status of the Seychellois school aged children using Urinary Iodine Concentrations (UIC). A total of 603 children provided a spot, non-fasted, urine samples at 7 years of age (mean 7.36 years and range 7–8 years). Sufficient iodine status was observed in 69% of children whereas 17% of children had intakes defined as mildly iodine deficient, 8.6% as moderately deficient and 2.7% as severely deficient. For 8.3% of children their UIC suggested iodine intakes were in the excessive range. The range of UIC observed were unexpected and may reflect changing dietary patterns in the Seychelles with a shift away from high fish consumption. These findings in an oceanic, high-fish-eating population warrant further research to explore the determinants of any low iodine intakes and their associations with neurodevelopmental outcomes in the children at 7 years of age.


Neonatal heel prick screening TSH concentration in the Netherlands as indicator of iodine status

Neonatal Thyroid Stimulating Hormone (tTSH) is proposed as indicator of iodine deficiency in a population. Population’s iodine sufficiency is indicated by a proportion of the newborns less than 3% having tTSH above 5 mIU/L. The aim of this study was to explore the Dutch neonatal heel prick screening TSH data to assess iodine status in the Netherlands and identify determinants and potential confounders of this assessment. All newborns born in the Netherlands between 2007 and 2015 with a heel prick collection at day 3–7 were included (n=1,453,600), except preterm neonates and baby’s with a low birth weight. Total T4 was measured for all children, tTSH was measured in the ~20% children with lowest total T4. The proportion with tTSH >5 mIU/L fluctuated between 0.6–1.3% in 2007–2015. The low proportion neonates with high tTSH suggests a sufficient iodine status in the Netherlands.


Effect of different cooking methods on iodine losses

IDD remains a public health problem in some areas of India. Since there is lack of scientific evidence on loss of iodine during different cooking methods, this study was undertaken to study the effect of different cooking methods on iodine losses. Methods used were boiling, roasting, shallow frying, deep frying, pressure cooking and microwave cooking. The loss of iodine ranged from 6.58% to 51.08%. Minimum losses were found during shallow frying where cooking time of salt was 1 min and 15 s and maximum during pressure cooking where cooking time of salt was 26 min. Losses during boiling, roasting, deep frying and microwave cooking were found to be 40.23%, 10.57%, 10.40% and 27.13% respectively. From the obtained results, authors have concluded that the loss of iodine depends upon type of cooking method and time of addition of salt during cooking.


Raised mortality in old adults with a history of hyperthyroidism following iodine fortification

A transient rise in the occurrence of hyperthyroidism ensued the introduction of iodine fortification (IF) of salt in Denmark. Older adults are at risk of complications to hyperthyroidism that could prove fatal to vulnerable individuals. The authors evaluated the association between thyroid function and mortality in older adults before and after nationwide implementation of IF. All 68-year-olds from the general population in the city of Randers were invited to participate in a clinical study in 1988 and followed until death, emigration or end of study using Danish registries. Median urinary iodine concentration was 42 µg/L at baseline consistent with moderate iodine deficiency. Hyperthyroidism (thyrotrupin < 0.4 mIU/L) occurred in 37 (0.9%) participants. There was an increase in mortality among participants with hyperthyroidism after IF. There was no significant association between hyperthyroidism and mortality before IF compared to euthyroid participants, but after IF hyperthyroid subjects had an increased mortality (adjusted hazard ratio: 2.22, 95% confidence interval: 1.44–3.44). The authors concluded that IF was associated with raised mortality among older adults with a history of hyperthyroidism and moderate iodine deficiency; this highlights the need for cautious iodine supplementation and for monitoring of IF.


Individual and community level factors associated with use of iodized salt in sub-Saharan Africa: A multilevel analysis of demographic health surveys

This study aimed to identify both individual and community level determinants of iodized salt utilization in sub-Saharan Africa. It used the appended datasets of the most recent demographic and health survey from 31 sub-Saharan countries. A total weighted sample of 391,463 households was included in the study. Those households with primary (AOR = 1.53, 95% CI = 1.50–1.57), secondary (AOR = 1.81, 95% CI = 1.76–1.86) and higher education level (AOR = 2.28, 95% CI = 2.17–2.40) had higher odds of iodized salt utilization. Households with middle (AOR = 1.05, 95% CI = 1.02–1.08), richer (AOR = 1.13, 95% CI = 1.09–1.17) and richest wealth index (AOR = 1.23, 95% CI = 1.18–1.28) also had an increased chance of using iodized salt. Households from high community media exposure (AOR = 2.07, 95% CI = 1.73–2.51), high community education level (AOR = 3.78, 95% CI = 3.14–4.56), and low community poverty level (AOR = 1.29, 95% CI = 1.07–1.56) had higher odds of using salt containing iodine. Both individual and community level factors were found to be associated with use of salt containing iodine in sub-Saharan Africa.


Corrigendum

In the article published on the Seychelles in the May 2021 issue of the IDD Newsletter, there were several editorial errors. Ulster University was incorrectly cited as ‘The University of Ulster’. The number of urine samples that were collected were 598, not 680. The article states that ‘local investigation’ were involved in the sample collection, but this should have stated specifically that the Ministry of Health, Republic of Seychelles was involved. Finally, the study collected samples from children across the island of Mahé, not only from the city of Victoria.