Angola’s final sprint to universal salt iodization

Germany returns to iodine deficiency
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IDD Workshop in Pakistan
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Maintaining iodine intake during salt reduction
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Angola is a large country in southern Africa covering 1,246,700 square km, with a population of about 33 million people. The median age is 16.7 years and life expectancy at birth, both sexes, is 62.2 years while infant mortality rate is 53.4 deaths per 1,000 births (1). The country has a coastal length of 1,600 km (990 miles) from Cabinda to Namibe province, most of it favoring salt production and fishing industries.

The Angolan salt industry is under the Ministry of Agriculture and Fisheries (MoAF). It has a potential of producing salt to >400,000 tons per year from 20 salt producers operating in 6 coastal provinces: Benguela, Namibe, Kwanza Sul, Bengo, Luanda, and Zaire (see Map). Out of these producers, three can be classified as large producers (>5000 ton per year) and the rest as medium producers (1000 – 5000 ton per year). In addition, 40 percent of the country’s salt requirement is imported (2). Angola has been implementing universal salt iodation (USI) since 1996 (2) and putting in place the infrastructure for program implementation, through collaborative efforts from the government with UNICEF and Iodine Global Network (IGN), as described below.

Enhancing advocacy and communication for development
Several major advocacy meetings have been conducted. The first was the Salt Sector forum entitled “Sector Saliniero: Uma aposta para a diversificação da economia Angolana”. It was conducted in Namibe Province to create awareness on the salt industry contribution to economic development of Angola and its contribution in improving the health status of Angolans through production and consumption of iodized salt. A similar advocacy meeting was organized in October 2019 by Ministry of Health as part of commemorating “International IDD Day”; it was attended by all stakeholders from government officials, development partners and private sector aiming at creating awareness to public on the benefits of consumption of iodized salt.

Dissemination of 2019 IDD survey findings and the 5-year Action Plan
Another advocacy meeting was held from 30-31 August 2021 for dissemination of the 2019 IDD survey findings and validation of the developed Five-year Country Action Plan (CAP). The meeting was officiated by Dr. Esperança Costa, Secretary of State for Fisheries, representing Eng. António Francisco de Assis, Minister for Agriculture and Fisheries.

In the official opening session, attendees included Dr. Franco Mufinda, Secretary of State for Public Health of the MoH; Dr. Lino Quienda, Deputy Governor of the Province of Luanda for the Economic Sector, Secretary of State Eng. José de Jesus Moda, Secretary of State for Forests of the MoAF and Dr. Andrew Trevelt, UNICEF. The meeting was attended by over 70 participants representing the government ministries, departments and agencies (MDAs), development partners, NGOs, Private sectors and media.

The overall findings of the 2019 IDD survey indicated that 74.3 percent of household salt samples had some iodine (>5 ppm). Only 34.4 percent had >15ppm iodine (29.2 percent adequately iodized salt, with 15–40 ppm; 5.4 percent with...
In assessing the iodine status in 2225 percent in 2019. Doubled from 10 percent in 2015 to 26 percent household samples with no iodine decreased from 90 percent to 74 percent, salt containing any level of iodine >5ppm to 2019, the coverage of households with excess iodine, with >40 ppm). From 2015 to 2019, the coverage of households with salt containing any level of iodine >5ppm decreased from 90 percent to 74 percent, while household samples with no iodine doubled from 10 percent in 2015 to 26 percent in 2019.

In assessing the iodine status in 2225 women of reproductive age (377 pregnant and 1,848 non-pregnant), the overall median urinary iodine concentration (mUIC) was 105 μg/L. The mUICs (range) for pregnant and non-pregnant women were 102.2 μg/L (5.5 - 2562.4) and 108.2 μg/L (4.5 - 4802.7), respectively. Among the non-pregnant women, the proportion of those with UIC <50 μg/L was 17.4 percent. The mUIC in pregnant women was below the recommended range of 150-249 μg/L but was sufficient in non-pregnant women, within the 100-299 μg/L range (3).

A survey validation report was done by an Independent Technical Committee composed of researchers from Portugal, Mozambique, Angola, Tanzania and IGNESSAR, and they unanimously approved the report.

The percentage of households with access to iodized salt (5-40 ppm iodine) had been increasing from 64% in 2001 to 90% percent in 2015, but then declined to 74% in 2019. Similarly, the coverage of adequate iodized salt (≥15ppm iodine) increased from 36% (2015) to 55% before declining to 34% in 2019 (Figure 1). This catalyzed the government and partners to review the strategy to try and again achieve the recommended WHO goal of at least 90 percent coverage of households with adequately iodized salt (3).

**Recommendations**

**Extension of support to the salt industry**
The government has taken the liberty of procuring KIO3 to ensure its availability to producers. KIO3 is tax exempt since 2013 and producers pay 14300 Angolan Kwanza (equivalent to 22USD/kg KIO3). A revolving fund for KIO3 is operational under government coordination through ENATIP (a government procurement agency) which should help ensure program ownership and future sustainability of the USI national program.

**Strengthen routine USI monitoring systems**
The country has five laboratories, one large private company and four public laboratories, earmarked country wide with the capacity for performing quantitative analysis of iodine content in salt. Three Angolan laboratory technicians have been trained on salt iodine testing and on urinary iodine analysis in Tanzania since 2019. However, they lack the tools (glassware, machines and chemical reagents) for measuring iodine. Efforts are underway through the Government and UNICEF to ensure these labs are functional. Currently, only rapid test kits (RTKs) are used.

**Generate evidence to inform the national USI program**

Four national surveys have been conducted from 2001 to 2019 which provide current data to inform the ultimate goal of sustainable optimal iodine intake by all Angolans.

**Development of a Country Action Plan (CAP)**
The government and development partners agreed to develop a Five-Year CAP 2021-2026, which will be implemented to ensure sustainability of optimal iodine nutrition to all populations. IGN engaged a consultant, Dr. Sabas Kimboka, who developed the CAP in consultation with all key stakeholders including the relevant ministries, the University of Agostinho Neto, UNICEF, the Angola Salt Producers Association (APROSAL) and IGN. It was then shared to a wider audience of stakeholders in the national workshop in August 2021. Inputs and comments were received, and the workshop endorsed the plan for budgeting and implementation. The CAP consists of eight program areas (PAs), each with an outlined number of activities to be budgeted and implemented. These PAs include coordination and institutional collaboration, improving the salt legislation, supporting hard-to-reach provinces and marginalized communities, marketing and social mobilization, minimizing iodine losses, addressing processed foods and iodine intake, monitoring and evaluation, and information management.

**Capacity building for salt iodation, monitoring and enforcement**
As part of implementation of the CAP, training of salt producers and inspectors (n=98) was conducted in five out of six salt-producing provinces, including an overview of IDD, the importance of iodine and the IDD situation in Angola. Quality assurance/quality control, inspection procedures and enforcement were emphasized to salt inspectors (Photo). Using an assessment tool developed to assess IDD knowledge before and after training, it was clear as crystal that the knowledge gain was high, for both salt producers and salt inspectors.
Development of a standard operation guidance manual
Concurrent with training, a standard operation guidance manual was developed with the help of UNICEF, that will guide stakeholders involved in the salt iodation value chain. It aims to harmonize the process of the supply chain and management of potassium iodate (KIO₃) and ensure sustainable availability of adequately iodized salt.

Conclusions
Overall, the news is good: the Angolan government and partners have provided continuous support towards USI implementation and have moved the country from a severe to an only mild iodine deficiency problem. Because the national mUIC is now just sufficient in non-pregnant women, Angola is now classified as a country with optimal iodine nutrition. However, some subgroups are still at risk of iodine deficiency, including pregnant women. This requires immediately action.

The Government recognizes that the unavailability of adequately iodized salt in Angola is a matter of food security. It has taken this issue for immediate consideration and spurred actions to improve the distribution of iodized salt throughout the country.

Recommendations
• To support salt producers in accessing loans/credit, to allow the mechanization of quality salt production and high-quality iodization
• To strengthen social behavior change and communication on the awareness of the benefits of iodized salt consumption for health improvement and national economic productivity
• To implement the mandatory quality standards for iodized salt by salt producers through close supervision and inspection of salt production and processing factories
• To continue monitoring studies that will provide national coverage data
• To improve the monitoring systems to minimize the possibility of deficient and/or excess iodine intake
• Priority actions from the CAP need to be established. The roles and responsibilities of each stakeholder, and progress made, need to be shared at the biannual meetings of National Technical Committee of Salt iodization (CNTIS).

References
1. UN population data 2020.

Salt producers in a happy moment, after successful demonstration of proper premix preparation and iodation procedure.

Acknowledgements: The authors thank the Government of Angola through the Ministry of Agriculture and Fisheries, and the Ministry of Health, as well as the University of Agostinho Neto and UNICEF for technical and financial support.
Germany’s iodized salt program slips backward

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Background
Germany is a historically iodine-deficient region. Goiter prevalence was >10% up to the beginning of the 1990s in several German regions, and in the 1980s, adult male and female median iodine excretion was found to be only 64 and 52 µg/day, respectively. However, iodine nutrition considerably improved during the following decade and urinary excretion, on average, exceeded 100 µg/day in various groups of adults. Also analyses in 24-h urine samples in school children, yielded a corresponding improvement from around 60 µg/day to around 100 µg/day within the 10 year period after the mid-1980s. A national representative survey in German children during the years 2003–2006 was followed by a second one around 11 years later (2014–2017). These surveys, done with spot urine collections, revealed an improvement in iodine supply in the period 2003–2006 but a decrease in 2014–2017.

A new analysis
A recent study examined whether these cross-sectional long-term ups and downs of iodine status, and the recent re-occurrence of iodine deficiency, could be identified in more detail by iodine analyses in 24-h urine samples in a cohort of German children in which samples have been longitudinally collected from 1985 onward. The authors were curious whether a long-term reduction in salt intake—assessed via 24-h urinary sodium excretion measurements—might have contributed to the recent impairment in iodine status.
Iodine intakes have risen and fallen in German children since the 1980s

Urinary iodine excretion of 6–12-y-old children exhibited marked changes during the last 30 years. Iodine excretion was very low between 1985 and 1992 and thereafter increased markedly with a doubling of daily excretion rates from ca. 40 to > 80 µg/d (median level: 85 µg/d in 1993–2003). After a decade of maintaining this 85 µg/d level, a marked decrease occurred, with the lowest median excretion rate of 59 µg/d in 2018 (Figure 1). In contrast, the corresponding sodium excretion and the derived salt intake steadily increased during these 30 years.

The nationwide KiGGS-surveys in 2003–2006 and 2014–2017 also revealed a large decrease in iodine status in both 6–8-year-old and the 9–12-year-old children. Calculated 24-h iodine excretion in the former age group fell from median 72 µg/d to median 59 µg/d and in the latter from 84 µg/d to 72 µg/d.

Based on these data, the authors express concern at a situation in Germany where 45–50% of school children are at risk of iodine deficiency, that is, their estimated iodine intakes are below the estimated average requirements (Figure 2). Alarmingly, the increase in overall salt ingestion was paralleled by a clear reduction in iodized salt intake in children (Figure 3).

A call to action

Insufficient iodine status increases risk for hypothyroidism, goiter, thyroid nodules, and cognitive and developmental delay in children. Hence, the authors emphasize that political efforts have to be urgently intensified that effectively re-strengthen awareness of both food industry and consumers for the importance of an improved and adequate iodine supply. What is required is not only an increase in use of iodized salt for processed food production, but also an increase in iodine fortification of iodized salt.
Iodine deficiency: a forgotten issue in the Andean countries?

Ana Maria Higa, IGN Regional Coordinator for South America, Lima, Peru

Great progress has been made in Andean countries in recent decades in reducing poverty and improving the nutritional status of children. Five countries, Peru, Bolivia, Colombia, Ecuador and Venezuela, were declared free of iodine deficiency more than two decades ago. As of 2021, the monitoring of the iodine status through the Global Scorecard of Iodine Nutrition shows adequate intake of iodine in the seven Andean countries, except in Colombia, where consumption is excessive.

However, these overall figures on population iodine intake hide geographic disparities between urban areas and the more remote mountainous and jungle areas where access to and consumption of iodized salt is scarcer, a problem exacerbated by lack of access to foods rich in iodine such as sea products. Populations in rural areas tend to be poorer and have more limited access to basic social services.

In the sixties, the governments of four countries decreed salt iodization by law and instituted surveillance and monitoring programs, which resulted in reducing the incidence of goiter and increasing the consumption of iodized salt. But with time, health practices and messaging have dwindled. There are no recent communication campaigns on the implications of iodine deficiency or risk about the consumption of non-iodized salt and / or excess salt in the Andean countries (Argentina, Bolivia, Colombia, Ecuador, Peru, Venezuela and Chile).

From public health success to forgotten issue

Recently, international organizations in the Andean countries have focused on the problem of child malnutrition and anemia, but there is little recent information on iodized salt production and the population’s access to and consumption of iodized salt.

To understand the situation in today’s context, IGN’s Regional Coordinator for South America, Ana Maria Higa, initiated a study to understand current perceptions and to develop a communications plan to address them. Work involved interviews with key informants. While complicated by the political situation and the pandemic, interviews with experts and specialists from five of the seven countries yielded valuable information and support for a communication strategy.

The study found that coordination between the different responsible entities / institutions and between the different political levels is lacking, leading to the absence of a proper situational diagnosis and a common strategy. Among decision makers and even health personnel, the perception is that salt iodization is an outdated issue and less of a public health concern, as it only impacts only pockets of population, especially in the light of other priorities such as the COVID pandemic.

Politically, this has translated in the weakening of structures for monitoring and controlling salt iodization and has resulted in less funding. An immediate consequence has been the lack of surveillance and control mechanisms for salt iodization, resulting in higher consumption of non-iodized salt. In some countries, 80% of salt production is carried out by a handful of companies, which should facilitate monitoring and quality control. Informal salt production by local producers, generally without registration, remains a challenge. Non iodized salt is informally available in the market and is cheaper, providing an economic incentive for households. Therefore, surveillance, monitoring and diagnosis need to be reinstated and strengthened.

The study found low awareness among the population of the issue of iodine deficiency and its implications, especially for pregnant women and children under one year of age. There is an urgent need for updated information on the impact of iodine deficiency and how to prevent it, especially among rural populations.
While the availability of non-iodized salt is expanding, consumption of salt is growing, posing a further threat to the health of populations. This is most likely the result of the addition of salt to processed foods, which is not generally legally mandated. Sensitization on the prevention of iodine deficiency through salt iodization therefore needs to be combined with new messaging around reduced salt consumption.

Addressing the issue
To address all these concerns, the study looked at ways of crafting a communication plan, to promote iodine salt fortification in the food preparation in the household, or as an ingredient in processed foods. The resulting informational and awareness-raising communication strategies aim to reinstall the issue in the public health agenda and in the interest, understanding and good nutritional practices of the population.

As the problem is concentrated in rural and remote areas, the study chose to prioritize local campaigns. Addressing inequities in access to sources of iodine is crucial. Additionally, the strategy explored the need to reinforce the communication skills of key health personnel in promoting good practices.

The communication plan was tested in two regions of Peru, Ucayali and Cusco, where the slogan “Salt Iodized, the Salt of Life” from the previous campaign that took place 20 years ago is still remembered. The proposed new slogan “Poca Sal, pero Sal Yodada. La Sal de la Vida” “Less Salt, but make sure it is Iodized Salt, The Salt of Life” and messages highlighting the benefits and advantages of iodized salt were incorporated in print and radio material, as radio is widely used in these rural areas.

Findings from group discussions
These materials were then tested with key audiences in the two regions. Interviews and focus group discussions were held with both health professionals and pregnant and lactating women as well as mothers of children below three years of age.

For all participants – both health professionals and the women taking part, iodized salt was a new topic, and one they knew little about, which concerned them. Health professionals confirmed that the COVID 19 epidemic was a top priority which meant other health problems were neglected, emphasized the usefulness of the information materials that were presented, and their interest in promoting it on social networks. They felt a video could also be produced targeted for the population and for journalists or “influencers” or for training.

The women taking part in the testing found that using iodized salt is very easy to do because it is eaten every day, and it is cheap. One participant mentioned “I think it’s nice and good that we now know all of this, but they don’t tell us any of this at the doctor’s office. It would be good to do so”. A nursing student was very interested and said this information will help her in her future career. A health promoter mentioned that these materials should be part of training, helping to create a demand for iodized salt.

Future steps
“It’s very important for our region to reactivate communications strategies”, says IGN Regional Coordinator Ana Maria Higa. “There’s a general perception that iodine deficiency is no longer a problem, but the risk of backsliding in the Andean region could affect pregnant women and children under three.” Over the coming year, they hope to engage with consumer organizations and advocate with individual countries to make sure that iodine deficiency is neither a relegated or an outdated issue.
Finding the strength for salt iodization: Father Jean Michelet Dorescar, salt processor in Haiti

Dave O’Brien, Senior Advisor to the Haiti Salt Project, The University of Notre Dame, USA; Jessica Rigutto-Farebrother, Human Nutrition, ETH Zurich, Switzerland

Being present in the moment is the standard operating procedure for Father Jean Michelet Dorescar, of the Congregation de Sainte Croix (C. S. C.) and general manager of Bon Sel Dayiti, a Haitian fortified salt processor. In a country of ever-deepening inequality and experiencing the continuing decline of traditional institutions, Fr. Michelet is accustomed to the inconvenience of instability. With a larger sense of mission, he leads the Bon Sel effort to assist the people of Haiti afflicted with or at-risk of suffering from IDD or Lymphatic Filariasis (LF).

The Bon Sel facility is supported by the Haiti Salt Project (HSP), part of the Global Center for the Development of the Whole Child at the University of Notre Dame, US. Formed in 2006 as a complementary strategy to rid Haiti of LF, HSP also addresses the prevention of IDD. Operating at the intersection of health, education, and social enterprise, HSP leverages these strategies to improve educational outcomes particularly for early childhood learners. HSP works with the Haitian Ministry of Health, World Food Program, Food for the Poor, USAID, CSC, and the Iodine Global Network to eliminate LF and IDD. This collaboration intensifies following natural disasters, as demonstrated in the summer of 2021 when Bon Sel provided salt fortified with iodine to several meal programs to alleviate food insecurity following the earthquake. Bon Sel, as the only salt processing facility in Haiti, provides local policy makers with a local resource, employing local talent, for local strategies and solutions.

A fortified salt strategy relies on achieving an ongoing minimum fortification level as well as continued consumption of fortified salt in appropriate amounts. As such, while access to fortified salt is important, of equal if not greater importance is the daily regimen needed to achieve ideal levels. The Bon Sel facility plays a crucial role in fortifying local and imported salt with potassium iodate and/or diethylcarbamazine (DEC) to combat LF, as well as supplying food processors and food service operators with iodized salt. By expanding into the food industry, particularly bakeries and bouillon makers, iodized salt can reach a wider population as consumption patterns shift away from the in-house use of salt.

Being mindful of the need for steady consumption, Fr. Michelet understands his larger sense of purpose in providing fortified salt. He knows that being part of the solution is to be on task every day – his presence is required. While others have the privilege to curtail operations in difficult times, Bon Sel operations continue. Adjusting production, marketing, and distribution to successfully maneuver through a chaotic marketplace is now the norm. Despite these challenges, Fr. Michelet finds the strength to be present in the moment.

Factory work in the Bon Sel Dayiti facility in Del Mas. Bon Sel Dayiti is the only food-grade, iodized, and fortified salt produced in Haiti. Its primary goal is to aid in reducing iodine deficiency disorders. → https://bonseldayiti.com
Albania achieves adequate iodine nutrition

A new law requiring the use of iodized salt by the food industry improves iodine nutrition in Albania

Agron Ylli, University Hospital Center "Mother Teresa", Tirana Endocrinology Service; Jolanda Hyska, Gentiana Qirjako, Genc Burazeri, Ervin Toçi, Institute of Public Health, Tirana; Mariana Bukli, UNICEF Tirana Office

Background
Albania is a country historically affected by moderate-to-severe IDD. After the introduction of iodized household salt, a 2012 study reported a national median urinary iodine concentration (mUIC) of 100 µg/L in school-age children, but children living in rural areas had a mUIC of 84–91 µg/L, suggesting mild IDD. Law 9942, revised and approved by the Albanian Parliament in February 2020, requires the use of iodized salt for human and animal consumption and use in the food industry. To judge the impact of the new law, a national iodine survey was done. Financial support for this survey was provided by the UNICEF and the Institute of Public Health (IPH) in Tirana, Albania.

The 2021 national iodine study
The aim of the study, performed from April-May 2021, was to evaluate progress towards the elimination of iodine deficiency in Albania through the measurement of the mUIC in school-age children (SAC) (6-12 years) and assessment of iodine levels in salt at the household level. A nationally representative sample of children aged 6-12 was included in the study. In total, 1200 children (60 schools and 20 children per school) were included in the study.

A spot urine sample and a salt sample were collected, a short food frequency questionnaire was done, and data was collected on the use of iodized salt in households, including knowledge of iodized salt, the types of salt consumed in the household, the type of salt packaging, the brand of salt used at the household level, and what the different types of salt were used for.

Urine samples were analyzed at the Institute of Public Health in Tirana by using the Sandell-Kolthof reaction. The iodine content of salt was determined by titration. This laboratory has participated in the EQUIP (Quality Assurance Procedures for Iodine Determination Procedures) program of the CDC (Centers for Disease Control and Prevention) Atlanta (USA).

The following definitions were applied: 1) A mUIC in the range 100–299 µg/L for school-age children indicates adequate iodine intake in this age group, while a mUIC ≥300µg/L indicates excessive iodine intake; 2) Salt iodine content was considered: a) 'salt without iodine', salt with < 5 ppm iodine; b) 'iodized salt', salt with ≥ 5 ppm iodine; c) 'adequately iodized salt', salt with ≥ 15 ppm iodine.

The following table shows the characteristics of the children participating in the survey:

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elbasan</td>
<td>80</td>
<td>6.7</td>
</tr>
<tr>
<td>Korçë</td>
<td>80</td>
<td>6.7</td>
</tr>
<tr>
<td>Vlorë</td>
<td>120</td>
<td>10.0</td>
</tr>
<tr>
<td>Shkodër</td>
<td>120</td>
<td>10.0</td>
</tr>
<tr>
<td>Fier</td>
<td>120</td>
<td>10.0</td>
</tr>
<tr>
<td>Durrës</td>
<td>120</td>
<td>10.0</td>
</tr>
<tr>
<td>Dibër</td>
<td>80</td>
<td>6.7</td>
</tr>
<tr>
<td>Berat</td>
<td>80</td>
<td>6.7</td>
</tr>
<tr>
<td>Gjirokastrë</td>
<td>40</td>
<td>3.3</td>
</tr>
<tr>
<td>Kukës</td>
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<td>3.3</td>
</tr>
<tr>
<td>Lezhë</td>
<td>40</td>
<td>3.3</td>
</tr>
<tr>
<td>Tiranë</td>
<td>280</td>
<td>23.3</td>
</tr>
</tbody>
</table>

Findings
Despite the COVID 19 pandemic, the field team collected 1200 urine samples, 1200 salt samples and completed 1177 questionnaires. Of the 1200 children aged 6-12 years who participated, 667 children or 55.6% were females. Half of surveyed schools were located in urban areas (Table 1).
Albania’s iodized salt program provides ample iodine to children in both rural and urban areas

The mUIC among school children at the national level was 136 µg/L. mUIC and salt iodine concentrations were significantly higher among school children living in urban areas compared to those living in rural areas (Table 2). A UIC <50 µg/L was observed in 12.9% of school children. The correlation between urine and salt iodine concentration was positive and significant only among school children living in rural areas.

Table 3 shows the distribution of salt samples by iodine concentration. No iodine content was found in 19.1% of salt samples and inadequate iodine content was found in 13.3% of samples.

Fish and dairy products, as well as bread containing iodized salt, are important sources of iodine in European diets. The frequency of fish consumption was low: about 7% of parents reported that their children never consumed fish and about 86% of school children in urban and rural areas consumed fish once a week or less. In contrast, about 69% of school children (about 73% of urban school children and 64% of rural school children) consumed dairy products at least once per day. The frequency of bread consumption was very high: about 91% of school children consumed bread at least once per day (about 92% of urban school children and 89% of rural school children).

Parents were asked whether they had ever heard of the term “iodized salt”. About 9 out of ten parents had heard of iodized salt. However, there were significant urban-rural differences: a higher proportion of urban parents (91.8%) had heard about iodized salt compared to rural parents (82.5%).

The percentage of children with a very low UIC (0-20 µg/L) diminished significantly with the increasing household salt iodine content: from 5.2% among those using non-iodized salt, to 3.8% among those using inadequately iodized salt, to 3.4% among those using adequately iodized salt, to 1.2% among school children using over iodized salt.

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Median (95% CI) urinary iodine concentrations and household salt iodine concentrations among school children by urban/rural residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean urinary iodine concentration (µg/L)</td>
</tr>
<tr>
<td>National</td>
<td>135.75 (128.25-142.28)</td>
</tr>
<tr>
<td>Rural</td>
<td>119.50 (112.75-126.90)</td>
</tr>
<tr>
<td>Urban</td>
<td>152.15 (142.42-160.88)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 3</th>
<th>Distribution of the iodine concentration in household salt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt iodine concentration</td>
<td>Number</td>
</tr>
<tr>
<td>No iodine (&lt;5 ppm)</td>
<td>229</td>
</tr>
<tr>
<td>Inadequate iodine (5-14 ppm)</td>
<td>160</td>
</tr>
<tr>
<td>Adequate iodine (15-40 ppm)</td>
<td>646</td>
</tr>
<tr>
<td>Excess iodine (&gt;40 ppm)</td>
<td>165</td>
</tr>
<tr>
<td>Total</td>
<td>1200</td>
</tr>
</tbody>
</table>
A UIC indicating adequate iodine intake (≥100 µg/L) was significantly higher among children consuming adequately iodized salt or over iodized salt (69% and 67.3%, respectively) compared to those using inadequately iodized salt or non-iodized salt (51.3% and 64.6%, respectively). There were no significant associations between UIC and fish, dairy or bread consumption.

Conclusions
1. The mUIC at the national level in SAC is 136 µg/L and only 12.9% of children have a UIC of <50 µg/L. Thus, the Albanian population is considered a population without iodine deficiency.

2. Compared to the last national study in 2012, when the mUIC in SAC was 100 µg/L, there appears to have been an improvement in the iodine intake in the Albanian population, and the mUIC has increased to 136 µg/L. For the first time, iodine deficiency is no longer a public health problem not only at the national level but also in both urban and rural areas of Albania, as the mUIC among SAC is now 120 µg/L in rural areas and 152 µg/L in urban areas, compared to 2012, when the respective values were 92 µg/L and 138 µg/L.

3. Despite adequate iodine status based on the mUIC, 32.4% of analyzed salt samples had no iodine or were not adequately iodized (<15 ppm). However, at the national level, the consumption of iodized salt has modestly increased, as 67.5% of salt samples in this study had iodine levels ≥15 ppm, compared to 62.1% in 2012 and 65% in the last ADHS 2017-18 study.

4. In urban areas, iodine intake (a mUIC 152.2 µg/L) and the level of salt iodine (median 29.35 ppm) are both higher than in rural areas, where the mUIC is 119.5 µg/L and the median salt iodine concentration is 22.2 ppm.

5. The majority of parents had heard of iodized salt (87.2%), but a higher percentage of parents from urban areas (91.8%) had heard of iodized salt compared to parents from rural areas (82.5%).

6. Children who never consumed bread or dairy products had a low mUIC (for both, mUIC 93.4 µg/L), and this was more pronounced in children in urban areas who never consumed dairy products (mUIC 75.9 µg/L) and in children of rural areas who never consumed bread (mUIC 87.5 µg/L).

Recommendations
- The ongoing availability of non-iodized or inadequately iodized salt in the Albanian market, and its use by about one third of the population, along with poor knowledge and practices on iodized salt encountered in a part of the population, highlight the need to take the following steps:
  1. Share and discuss these findings with all relevant stakeholders as efforts to achieve USI require broad partnerships and cooperation beyond the health sector.
  2. Secure a strong regulatory monitoring and enforcement of the national iodized salt standards to ensure consistent and high (>90%) use of iodized salt at household level as well as >90% use of iodized salt in key salt-containing industrially produced foods.
  3. Strengthen the cooperation between the structures involved in the control of iodized salt to not allow import, production or domestic trade of non-iodized or inadequately iodized salt. Proper implementation of the updated law will ensure a better monitoring and control system, thus improving the coverage and quality of iodized salt in Albania.
  4. Use the mass media as part of a national strategy to prevent IDD, as they can achieve/ensure improvements in both knowledge and behavior.
  5. Use contacts between health authorities and salt producers to inform and educate producers on IDD and the need for optimal salt iodization.
  6. Conduct assessments of the contribution of processed foods to salt and iodine intake of population.
  7. Emphasize universal use of iodized salt at households and in the bread industry, along with salt reduction targets and objectives.
  8. Periodically (every five years) monitor population iodine status to track progress, carried out through nutrition sentinel surveillance.
Workshop in Pakistan

Iodine Deficiency Disorders, Universal Salt Iodization – A Game-Changing Solution

On December 22, 2021, the Iodine Global Network, together with the University of Lahore, Multisectoral Nutrition Centre (Planning & Development Board, Government of Punjab) and the Punjab Food Authority, which acts as a provincial public sector regulatory authority, held a workshop in Lahore on Universal Salt Iodization as a solution to IDD.

The workshop, which brought together stakeholders from the academia, public, private and development spheres, highlighted the situation in country and commitment of stakeholders to improve universal salt iodization (USI). Dr. Werner Schultink, Executive Director Iodine Global Network (IGN), during a video message, acknowledged the role of partners, celebrating the energy that all partners show in making sure everyone in Pakistan is free of iodine deficiency, now and in the future.

Ms. Maryam Maqsood from University of Lahore opened the workshop by introducing the University Institute of Diet and Nutritional Science and University of Lahore’s efforts to ameliorate nutrition indicators.

In Pakistan, remarkable results have been achieved in the fight against iodine deficiency, but there is still progress to be made. While the median urinary concentration of iodine at national level is within the adequate range, populations in the mountainous and rural areas have lower levels, pointing to insufficiencies. The latest national survey showed a reduction in the prevalence of IDD in school age children from 64% in 2001 to 37% in 2011. The situation among women of reproductive age shows similar progress with a reduction from 76% to 69%.

A revolving fund was established in 2013 to manage the distribution on a non-profit-no-loss basis of potassium iodate, which is necessary for the iodization of salt. This was followed by the revitalization of the salt iodization program in 2015, which comprised technical and material support as well as a mass awareness campaign. Moreover, active monitoring of salt processing played a positive role in strengthening the culture of salt iodization in the food industry.

As a result, household coverage of iodized salt increased to 80% as reported in the 2018 Nutrition Survey. However, measurements of urinary iodine showed that 7.3% of 6–12-year-old children were severely deficient in iodine, with girls more severely impacted than boys, and children in rural areas more affected than those in urban settings (1). Regional disparities exist, with household consumption of iodized salt ranging from 32% to 91%. The iodine status of women is below the acceptable range in three provinces, concentrated in the North of the country (FATA, Azad Jammu Kashmir, and Gilgit provinces).

Indeed, while most households consume iodized salt, it is not known if it is adequately iodized, presenting a further challenge to universal salt iodization. A way to address this, would be carry out USI surveys in the future in order to estimate the total proportion of the population who may not be protected from iodine deficiency.

Pakistan is a salt exporting country. According to Status of the Iodine Nutrition and Salt report by IGN and UNICEF (not yet published), the country produces 960,000 MT of salt. Of this, only 768,000 MT are iodized for a total annual requirement of 784,000 MT. It is estimated that while large salt producers meet around 25% of the total market requirement, 30–40% of needs are met by medium scale producers and another 30–40% by small scale enterprises. This is a problem as medium and small salt processors often do not provide uniform and/or adequate iodization.
During the workshop, Mr. Faiz Rasool, Senior Policy Advisor (GAIN), who is the National Coordinator for IGN (Photo), presented the Government of Pakistan’s proposed pathway towards “Pakistan’s National Food System Transformation”, highlighting the need and importance of improved governance of the food fortification programs, including universal salt iodization. He explained the role of IGN at global level and the potential strategic support that it could bring to the Pakistan USI program in coming years, in collaboration with other national & international stakeholders.

In the same vein, Technical Director General from Punjab Food Authority, Mr. Ghulam Mustafa Dogar, highlighted the importance of a national level legislation on mandatory salt iodization. To date, in the absence of a national legislation that mandates production and consumption of iodized salt for edible purpose, iodization of salt has been made mandatory at the provincial level through different approaches. The responsibility of monitoring salt iodization falls under the Provincial Food Authorities. There is no harmonized approach for enforcement, resulting in regional variations depending on the capacity and strength of the regulatory bodies. Mr. Dogar further emphasized the importance of innovative and mechanized technology in the salt industry to ensure the quality of iodization at production point.

Dr. Khawaja Masoud Ahmad, National Coordinator from the Nutrition Wing & National Fortification Alliance in the Ministry of National Health Services, Regulations & Coordination, highlighted key challenges of USI. He also proposed some strategic solutions to ensure the quality of iodization by small and medium scale salt processors, sustainability of the potassium iodate supply chain and the use of qualitative methods during large scale household surveys.

An example of innovative and mechanized ways to iodize salt was given by Mr. Lorenzo Locatelli, inventor of the Nimble. This small iodization machine was developed specifically for the small- to-medium sized salt producers operating in areas without access to electricity. With the Nimble, they can iodize small quantities of salt on a continuous basis to meet the needs of their local communities. Made for durability and heavy-duty use, the Nimble measures and mixes the appropriate quantities of iodine homogeneously to deliver consistently high-quality iodized salt.

While provincial authorities regulate the iodization of salt for edible purposes, there is no explicit mention that iodized salt should be used for processed foods and condiments. Little information is available on the use of iodized salt in the manufacturing of processed foods and its contribution to the intake of iodine. In the Pakistani context, processed foods containing iodized salt represent an opportunity for regions where salt iodization is weak.

As a highlight of the workshop, Dr. Fayyaz Ashraf, made the high-level commitments in the name of National Foods Ltd., one of the largest processed food companies of Pakistan, to use adequately iodized salt in all the processed food items which contain salt, to improve the nutritional status of Pakistanis.

A further step was taken in proposing to set up a research hub to develop a “National Research Agenda” for the production of safe, healthy and nutritious (fortified) food, which may require IGN support in the coming years.

To overcome negative beliefs on iodized salt that prevail in some populations/regions, Mr. Awais Khan, from the National Alliance for Safe Foods, explained the role of the halal certification to increase the acceptance of iodized salt among consumers.

The closing remarks came from chief guest Dr. Suhail Saqlain, member of the Health, Nutrition and Population, Planning & Development board, Government of Punjab, who underscored the importance of having the public and private sector joining forces to address the issue of iodine deficiency disorders for the generations to come.

IGN would like to take this opportunity to thank all the partners in Universal Salt Iodization in Pakistan: MSNC, UNICEF, Nutrition International, National Alliance for Safe Food, National Foods Ltd. University of Lahore, University Institute of Diet and Nutritional Sciences, Punjab Food Authority.

Ensuring iodine intakes in Pakistani girls is important for their development

Mr. Faiz Rasool, Senior policy advisor for IGN, Pakistan

References
Making salt iodization and salt reduction compatible in South Asia

For more than two decades, the world has been working to eliminate iodine deficiency through the iodization of salt. It has been a major success, with more than 85% of the world’s households using iodized salt, protecting the brain development of hundreds of millions of children. IGN continues to work with partners, including UNICEF, to protect this achievement and to reduce iodine deficiency in countries and populations where it is still an issue.

In recent years, evidence has emerged on the effect of salt on our health. Most people consume 9-12g (about 2 teaspoons) of salt per day. That’s more than twice the daily intake recommended by the World Health Organization. Reducing salt in the diet can help reduce blood pressure, risk of cardiovascular disease, stroke and heart attack, potentially preventing some 2.5 million deaths per year. WHO member states have agreed to reduce the global population’s intake of salt by a relative 30% by 2025.

So how do we make these two important public health issues compatible? This webinar was organized by IGN’s Regional Coordinator in South Asia, Dr. Renuka Jayatissa, to review, discuss, educate, and create awareness among professionals and practitioners on these two aspects of sustaining universal salt iodisation in compatibility to salt reduction initiatives in South Asia. The webinar was held on 31 January 2022 via Zoom with the participation of 485+ participants from over 35 countries.

Opening the workshop, IGN’s Executive Director, Dr. Werner Schultzink, noted that the two strategies are perfectly compatible as it is technically easy to adjust iodization levels so that when people consume less salt, they still get enough iodine, thus protecting them from IDD and NCDs. He stressed that good communication and good monitoring are fundamental to the joint implementation of these two complementary strategies.

Iodine status in South Asia
Dr. Arnold Timmer, Senior Adviser, IGN, reviewed the findings of a comprehensive landscape analysis conducted in all eight South Asian countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) by IGN in partnership with UNICEF Regional Office of South Asia (ROSA) in 2019-2020. He highlighted the following key findings and ways forward:

- South Asian countries have scaled up programs that largely provide adequate iodine to populations. Median urinary iodine concentration (mUIC) among school age children was in the range of 128-314 µg/L, indicating adequate iodine in each country in the region.
• However, some regions and people are still iodine deficient and program improvements are needed to go the last mile. Household coverage of iodized salt (>0 ppm) across the countries was in the range of 57%-100% calling for more efforts in the countries lagging behind.
• Overall focus should be to sustain the efforts and to ensure the program is anchored into national health agendas.
• Regional coordination and collaboration, among others, are crucial with salt reduction efforts, which work synergistically both ways.

The presentation was followed by discussions, which elicited further information:
• Harmonization of salt iodization standards across South Asian countries is not required because standards have been set in each country as per their country specific needs which are not the same across the countries.
• Sustainable communication approaches would include integrated iodine and salt reduction topics into curriculums of school students as well as health and medical professionals.

Sustaining salt iodization programs in compatibility with salt reduction
Dr. Michael Zimmermann, Chair of the Iodine Global Network and Professor off Human Nutrition at ETH Zurich, highlighted some key issues to consider as part of the compatibility discussion.
• In Asia and Africa, salt is the only fortification vehicle which reaches many of the rural poor.
• Salt iodization is a remarkably high cost-effective public health intervention, with up to 70:1 benefit: cost ratio.
• Policies for salt iodization and salt reduction are compatible, cost-effective and of great public health benefit.
• The potential impact of salt reduction on iodine intake will vary and likely be country and context specific as this will depend on various factors including (i) baseline salt intakes and how much salt intakes are reduced, (ii) whether reductions in salt intake occur mainly in households vs. industry, (iii) extent of household coverage with iodized salt, and (iv) extent of use of iodized salt by food industry.
• A generalized iodization standard will be of limited value as salt intake falls.
• Careful monitoring of iodine status and ‘tailored’ iodine programs are highly important.

During the discussion session that followed the presentation, following points were also shared:
• Iodine status should dictate the iodization level. If there is a case of excess iodine intake, such as currently in Nepal, currently, salt iodization levels will need to be reduced. When salt intake is decreasing, the iodine level in salt can be adjusted. This approach is already applied in Switzerland, US and Netherlands.
• Some countries like the UK have based their iodine strategy on iodine content in livestock products such as milk. It depends upon how big animal husbandry is and if feed production is industrialized.
• There is a strong need to accelerate the collaboration between salt iodization and salt reduction initiatives in South Asian countries.

Salt reduction strategies and parallels with iodization programs
Dr Kathy Trieu, Research Fellow and Senior Lecturer at the George Institute for Global Health, University of New South Wales, shared an overview of national salt reduction efforts around the world and highlighted some parallels between salt iodization and salt reduction strategies. Salt intake among the adults worldwide was estimated at around 10 g per capita per day in 2013 – twice the WHO recommendation. The George Institute for Global Health has been monitoring salt reduction strategies/initiatives since 2010 which has revealed the following:
• Countries with salt reduction strategies/initiatives increased from 30 in 2010 to 75 in 2014 and to 96 in 2019. In 2019, 60 countries had legislative approaches and 16 countries had multi-legislative approaches.

During the discussion session, following points were clarified:
• Multiple interventions are more effective in reducing salt intake level than one single intervention.
• Legislative approaches include mandatory sodium content targets for packaged foods, mandatory nutrition criteria for public institutions such as schools, hospitals and other government agencies, as well as mandatory front-of-pack labeling.

• While the number of countries with strategies/initiatives increased mainly in Europe, Americas, and Eastern Mediterranean, it reduced in Western Pacific. There were no changes in Southeast Asia and Africa.
• Initiatives between 2014 and 2019 include interventions in setting, food reformulation, front-of-pack labeling, and salt taxation. Consumer education, the most common initiative in 2014, decreased due to the high cost of sustaining the intervention and a shift of focus to other areas.
• In 2019, 3 countries reported population salt intake reduction of more than 2 g/day, 9 countries 1-2 g/per day, 5 countries 0.5-1 g/day, 7 countries nominal or no reduction, and one country increased consumption. Progress has been slow and quite gradual.
• Potential areas for collaboration between salt iodization and salt reduction initiatives include monitoring and surveillance, communication and education, engagement of food industries, and research.
Alternative approaches to salt reduction – the China study

Professor Bruce Neal, Executive Director of the George Institute for Global Health, University of New South Wales, shared the key findings of a 5 year, large scale (n=20,995), open, cluster randomised trial conducted in rural China to define the effect of a salt substitute—a blend of 75% sodium chloride (NaCl) and 25% potassium chloride (KCl)—compared to regular salt (100% NaCl) on stroke, major adverse cardiovascular events and total premature mortality. Key findings include:

- The use of the salt substitute can significantly reduce (p value<0.05) the risk of having stroke (by 14%), major cardiovascular events (by 13%), and premature deaths (by 12%).
- There was no evidence on increased risk of hyperkalaemia due to use of KCl.
- The effect on stroke was similar among all sub-groups of the study participants in terms of age (>65 y, <=65 y), education, presence/absence of prior stroke, diabetes, hypertension, etc., and other parameters.

Based on the study findings, Prof Neal suggested some potential strategies for future implementation:

- Salt manufacturers and retailers worldwide could switch to producing and marketing salt substitute at scale.
- The worldwide food processing industry could reformulate products to lower sodium and higher potassium compositions.
- Governments could design policies to promote salt substitute and discourage regular salt use.

World Health Organization perspective

Dr. Angela De Silva, Regional Adviser, Nutrition and Health for Development in WHO’s Regional Office for South-East Asia noted that while salt iodization is the most successful interventions for preventing iodine deficiency, salt reduction is the most cost-effective intervention for preventing and controlling non-communicable diseases. Both these strategies are key priorities for WHO South-East Asia. She made the following points:

- WHO has a clear message that per capita salt consumption should be reduced to less than 5 g/day but whatever amount of salt is consumed, it should be iodized.
- WHO guidelines emphasize that potassium intake should be increased through consumption of fruits and vegetables but it does not mean that salt substitutes are not ok.
- There is still a lot to be done to ensure universal salt iodization coverage in South-East Asian countries. Efforts towards salt reduction have just started and progress is very slow despite the existence of polices in countries to reduce relative salt intake by 30% by 2025.
- Salt reduction efforts are complex as well as difficult and reducing salt content in packaged foods alone will not resolve the problem since main sources of salt in the region are home foods, street/market foods, and restaurant foods. There is a need to adjust the preference of salt taste because it is the taste that drives consumption of more and more salt.
- Salt consumption should be reduced even if it is low sodium salt because it still contains 60-70% NaCl. WHO is bringing out a guideline on the use of low sodium salt soon.
- WHO promotes good coordination and integration between salt iodization and salt reduction programs in order to ensure success of both of these important public health interventions.

Concluding remarks

Dr. Jayatissa thanked the speakers and said the workshop has highlighted the need for regular monitoring of salt iodine content, urinary iodine concentration and salt consumption reduction. It has also provided ideas with respect to cost-effective options for salt reduction in meaningful way while keeping in mind the food culture in South Asia. She was hopeful that the webinar would be helpful in creating a positive perception towards the two important public health interventions especially in the South Asia region.

For more information or to view videos of individual presentations, please visit:
Mild-to-moderate iodine deficiency in pregnancy exists in many countries in Europe. Iodine status in the general population in Cyprus is thought to be sufficient (median UIC 120 µg/L), but this classification is based on data from a national survey of school-aged children from Northern Cyprus that is more than 20 years old. A previous study of iodine status of pregnant women in Northern Cyprus found the median UIC to be low, at 110 µg/L. Cyprus has been divided into the Republic of Cyprus (populated by Greek-Cypriots) and the self-declared northern part of the island (populated by Turkish-Cypriots) since 1974. There may be differences between the two regions of Cyprus as the northern part of the country may be exposed to additional iodine because of their reliance on food imports from Turkey where there is a mandatory salt iodisation programme and this may not be the case in the Republic of Cyprus. In Cyprus there is no official recommendation for pregnant women to take an iodine supplement and it is uncertain whether women are aware of the increased iodine requirements in pregnancy or dietary sources of iodine.

The authors recruited 128 pregnant women at their first-trimester ultrasound scan to a cross-sectional study. They collected spot-urine samples for the measurement of urinary iodine concentration (UIC, µg/L), and creatinine concentration (Creat, g/L), the latter allows to correct for urine dilution and to compute the iodine-to-creatinine ratio (UI/Creat). Women completed a Food Frequency Questionnaire (FFQ) and a general questionnaire.

The median UIC (105 µg/L) indicated iodine deficiency according to the World Health Organisation criterion (threshold for adequacy=150 µg/L) and the UI/Creat was also low at 107 µg/g.

Only 32% (n=45) of women reported the use of iodine-containing supplements; users had a higher UI/Creat than non-users (131 µg/g vs. 118 µg/g), though this difference was not statistically significant. Of the dietary components, only egg intake was significantly associated with a higher UI/Creat in adjusted analyses; there was no significant association with milk, dairy products, or fish intake.

The study results suggest that pregnant women in Cyprus have inadequate iodine status and are at risk of mild- to-moderate iodine deficiency. Further research on dietary sources in this population is required.

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<td>UIC (µg/L)</td>
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<td>Urinary iodine-to-creatinine ratio (µg/g)</td>
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<td>Estimated 24-hr Urinary Iodine Excretion (µg/d)</td>
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**In Memoriam: Professor Geraldo Medeiros-Neto, champion of USI in Brazil**

Dr. Medeiros-Neto was born in São Paulo, Brazil, where he graduated and completed his Residency in Internal Medicine and Endocrinology at the University of São Paulo. After his studies, he moved to Boston, USA, to undertake a research fellowship under Professor John B. Stanbury at the Massachusetts General Hospital. He subsequently returned to São Paulo where he founded and headed the Thyroid Laboratory at the Hospital das Clinicas da Universidade de São Paulo for several decades. His work is reflected in 237 peer-reviewed publications as well as in the 12 books of which he was the editor, author, or co-author. For two decades, Dr. Medeiros-Neto was a strong promoter of the implementation of an iodization program in Brazil, where the issue had not been adequately addressed since 1955. In 1995, he and several colleagues finally succeeded in convincing the Brazilian Government to introduce a law stating that all salt for human use was to be iodized at levels established by the Health Authorities. Geraldo was one of the founders of the International Council for Control of Iodine Deficiency Disorders (ICCIDD). Professor Geraldo Medeiros-Neto is survived by his beloved wife Suzana, their four children, and their nine grandchildren.

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**Japan donates 850kg of potassium iodate to Madagascar**

Minoru Irie, M.D., IGN National Representative for Japan, recently announced that, courtesy of Ise Chemicals Corporation, The Japan Iodine Industries Association (JIIA) and the Chiba Prefectural Government, 850kg of potassium iodate will be sent by ship from Yokohama to Madagascar, to aid in the USI program there. This is the 4th large donation of iodate from Japan for the purpose of producing iodized salt and its contribution to the health of the people of Madagascar. The donation is done as the manifestations of goodwill of the Japan Iodine Industries Association (JIIA), Foundation for Growth Science and Chiba Prefectural Government, to the government and UNICEF of Madagascar. The donation ceremony was held by Chiba Prefectural Government on Monday, January 31, 2022 at the Chiba Prefectural Government Offices. Ms. Tsilavo Maherizo Randrianjafy, Ambassador Extraordinary of the Republic of Madagascar was invited to the ceremony to make greetings.

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**February is Iodine Month in Nepal**

Online Khabar, Ramesh Karki, February 12, 2022. The government of Nepal is observing February as National Iodine Month with an aim of creating awareness among people about the consumption of iodised salt. Nepal once had one of the highest prevalences of iodine deficiency disorders in the world. Reports from British visitors to Nepal decades ago noted a high prevalence of goitre and cretinism and attributed the problems to a wide variety of causes by the local population. A policy to fortify all edible salt with iodine in Nepal was adopted by the government in 1973 and salt iodisation was gradually adopted as the sole strategy to control and eliminate IDD in the country. A social marketing campaign along with the celebration of the month of February as the Iodine Month continues to raise awareness. Now, as highlighted by Iodine Month, future challenges include managing the iodine content in iodised salt to address excessive iodine in salt, understanding the use of iodised salt in processed foods, and ensuring programme visibility to ensure sustainability.  

Abstracts

Iodine Status of 6–12-Year-Old Children in Russia over the Past 10 Years: A Scoping Review
National data for large countries may hide regional differences in the UIC. Currently, there is limited data on the iodine status of children in Russia. The authors summarized the evidence on the iodine status of children in Russia using both international and local literature in accordance with the PRISMA guidelines. A total of 2164 studies were identified, 12 of which met the selection criteria and covered 10 of 85 federal subjects. For most of the Russian regions there was no information on UIC. A range of methodologies were used to determine UIC. The median UIC ranged from 46 µg/L in the mountainous areas of the Republic of Kabardino-Balkaria, which corresponds to a moderate iodine deficiency, to 719 µg/L in the town of Turinsk (Sverdlovsk region) indicating excessive of iodine intake. Nationwide monitoring should be implemented in Russia and public health measures should be adjusted to regional and local conditions to ensure adequate iodine nutrition for all citizens. Korobitsyna, R. et al. Nutrients 2022, 14, 897. https://doi.org/10.3390/nu14040897

Nutritional iodine status and obesity
In this short review, the authors analyzed current knowledge on the effects of overweight and obesity on indicators of adequacy and monitoring of iodine status, namely urinary iodine excretion and thyroid volume and echogenicity. Data on urinary iodine excretion in overweight/obese children are divergent, as both increased and reduced levels have been reported in overweight/obese children compared to normal-weight controls. Whether gastrointestinal surgery may affect iodine absorption and lead to iodine deficiency in patients undergoing bariatric surgery has been evaluated in a limited number of studies, which excluded iodine deficiency, thus suggesting that supplements usually recommended after bariatric surgery do not need to include iodine. Albert limited, evidence on thyroid volume and obesity is consistent with a direct relationship between thyroid volume and BMI, irrespective of nutritional iodine status. Finally, a higher frequency of thyroid hypoechogenic pattern has been described in overweight/obese children. Further studies, specifically addressing the role of schoolchildren body mass index as a factor potentially influencing iodine intake indicators are needed. Moledl M et al. Thyroid Res. 2021 Nov 27;14(1):25. doi: 10.1186/s12937-022-00760-6.

Iodine from brown algae in human nutrition, with an emphasis on bioaccessibility, bioavailability, chemistry, and effects of processing: A systematic review
Brown algae are becoming increasingly popular as a food source and dietary supplement in Europe and other Western countries. As they are highly rich in iodine, they represent a potential new dietary iodine source. The iodine content of algae or foods containing algae is currently not regulated in the European Union. The aim of this paper was to review the literature to determine the chemical species of iodine in brown algae, the loss of iodine during processing, and the bioavailability and bioaccessibility of iodine. The bioavailability of iodine from brown algae was generally high, with in vivo bioavailability ranging from 31% to 69%. The in vitro bioavailability of iodine (2%-28%) was systematically lower than in vivo bioavailability (31%-90%), indicating an inadequate in vitro methodology. Processing may reduce the iodine content of brown algae, and a higher I-content was positively correlated with increased iodine loss during processing. However, the iodine content may still be high after processing. Further research on processing techniques to reduce the iodine content in brown macroalgae is warranted. Bliks M et al. Compr Rev Food Sci Food Saf. 2022 Mar 1. doi: 10.1111/1541-4337.12918.

Iodine deficiency in pregnancy along a concentration gradient is associated with increased severity of preeclampsia in rural Eastern Cape, South Africa
Iodine deficiency in pregnancy, which is amenable to correction through iodine supplementation, has been reported in a number of the developing countries. The authors enrolled 51 randomly selected normoiodine pregnant controls at term together with 51 consecutively selected cases of preeclampsia and 51 cases of severe preeclampsia/eclampsia, all in the third trimester, in the Eastern Cape Province. UIC < 100 µg/L, Tg > 16 µg/L, and TIT < 11.3 pmol/L were independent predictors of preeclampsia/eclampsia syndrome. The authors concluded that women with severe preeclampsia/eclampsia had significantly low UIC and high Tg, suggesting protracted iodine deficiency. Businge CB et al. BMC Pregnancy Childbirth. 2022 Feb 4;22(1):98. doi: 10.1186/s12884-021-04356-6.

Iodine nutrition status and thyroid autoimmunity during pregnancy: a cross-sectional study of 4635 pregnant women
Because thyroid autoimmunity in pregnant women can lead to premature birth and miscarriage as well as neurodevelopmental deficits in the fetus, the aim of this study was to explore the association of iodine nutrition status with thyroid antibodies during pregnancy. A pregnancy-birth cohort was conducted including 4635 pregnant women in Shanghai, China. The median urinary iodine excretion level in the sample was 138.14 µg/L. Among all the subjects, 25.9% consumed non-iodized salt, 54.5% had moderate iodine deficiency, and 31.0% had thyroid autoimmunity. After adjusting for age, educational status, former smoker status, former drinker status, first pregnancy, and previous thyroid disease, the results of the multivariable analysis showed a non-linear relationship between the continuous change in iodine intake and thyroid autoimmunity. Participants with iodine deficiency had an increased risk of testing positive for thyroid antibodies. Moreover, this associated existed even after removing participants with previous thyroid disease. The authors concluded that inadequate iodine nutrition in pregnant women is an independent risk factor for thyroid autoimmunity. Chen X et al. Nutr J. 2022 Jan 29;21(1):7. doi: 10.1186/s12937-022-00760-6.

Iodine supplementation: compliance and association with adverse obstetric and neonatal outcomes
Portuguese women of childbearing age and pregnant women were previously shown to be mildly-to-moderately iodine deficient. As a response, in 2013, the National Health Authority (NHA) issued a recommendation that all women consuming pregnancy, pregnant or breastfeeding, take a daily supplement of 150-200 µg iodine. This study explored how the iodine supplementation recommendation has been fulfilled among pregnant and lactating women in Portugal, and whether the reported iodine supplements intake impacted on adverse obstetric and neonatal outcomes. In this observational retrospective study, the use of iodine supplements increased from 25% before the recommendation to 81% after the recommendation. This was mostly due to an increase in the use of supplements containing iodine only. Iodine supplementation was protective for the number of adverse obstetric outcomes (odds ratio (OR) = 0.791, P = 0.018) and for neonatal morbidities (OR = 0.528, P = 0.024) after controlling for relevant confounding variables. The authors concluded that the recommendation seems to have succeeded in implementing iodine supplementation during pregnancy, and further studies are needed. Lopes-Pereira M et al. Eur Thyroid J. 2022 Jan 1;11(1):e210035. doi: 10.1530/ETJ-21-0035.