



**Summary Report from the Pilot Implementation of the  
IGN Programme Guidance on the Use of Iodised Salt in  
Processed Foods**

**March 2020**

## Table of Contents

Glossary .....	iv
Abbreviations.....	v
Executive Summary .....	vi
Introduction.....	1
Kenya .....	2
1. National situation analysis.....	2
2. Outcome of the legislative review. ....	3
3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.....	4
4. Outcome of the enabling environment for USI review.....	8
5. National conclusions based on all above findings .....	8
Macedonia.....	10
1. National situation analysis.....	10
2. Outcome of the legislative review. ....	11
3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.....	11
4. Outcome of the enabling environment for USI review.....	15
5. National conclusions based on all above findings .....	15
Republic of Moldova.....	18
1. National situation analysis.....	18
2. Outcome of the legislative review. ....	19
3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.....	19
4. Outcome of the enabling environment for USI review.....	25
5. National conclusions based on all above findings .....	26
Sri Lanka.....	28
1. National situation analysis.....	28
2. Outcome of the legislative review. ....	29
3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.....	29

4. Outcome of the enabling environment for USI review.....	34
5. National conclusions based on all above findings .....	34
Thailand .....	36
1. National situation analysis .....	36
2. Outcome of the legislative review. ....	37
3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.....	37
4. Outcome of the enabling environment for USI review.....	45
5. National conclusions based on all above findings .....	45

## Glossary

Universal Salt Iodisation (USI)	<p>Fortification with iodine of all food-grade salt for human and animal consumption, including salt for food processing (WHO 2014).<sup>(1)</sup></p> <p><i>For the purposes of this document only food-grade salt for human, not animal, consumption is being considered in relation to the term salt iodisation.</i></p>
Food-grade salt	<p>Salt used as an ingredient of food, both for direct sale to the consumer and for food manufacture. It applies also to salt used as a carrier of food additives and/or nutrients (CODEX STAN 150 - 1985 (2006 amendment)).<sup>(2)</sup></p> <p><i>This document refers to consumer salt as household salt, and food manufacture salt as salt used in industrially processed foods or food industry salt.</i></p>
Household salt	<p>Salt used in cooking or added at the table.</p> <p><i>For the purpose of this document, we use household salt to describe <b>all retail salt</b> which includes salt used at the household, in small-scale local food production and by street market food vendors.</i></p>
Food industry salt	<p>Salt used in the production of industrially processed foods.</p> <p><i>This document focuses on salt used by industrial food producers and not salt used in commercially produced foods for the local market.</i></p>
Industrially processed foods (including condiments)	<p>Products from food industries that purchase salt in bulk and produce foods with relatively wide market reach. Products are usually packaged and branded.</p>

## Abbreviations

HCES	Household Consumption and Expenditure Survey
HIES	Household Income and Expenditure Survey
IDD	Iodine Deficiency Disorders
IGN	Iodine Global Network
MUIC	Median urinary iodine concentration
NCD	Non-communicable disease (NCD)
PW	Pregnant women
RNI	Recommended Nutrient Intake
SAC	School age children (usually 6-10 or 6-12 years of age)
USI	Universal salt iodisation
WRA	Women of reproductive age (usually 15-49 years of age and typically refers to non-pregnant women)

## Executive Summary

The main intended purpose for pilot implementation of the Iodine Global Network (IGN) Programme Guidance on the Use of Iodised Salt in Processed Foods, was to evaluate its utility, identify areas where it could be strengthened before finalisation, and assess the level of technical support that would be helpful for effective future implementation in other countries. Based on a request for Expressions of Interest (EOI) and an IGN aim for the pilot to learn from experiences in countries from different regions with varying food industry contexts; national teams from the following countries were selected to pilot the Programme Guidance: Kenya, Macedonia, Republic of Moldova, Sri Lanka, and Thailand.

The above intended aims of the pilot were successfully achieved and a list of proposed changes and additions to the current Programme Guidance has been developed, along with recommendations for additional modules to consider for future versions. However, the pilot implementation process also resulted in significant national programme findings and recommendations for each of the five countries involved.

A summary of key findings and recommendations are included in the table below. These varied considerably according to the national context and will provide helpful case studies for the next version of the Guidance. Additional detail on the process and findings for each country are presented by chapter in the main body of this report.

Country	Key Findings	Key Recommendations
Kenya	<ul style="list-style-type: none"> <li>• Lack of data (or access to data) to estimate the consumption of salt-containing processed food from surveys and/or food industry records.</li> <li>• The salt industry supplies only iodised salt to the food industry.</li> <li>• One serving size of instant noodles or bouillon can contribute at least 50% of the recommended nutrient intake (RNI) for iodine for non-pregnant adults, and 35% of the RNI for pregnant women.</li> </ul>	<ul style="list-style-type: none"> <li>• Mandate iodisation of all food grade salt, currently only for table salt.</li> <li>• Improve data collection on consumption of salt-containing processed foods and on iodine status, to assess iodine intake and relationship with iodine status among different groups.</li> </ul>
Macedonia	<ul style="list-style-type: none"> <li>• Salt iodisation strategy is successful, including salt for the domestic food industry.</li> <li>• Data gap for iodised salt content of imported processed foods (relatively large market share).</li> <li>• High population salt intake. Results in &gt; 200% RNI iodine for adults and &gt; 100% RNI for pregnant women (consumption data for table salt and 9 industrially processed foods).</li> </ul>	<ul style="list-style-type: none"> <li>• Sustain regular assessment of iodine status to verify different groups have optimal iodine status.</li> <li>• Strengthen inspection, enforcement and engagement of food industry practices.</li> <li>• Review and expand National Iodine Committee membership to include customs and the food industry.</li> </ul>

Country	Key Findings	Key Recommendations
Republic of Moldova	<ul style="list-style-type: none"> <li>• Mandatory iodisation of processed food industry salt has been poorly understood and not enforced.</li> <li>• Data gap for iodised salt content of imported processed foods (relatively large market share).</li> <li>• High population salt intake. Results in potential to meet &gt; 100% RNI iodine for adults and 70% RNI for pregnant women (consumption data for table salt and 7 industrially processed foods),</li> <li>• However, estimates based on current use of iodised salt are that table salt and processed food salt meets 50% and 30% of the RNIs for adults and pregnant women, respectively.</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen inspection, enforcement and engagement of food industry practices.</li> <li>• Improve assessment of the consumption of salt-containing processed foods and of iodine status among different groups.</li> <li>• Strengthen inter-partner links, e.g. public health nutrition, food fortification committee, food industry, customs, non-communicable disease department.</li> </ul>
Sri Lanka	<ul style="list-style-type: none"> <li>• Industrially processed foods have a limited market; bread, biscuits &amp; dried fish were included in the assessment.</li> <li>• Dried fish are not preserved with iodised salt because it is not categorised as a processed food and uses the cheapest salt available.</li> <li>• Estimated that 90% RNI iodine for adults and 55% RNI for pregnant women can be met from iodised table salt and iodised salt in bread and biscuits.</li> </ul>	<ul style="list-style-type: none"> <li>• Salt iodisation strategy, including current salt iodine levels, is appropriate to maintain optimal iodine status.</li> <li>• Regulatory monitoring to re-focus on salt and food industries, not household salt at retail level.</li> <li>• Monitor potential impact of salt reduction on iodine intake through regular assessment iodine status among different groups.</li> </ul>
Thailand	<ul style="list-style-type: none"> <li>• Multiple sources of relevant data.</li> <li>• Fish and soy sauce have potential to contribute to 50% adult RNI for iodine (if iodised salt used in their production).</li> <li>• Iodine intake from household salt, iodised salt in other processed foods, and from non-salt sources such as rice, milk and eggs, shown to meet &gt;100% RNI for iodine for adult (approx. 80% of the RNI for pregnant women).</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain the policy of adding iodine to fish sauce and soy-based sauces and salty brine until regular assessment of urinary iodine status among pregnant women and other groups confirms sustained optimal iodine status.</li> <li>• Strengthen enforcement of iodised salt use and direct iodisation of specific foods, by the food industry.</li> <li>• Monitor the impact of improved regulatory monitoring through regular assessment of iodine status among adults, children and especially among pregnant women.</li> </ul>

# Introduction

This report provides a summary of the process and findings from pilot implementation of the IGN Programme Guidance in five countries. The summaries are structured to reflect outcomes from the Programme Guidance modules, which are as follows:

1. **National situation analysis.** Conducted to:
  - a. Determine the need to strengthen the salt iodisation strategy to include food industry salt. This is based on responses to 4 questions about i) the contribution of processed foods to total salt intake, ii) the use of iodised household salt, iii) iodine status, and iv) existing/future plans for a salt reduction policy.
  - b. Assess knowledge and understanding of the national infrastructure for salt and industrially processed food production and import.
2. **Legislative review.** Conducted to:
  - a. Identify possible gaps or ambiguities in the legislative framework for salt iodisation, related to the inclusion of industrially processed food salt.
3. **Modelling the potential and current iodine intake from industrially produced processed foods that contribute significantly to population salt intake.** The level of detail in modelling the contribution of industrially processed foods to salt (and potential) iodine intake will depend on:
  - a. Available data sources which determine the modelling methods available, ability to identify key salt-containing industrially processed foods, and to estimate their level of consumption. Data sources were determined as an initial step in this module, through a structured review of different types of data that might be available to understand the key foods consumed, the salt content of these foods, the relative contribution to average daily salt intake, and the proportion of different food industry salt that is iodised.
  - b. These data were reviewed and triangulated where possible, then used as inputs to an excel tool to model the proposed indicators (current and potential iodine intake from specified foods) for different population groups and sub-national areas, where relevant data were available.
4. **Review of the enabling environment for the salt iodisation strategy.** Conducted to:
  - a. Summarise current requirements for and enforcement of iodisation of salt used in industrially processed foods.
  - b. Assess whether changes to these requirements or enforcement processes would be recommended to sustain optimal iodine status among all population groups.
5. **Review of programme challenges and recommendations to overcome these.** However, this module was changed during implementation to focus on national conclusions based on findings from implementing the Guidance, with some key recommendations for changes to address identified challenges.

***The key findings reported for each country are based on national reports and do not necessarily reflect IGN recommendations/views.***



# Kenya

The EOI submitted by the Kenya team included the following rationale for how piloting the Programme Guidance will help address the main programme challenges to sustaining optimal iodine nutrition:

*Information on the contribution of processed food to iodine intake in Kenya would be very useful for national programme review. With the current national debate on the reduction of salt intake, knowledge on the contribution of processed food to both salt and iodine intake would guide the debate and help in decisions on the current review of iodine standards and guidelines.*

The EOI indicated that the country has optimal iodine status among children and non-pregnant women, and high household use of iodised salt. It stated that “Kenya is one of the countries in East Africa and it’s the main producer of the table salt in the region supplying most of the neighbouring countries.”

## 1. National situation analysis

- i. An initial review of available evidence and understanding of dietary habits in Kenya, indicated that industrially processed food salt appears to contribute significantly to salt (and potentially iodine) intake among one or more population groups:
  - o Summary information from Euromonitor reports<sup>1</sup> (available to view without purchasing the report) indicated an increase in consumption of many types of salt-containing industrially processed foods and condiments. Industry awareness of growing consumer preference for products with reduced salt content was also noted. The increased expenditure on consumer-ready foods is supported by data in the USDA Gain report, which reported an increase in processed food imports. Where foods are processed outside the country, it is more difficult to assess the type of salt used in the product.
  - o A 2018 paper that used a statistical approach to apportion dietary sources of iodine based on urinary sodium, urinary iodine and household salt iodine content,<sup>2</sup> estimated the relative proportion of dietary iodine sources were approximately 36% from native iodine (iodine “naturally” present in the common diet), 17% from household table/cooking salt, and 47% from processed foods manufactured using iodised salt.
- ii. Household use of adequately iodised salt has been consistently above 95% (nationally & by urban/rural and regional location)<sup>3</sup>
- iii. The 2011 Kenya Micronutrient Survey indicated adequate iodine intake, nationally and by urban/rural location, among school age children (national MUIC 208µg/L) and non-pregnant women of reproductive age (WRA) (168µg/L). The MUIC for both groups was also adequate among all sub-groups (province<sup>4</sup> and wealth quintile), however the sample sizes at this level of disaggregation means the data are less reliable.

---

<sup>1</sup> List here contains reports that were released in October 2019, after the main period of implementation

<https://www.euromonitor.com/kenya?PageCode=283&CountryCode=null&IndustryCode=88216&ContentType=null&ReportType=null&SortBy=1&PageNumber=0&PageSize=20&PageType=13>

<sup>2</sup> van der Haar F, Knowles J, Bukania Z, et al. (2018) New Statistical Approach to Apportion Dietary Sources of Iodine Intake: Findings from Kenya, Senegal and India. *Nutrients* **10**, 430

<sup>3</sup> Kenya Health Demographic Survey, 2014

<sup>4</sup> Except among WRA in the Western province where MUIC was borderline deficient at 98µg/L

- iv. There is a published voluntary Kenya Standard for reduced salt products, targeting products traditionally associated with high salt use such as bread and margarine. A salt reduction strategy targeting household salt consumption is currently under development.

### ***Outcome of the initial situational analysis***

It currently appears that Kenya has achieved global targets for iodisation of household salt and two main population groups have optimal iodine status nationally and sub-nationally. At this initial stage of implementation of the Programme Guidance, the national team felt that further assessment of the legislative framework, the enabling environment, and the details of a proposed salt reduction strategy were required to assess if any strategic changes would be recommended to ensure that optimal population iodine status is sustained.

### ***National infrastructure for salt and industrially processed food production and import***

The Kenya Programme Guidance implementation report references there being four main producers of food grade salt, all are well known and are represented on the national iodine committee. The main producers/importers of key salt-containing industrially processed foods are, however, less well understood.

## **2. Outcome of the legislative review.**

The legislation for salt iodisation and associated labelling:

- Is mandatory for “table salt or salt for general household use”.
- Does not include specific provision for ensuring iodisation of food industry salt.
- Specifies an “authorised officer” for regulatory inspection and enforcement as “a medical officer of health, a public health officer or any suitably qualified person authorized in writing by a municipal”. Nationally, there is clear agreement that enforcement at the salt industry level is implemented by the Kenya Bureau of Standards, while inspection at the market level is implemented by public health officers from the Ministry of Health.
- Is contained within a broader food law “Food, Drugs and Chemical Substances Act”
- Includes salt iodine levels. Kenya was supposed to transition to use the East Africa Standard six months after it was regionally adopted, however, there were delays due to reservations from salt industries about some of the quality parameters. The salt industry recently approved the use of the 2013 East Africa Standard (EAS) for “Fortified food grade salt — Specification.”<sup>5</sup> <sup>6</sup> The EAS states that the iodine content at production should be 40±5 mg/kg salt, with a regulatory range of 30-60mg/kg. The revision of the related national regulatory document<sup>7</sup> will be initiated in early 2020 to refer to the appropriate standard to be applied for salt iodisation.

---

<sup>5</sup> © East African Community 2013. The standard for salt iodisation was set to meet the iodine needs of a population, based on an expected daily per capita intake of 10g food grade salt (table salt or salt in processed foods).

<sup>6</sup> The salt industry formally accepted to use this East Africa standard for iodisation on 30<sup>th</sup> October 2019. Pending expected revisions to other aspects of the standard, e.g. grain size and pH, following a meeting of regional groups in early December 2019.

<sup>7</sup> National Council for Law Reporting with the Authority of the Attorney General. Food, Drugs and Chemical Substances Act. Chapter 254. Revised Edition 2012 [1992]. Kenya, 2012

### 3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.

#### Data sources

The initial step in this Module was to review all possible sources of data to identify key salt-containing foods. A challenge to the assessment in Kenya was a lack of reliable data on household expenditure or consumption of foods and a lack of access to quantitative data about salt and iodised salt supply to, and use by, the food industry<sup>8</sup>.

- The only recent survey with a dietary/food consumption component was the 2011 National Micronutrient Survey. However, this survey report focused on dietary diversity and nutrient intake adequacy using food group categories, which included potential sources of macro and some micronutrients, but did not include iodine. Some data were collected and reported on estimated household and individual salt intake, however, no data on any processed foods were reported. The 24-hour dietary recall component of the questionnaire collected information on intake of bouillon and other processed foods, however these data were never analysed. It was not possible to access these data for analysis as part of this process.
- Market research reports are available for many processed food categories in Kenya<sup>9</sup>, however they were not purchased as part of the pilot. The Euromonitor reports, for example, are very recent and purchasing them could be considered in the future if stakeholders in Kenya have a strong need to strengthen the data used in the models below, to estimate salt and iodine intake from certain foods.
- A USDA Global Agricultural Information Network (Gain) document from 2012 was available and can be used as evidence to suggest increased consumption of consumer-ready foods, but it does not have sufficient detail to estimate per capita expenditure or consumption quantities.<sup>10</sup>
- Major salt and food industry bodies were asked for information to help identify processed foods contributing significantly to salt intake. No response was received about specific food industries/types of processed foods contributing to salt intake, however, the salt industry revealed that they provide only iodised salt to Kenyan food industries. Hence the assumption can be made that any industrially processed foods produced in Kenya, are a source of iodine through iodised salt.
- The only other source of information available to use in determining the need for this assessment was from an experimental analysis to estimate the partition of urinary iodine associated with intake of household salt and with other dietary sources of salt (potentially processed foods made with iodised salt). This analysis was based on data from the 2011 survey for urinary sodium and iodine concentrations and for household salt iodine<sup>11</sup>. The outcome supports the finding that a substantial proportion of dietary salt and iodine is from non-table salt sources, however, does not have information on any specific foods.

---

<sup>8</sup> Despite contacting many national and international researchers and food industry contacts

<sup>9</sup> List here contains reports that were released in October 2019, after the main period of implementation

<https://www.euromonitor.com/kenya?PageCode=283&CountryCode=null&IndustryCode=88216&ContentType=null&ReportType=null&SortBy=1&PageNumber=0&PageSize=20&PageType=13>

<sup>10</sup> [https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Retail%20Foods\\_Nairobi\\_Kenya\\_11-8-2012.pdf](https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Retail%20Foods_Nairobi_Kenya_11-8-2012.pdf)

<sup>11</sup> Example of application: van der Haar F, Knowles J, Bukania Z, et al. (2018) New Statistical Approach to Apportion Dietary Sources of Iodine Intake: Findings from Kenya, Senegal and India. *Nutrients* **10**, 430

### ***Selection of processed food products and modelling the contribution to iodine intake***

The lack of any dietary consumption/expenditure or industry salt use data for Kenya, meant that:

- i. The selection of foods contributing to salt intake across population groups was based on the expert knowledge of the national working group. The foods selected were:
  - o Instant noodles – wide market reach, both urban and rural
  - o Margarine – market reach more limited (urban focus)
  - o Sausages (different types) – higher urban consumption
  - o Branflakes (a widely consumed cereal product, and one with sufficient data to include)
  - o Bouillon
  - o Soy sauce
  - o Tomato paste (widely used)
  - o Tomato ketchup (marketed in different packaging and form for different market segments).

Bread is understood to be a widely consumed product, however, the weak data about different types, suggested serving sizes, and salt content, meant it was not included in the model.

- ii. Modelling the contribution to per capita salt intake from the selected foods could not be implemented (lack of data on consumption), therefore the alternative modelling template to assess contribution to salt and related iodine intake per serving size was conducted.

For the modelling:

- o The salt content of the selected foods was determined based on a 2019 survey of retail product labels and 2018 food composition tables<sup>12</sup>
- o Information from the salt industry was used to assume that all food industry salt was adequately iodised, at the intended national production standard for salt iodine (40 mg/kg)<sup>13</sup>
- o A salt reduction target of 30% for all products was applied to determine potential iodine intake from each product if this target is successfully achieved.

The outcome shown in Figures 1a and 1b show the estimated contribution to the recommended nutrient intake (RNI) for iodine from one serving size of each of the above products with the above assumptions. The graphs are (Fig 1a) for non-pregnant WRA (RNI 150µg iodine/day) and (Fig 1b) for pregnant women (RNI 250µg iodine/day).

These charts show that, for non-pregnant adults, a single serving of instant noodles or bouillon can provide approximately half the daily RNI for iodine, a serving of soy sauce provides around 30% and different sausages provide from 15-20%.

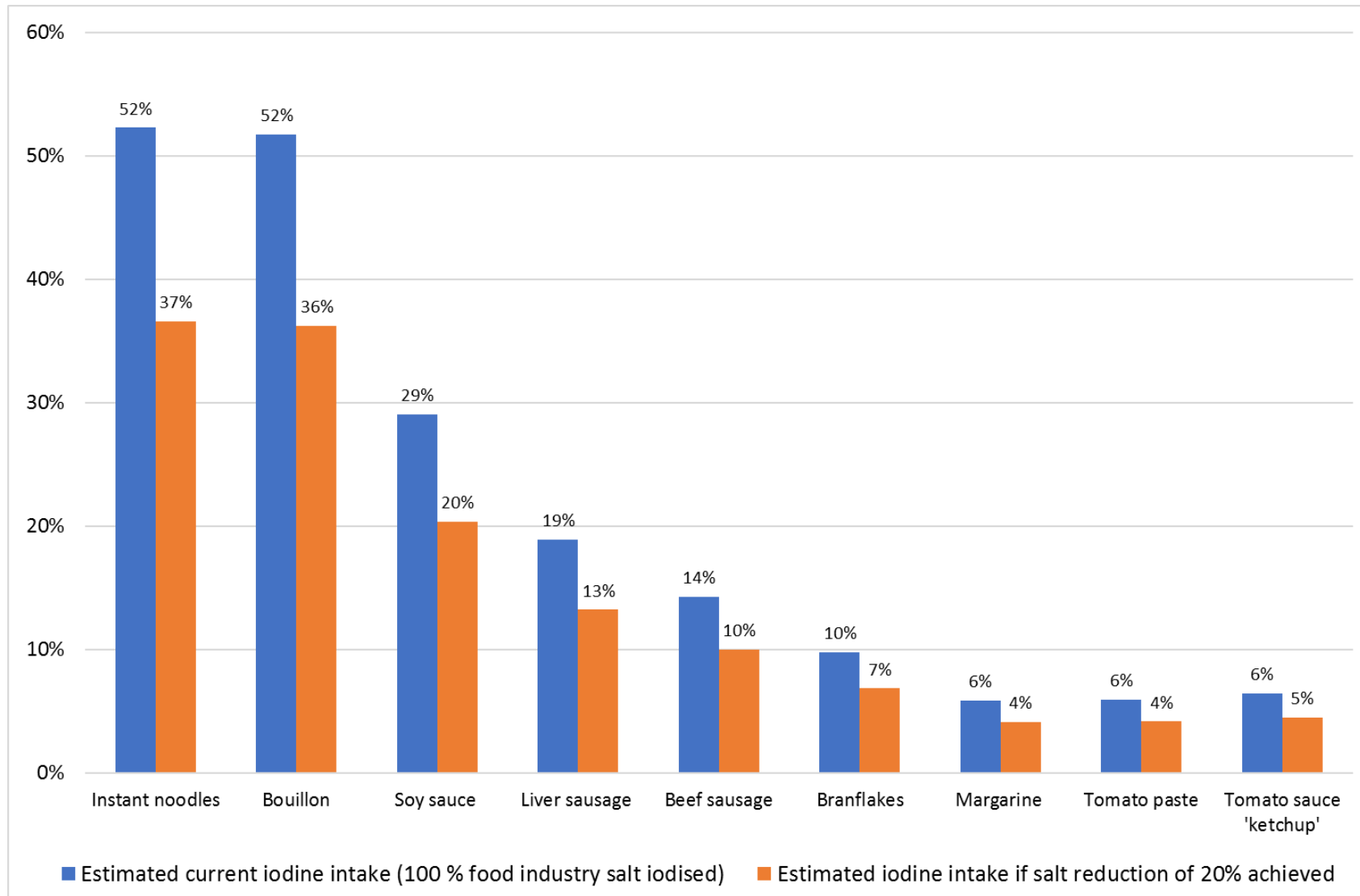
Even though the iodine content in one serving of a product doesn't relate to daily per capita intake of iodine from that product for any population group, the evidence of optimal population iodine status suggests that current salt iodisation practices (household and food industry salt) are providing sufficient iodine in addition to any natural dietary sources of iodine. Sources of iodised salt may include the products included in the model here, other (not included) processed food products, iodised household salt, and *possibly* iodine from dairy and animal products (as a result of iodised salt in the feed, if used).

---

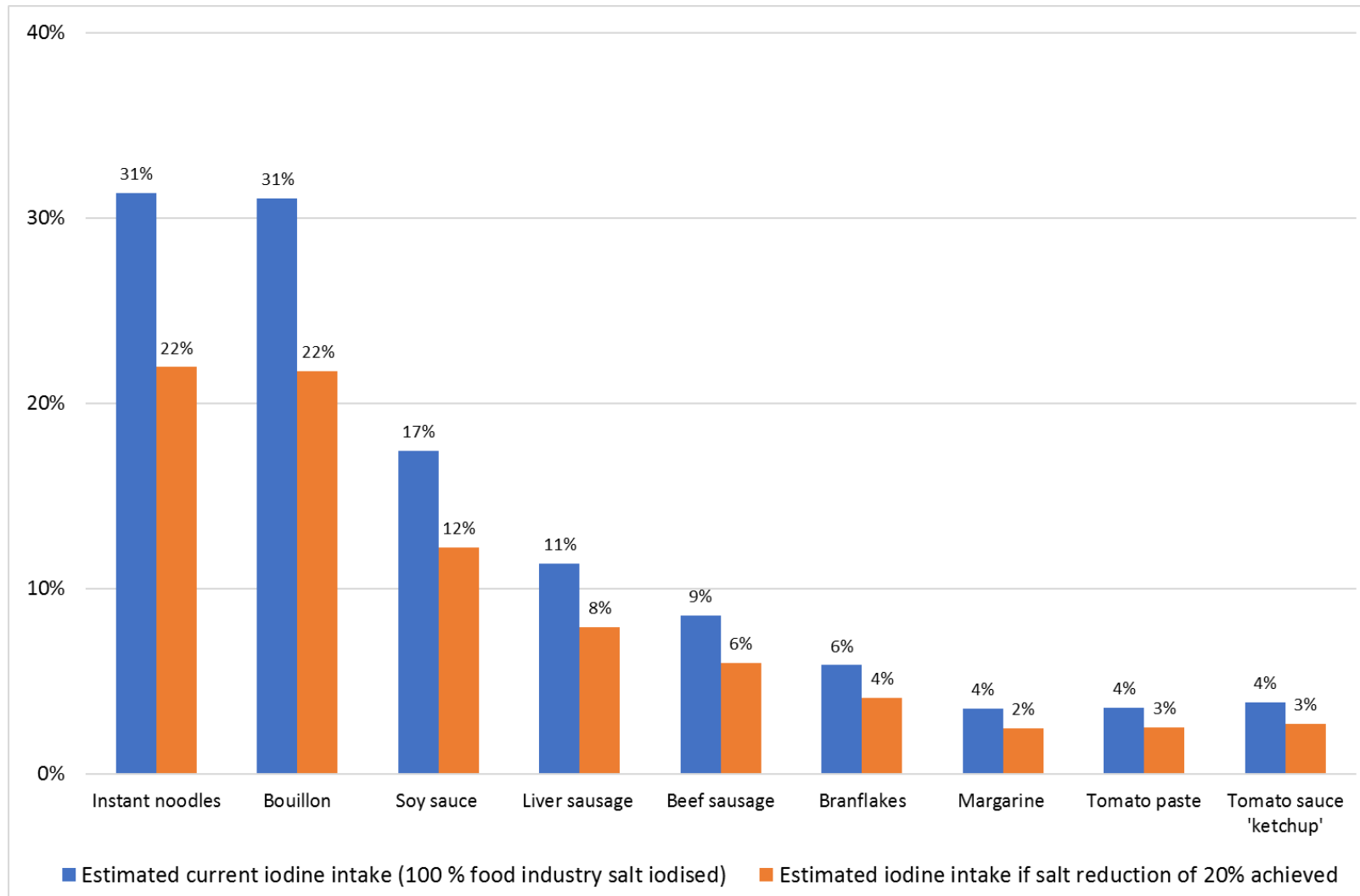
<sup>12</sup> FAO/Government of Kenya. 2018. Kenya Food Composition Tables. Nairobi, 254 pp.  
<http://www.fao.org/3/19120EN/i9120en.pdf>

<sup>13</sup> The mean of the EAS 2013 regulatory range for iodine in salt (30-60 mg/kg) is 45 mg/kg, however, the stated intended level of iodine at production is 40±5 mg/kg.

**Figure 1a. Contribution of iodised salt in one serving size of different processed foods to % daily RNI iodine - Kenya, NON-PREGNANT ADULT. For current estimated iodine intake from salt and if 30% salt reduction target achieved (RNI iodine 150µg/L).**



**Figure 1b. Contribution of iodised salt in one serving size of different processed foods to % daily RNI iodine - Kenya, PREGNANT WOMEN. For current estimated iodine intake from salt and if 30% salt reduction target achieved (RNI iodine 250µg/L).**



#### 4. Outcome of the enabling environment for USI review

Areas of weakness in terms of the enabling environment for salt iodisation were found to be:

- The legislation does not include mandatory iodisation of salt for use in the food industry.
- Food control protocols do not include monitoring, inspection and enforcement of the use of iodised salt in industrially produced processed foods, since there is no legislative requirement for this.
- A communication plan and other mechanisms to improve awareness, engagement and practices of the food industry are not in place.
- Household surveys have, to date, not been designed or implemented to capture useful information on the consumption of key salt-containing industrially processed foods.
- Financial and personnel resources to strengthen the national salt iodisation strategy are limited.

#### 5. National conclusions based on all above findings

The programme to achieve optimal iodine status has been successful, based on available data in Kenya. Data on the iodine status of pregnant women would help to verify this. The high level of consolidation in the salt industry has facilitated strong engagement (and relatively straight forward regulatory monitoring/enforcement) meaning that, in practice, close to all food grade salt is iodised. This has resulted in high household coverage for the use of iodised salt, and the default use of iodised salt by domestic food industries.

#### **Challenges**

The *main* programme weaknesses identified by the national team were:

- i. The national gap in data on food consumption, which meant the modelling had to be conducted on serving sizes. Using serving sizes was not ideal but provided a starting point from which to assess the potential focus and impact of a future salt reduction policy. It also provided the basis for additional modelling analyses once per capita consumption data are available.
- ii. The fact that iodisation of food industry salt is not mandatory. This does not appear to affect current food industry practice; however, it could be a potential loophole in the future if any industry decided to change their practice of using iodised salt.

#### **Recommendations**

National recommendations to address the programme and strategic gaps identified during implementation of the draft IGN Guidance include:

- i. Revising the legislation to mandate iodisation of all food grade salt, including for the food industry and animal feed.
  - If this legislative change is implemented, to then review and change food industry control procedures to ensure inspection and enforcement of the use of iodised salt, possibly including in imported food products.
  - The committee for processed food standards may require parallel changes to individual processed food standards, to specify that salt as an ingredient must follow the Kenya/EA standard for iodised salt.

- ii. Advocate for future household surveys to collect relevant dietary/consumption data, including on processed foods, preferably to enable disaggregation by different demographic and regional groups. These data could then be used to model the average potential per capita intake of iodine from different products for different population groups. This is important to have stronger evidence about both sources of dietary salt (and iodine) and the potential impact of salt reduction.
- iii. Inform non-communicable disease (NCD) partners of the modelling outcome, for use in formulating a comprehensive salt reduction policy, including household and food industry salt, as appropriate.
- iv. Develop and implement activities to strengthen understanding of and engagement with the food industry in terms of their responsibility to use iodised salt (some activities may include sensitisation about salt reduction strategies). Representatives of the food industry could be invited to join the iodine technical working group.
- v. Develop and implement a system for routine monitoring of iodine status to assess the impact of any changes in salt iodine level and/or salt intake on iodine status among all population groups, including pregnant women, and to re-adjust levels of salt iodine as needed.



## Macedonia

The EOI submitted by the Macedonia team included the following (paraphrased) rationale for how piloting the Programme Guidance will help address the main programme challenges to sustaining optimal iodine nutrition:

*Participation in piloting the Programme Guidance should help the National Committee for Iodine Deficiency to understand the levels of salt intake through processed foods [thought to be high], to be able to make recommendations to the Ministry of Health and other authorities on any necessary steps to maintain iodine intake in the optimal range.*

The EOI indicated that the country has optimal iodine status among children, non-pregnant and pregnant women, and high household use of iodised salt.

### 1. National situation analysis

- i. Household Consumption and Expenditure Surveys (HCES) since 2010 indicate that industrially processed foods play an increasingly significant role in total salt intake.
- ii. Household use of adequately iodised salt was above 95% in the most recent (2016) survey<sup>14</sup>.
- iii. Adequate iodine status has been confirmed among SAC (MUIC 241µg/L)<sup>15</sup> and among pregnant women (MUIC 168 µg/L)<sup>16</sup>
- iv. Cardiovascular diseases have been identified as one of the major contributors to the burden of diseases in Macedonia. Salt intake reduction activities are in the planning stages, these are the responsibility of the Institute of Public Health.

#### ***Outcome of the initial situational analysis***

It currently appears that Macedonia has achieved global targets for iodisation of household salt and optimal iodine status nationally. Based on the situation analysis, the national team would like to improve understanding of the contribution of processed foods to salt and iodised salt intake then determine whether and which changes to the salt iodisation strategy would be beneficial to ensure that optimal iodine status is likely to be sustained.

#### ***National infrastructure for salt and industrially processed food production and import***

All salt in Macedonia is imported. There are 2 main salt importers “Izvor” and “Alkaloid AD” (approximately 85% and 10% of the household and food industry salt market respectively).

---

<sup>14</sup> Karanfiski B, Milevska Kostova N, Miladinova D, Kochova M, Majstorov V, Kuzmanovska S, Vaskova O, PopGjorceva D, Urginska A, Jovanovska V, Dimitrov G, Kocoski G, Samardziski I, Atanasova Boshku A, Anastasovska V, Stefanija A, Shabani A, Zdraveska N, Dimkovski V, Chuleva B. 2018 Iodine and thyroid status of the population in Macedonia, 2018 (monograph). Medical Faculty, University "Ss. Cyril and Methodius", Skopje.

<sup>15</sup> Karanfiski B, Milevska-Kostova N, Miladinova D, Jovanovska V, Kocova M 2018 Continued efforts are key to sustaining iodine sufficiency in Macedonia. IDD Newsletter 4.

<sup>16</sup> Karanfiski B, Milevska Kostova N, Miladinova D, Kochova M, Majstorov V, Kuzmanovska S, Vaskova O, PopGjorceva D, Urginska A, Jovanovska V, Dimitrov G, Kocoski G, Samardziski I, Atanasova Boshku A, Anastasovska V, Stefanija A, Shabani A, Zdraveska N, Dimkovski V, Chuleva B. 2018 Iodine and thyroid status of the population in Macedonia, 2018 (monograph). Medical Faculty, University "Ss. Cyril and Methodius", Skopje

## 2. Outcome of the legislative review.

The legislation for salt iodisation and associated labelling:

- Is mandatory for edible salt “for immediate human use – table salt, as an additional raw material in the production of food or as a carrier of additives or nutrients”.
- Specifically includes provision for ensuring iodisation of food industry salt.
- Specifies appropriate regulatory authorities for inspection (Food and Veterinary Agency) and enforcement (Ministry of Economy).
- Is adopted as a Rulebook (Bylaw) under the Law on Standardisation”, adopted by the Ministry of Economy in agreement with the Ministry of Health
- Includes standards for salt iodine levels (Iodine content  $\geq 20\text{mg}$  and  $\leq 30\text{mg}$  per kg salt).

## 3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.

### **Data sources**

The following sources of data were found and used to verify information so that the best available data were used for identification and modelling of foods contributing significantly to salt intake across the population.

- HCES 2010-2017. These survey reports include information on consumption of individual foods at the household level, with information on number of household members. Therefore, it was possible to determine the average per capita consumption of each selected food per household member using 2017 data.
- Customs data on salt imports. Customs officials provided information about the total quantity of salt imported by importer and this was used to estimate the relative percentage of iodised and non-iodised salt imported in total.
- A 2013 small-scale (50 participants) pilot study of total salt intake.<sup>17</sup>

### **Selection of processed food products and modelling the contribution to iodine intake**

- The process for selection of relevant salt-containing processed food products from the HCES reports was as follows:
  - Included only products for which the relative error was less than 10% = 67 food products
  - Filtered for industrially produced foods = 29 products
  - Selected products that significantly contributed to salt intake among many population groups, because they had either:
    - Low to medium salt content but high overall consumption, e.g. bread, or,
    - High salt content and consumed frequently, even if in low amounts.

The final industrially processed foods selected to use in the modelling were:

- |                             |                     |
|-----------------------------|---------------------|
| ○ Bread                     | ○ Sausage (various) |
| ○ Spice additives (vegeta)  | ○ Salami            |
| ○ Tomato puree              | ○ Ham               |
| ○ Instant soup              | ○ Butter            |
| ○ Cheese, white (feta type) |                     |

---

<sup>17</sup> Internal report of the National Committee for Iodine Deficiency

- Household (table) salt data were also available from the HCES and were included.
- ii. Given the fact that per capita intake estimates were available from the HCES data, it was possible to model the contribution of each processed food to per capita salt intake. For the modelling:
  - The salt content of the selected foods was determined based on the available normative standards in the country - bylaws to the Law on Food Safety that regulate the maximum salt content of certain, but not all, foods<sup>18</sup>
  - Where the bylaw did not specify maximum salt content, typical sodium content based on the Danish food composition tables was used<sup>19</sup>. The sodium was converted to salt content using the conversion formula ( $m(\text{NaCl}) = m(\text{Na}) \times 2.54$ ), confirming with an online sodium to salt converter.<sup>20</sup>
  - It was assumed that 94% of domestically produced processed foods, and 94% of national household salt, are made with iodised salt, based on reports from The Customs Office of Macedonia and The Food and Veterinary Agency. Regulatory monitoring indicates that the 2 main salt importers either import iodised salt directly, else import non-iodised salt which they then iodise. The remaining salt imports, 5-6% of the market share were considered to be non-iodised.
  - The model assumed that the iodine content of iodised salt was the average of the national salt iodine standard, i.e. 25mg/kg.<sup>21</sup>
  - A salt reduction target of 20% for table salt and all processed foods was applied to determine potential iodine intake from each product if this target is successfully achieved.

The modelling, illustrated in Figures 2a and 2b, indicated:

- An average per capita consumption of 11g table salt, and 9g salt from other included foods, per day. This is higher than the total salt intake of 11g found in the 2013 study (small sample size).
- Approximately 220% and 130% of the daily iodine RNI for non-pregnant adults and pregnant women, respectively, is currently met through the use of iodised salt in the selected processed food products together with table salt.
- If the 20% salt reduction target is met, these sources of iodine would still meet at least 100% of the daily iodine RNI for non-pregnant adults (180%) and pregnant women (105%).
- The modelling data demonstrating sufficient iodine intake from salt sources, together with the MUIC data indicating optimal iodine status of the population, suggest that Macedonia has successfully achieved optimal iodine nutrition and that the current level of iodine in salt (20 to 30 mg/kg salt) is appropriate.
  - In consideration of the contribution of salt iodine to iodine status it is important to also consider that iodised salt does not account for total iodine intake, since other foods are also contributing, e.g. the natural iodine content of sea fish, and iodine in meat and dairy products, possibly due to iodine or iodised salt enriched feed.

---

<sup>18</sup> Official Gazette of RM, no. 157/2010. For milk and dairy products (Official Gazette no. 26/2012); for soups, soup concentrates and sauce concentrates (Official Gazette no. 95/12)

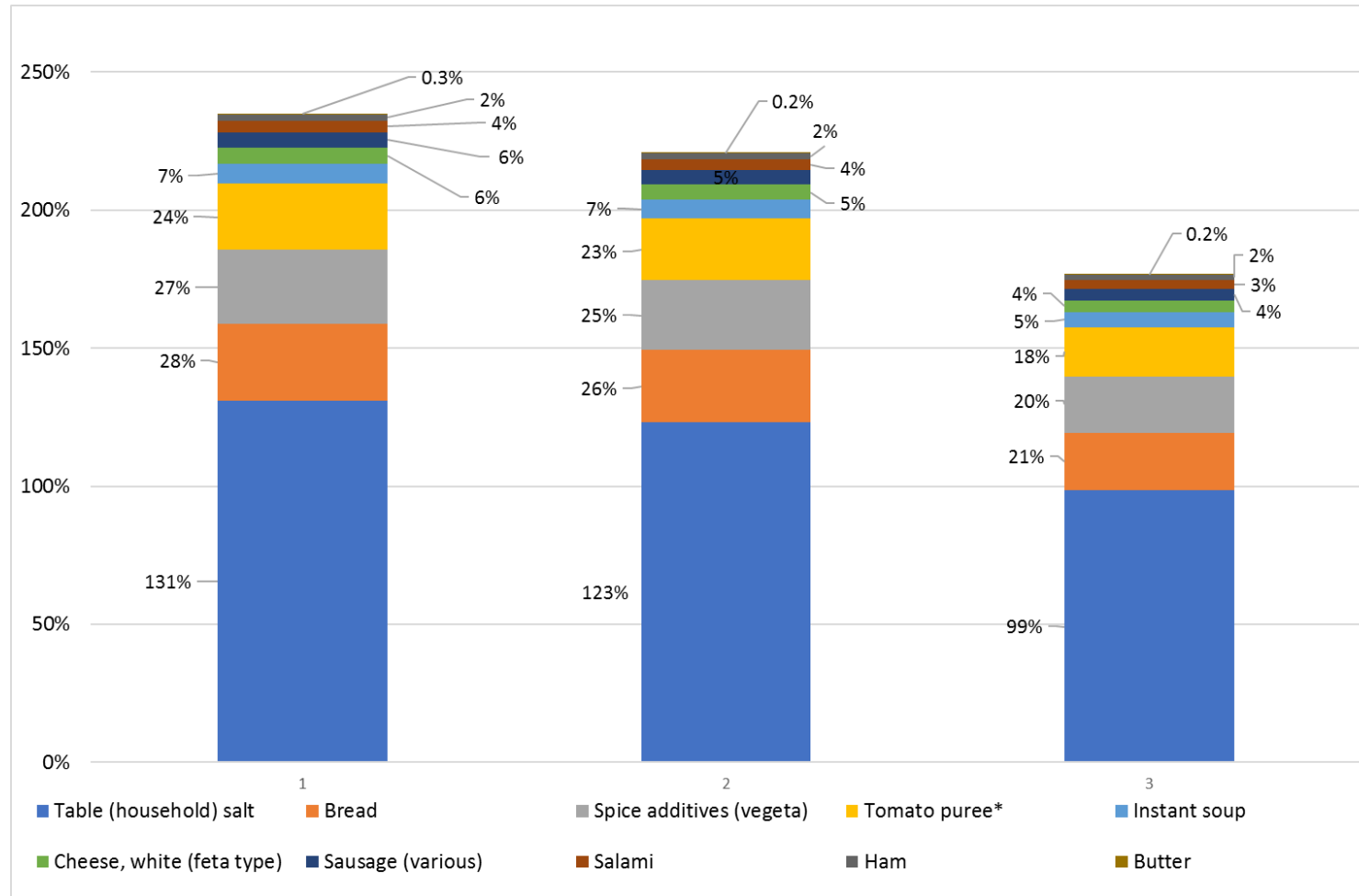
<sup>19</sup> Christensen T, Biloft-Jensen AP 2016 The New version of Danish food composition database FRIDA including a case study on recipe calculation compared to a chemical analysis 39th National Nutrient Databank Conference.

<sup>20</sup> OxSalt. Sodium to salt calculator. [http://oxsalt.org.uk/db/?page\\_id=37-sodiumtosaltcalculator](http://oxsalt.org.uk/db/?page_id=37-sodiumtosaltcalculator).

<sup>21</sup> The 2016 iodine survey showed the average iodine content for household salt samples was in fact 25mg/kg.

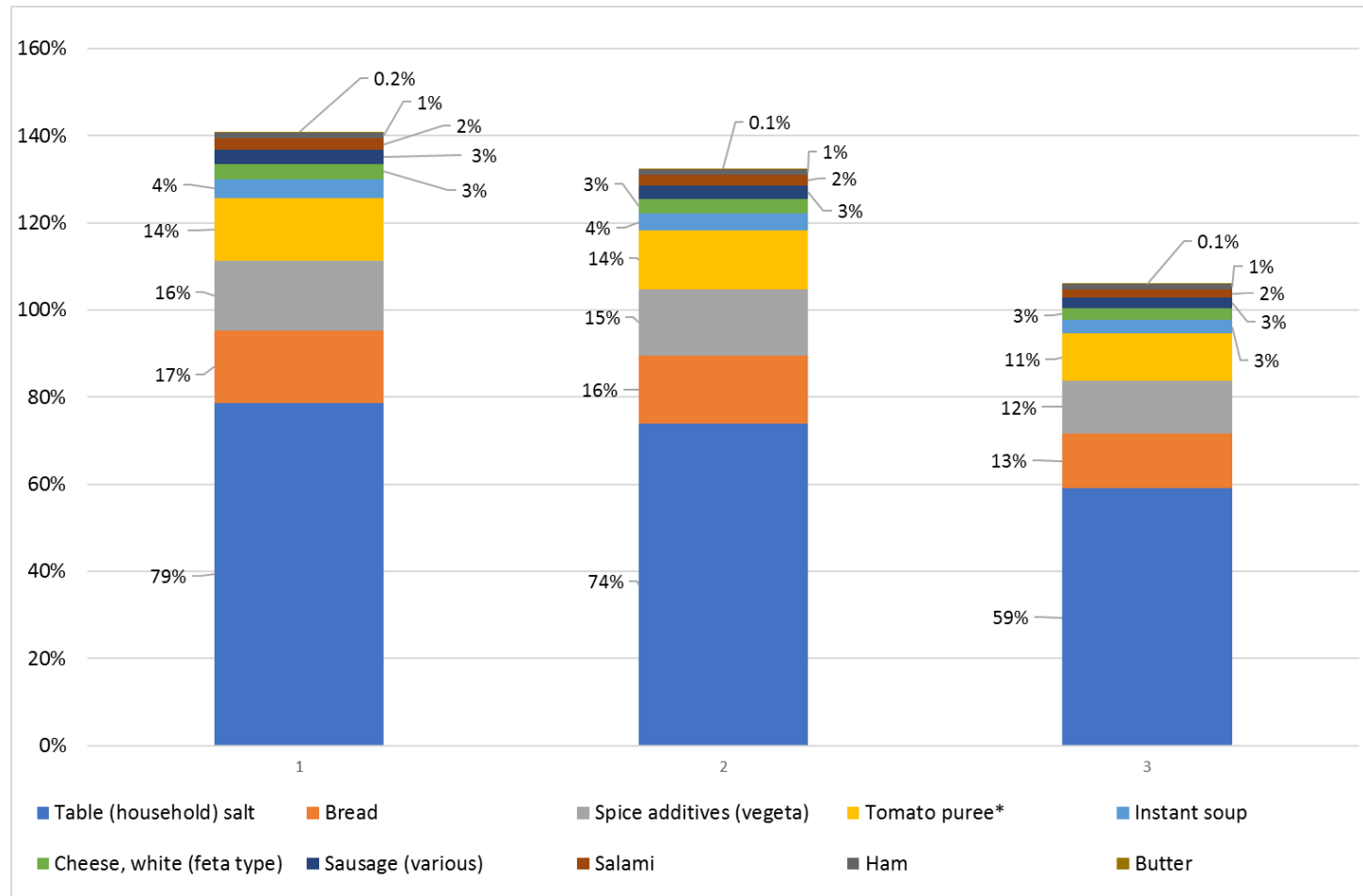
**Figure 2a. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Macedonia, NON-PREGNANT ADULT (RNI iodine 150µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 94% salt iodised), 3 = potential iodine intake if current iodisation levels and salt reduction of 20% achieved. \* Salt content of tomato puree based on the average salt standard for all sauces.



**Figure 2b. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Macedonia, PREGNANT WOMAN (RNI iodine 250µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 94% salt iodised), 3 = potential iodine intake if current iodisation levels and salt reduction of 20% achieved. \* Salt content of tomato puree based on the average salt standard for all sauces.



#### 4. Outcome of the enabling environment for USI review

Strengths and weaknesses of the enabling environment were found to be:

- Existing legislation applies to all food grade salt and requires its enforcement. However, enforcement at the food industry level is not well established.
- Standards for salt iodisation were developed based on iodine status surveys performed in 1995/96 and in 1997, and on WHO/ICCIDD/UNICEF recommendations at that time, which were based on typical intake of household salt
- Food control protocols are adequate to ensure monitoring, inspection and enforcement of iodised salt imports. Some controls are also performed on salt iodine content at the Food industry level, however, not on regular basis. These are defined in the Food and Veterinary Agency annual programme.
- There are currently no mechanisms to improve awareness, engagement and practices of the food industry. The use of iodised salt by the food industry has been based on strong enforcement of iodised salt imports. Such awareness raising and engagement activities could be developed and implemented to improve strategic sustainability (see recommendations).
- The main communication channels are through modules on iodine deficiency and its prevention that are integrated into school and medical/health-related university courses; and through the active National Committee for Iodine Deficiency, which includes a range of stakeholders, including the major salt importer and consumer groups. There is a plan to include food industry groups in the future (see recommendations).
- The HCES is performed every year and the questionnaire is designed to capture information on the consumption of key salt-containing industrially produced foods. However, the reliability of the data could be improved (see recommendations).
- Financial and personnel resources to sustain or strengthen the national salt iodisation strategy are available for the regular work of inspection and enforcement agencies.

#### 5. National conclusions based on all above findings

The programme to achieve optimal iodine status has been successful, based on available data in Macedonia. The reliance on 2 companies for over 90% of national salt imports has facilitated strong and relatively straight forward regulatory monitoring and enforcement of salt iodisation. The result has been high levels of household use of quality iodised salt and the default use of iodised salt by domestic food industries.

##### **Challenges**

The **main** areas of programme weakness identified by the national team were:

- i. Salt intake is relatively high and proposed salt reduction policies may lead to a future reduction in iodine from salt sources. This is not expected to result in overall inadequate iodine intake and no revision of the current salt iodine standard of 20 to 30 mg/kg salt is envisaged in the near future. However, it is recommended to closely monitor iodine status of the population through regular assessment of urinary iodine concentration among pregnant women and school age children, and continue to include routine neonatal TSH data as part of the monitoring system.

- ii. Some inadequacy of the survey data available to input into the modelling framework. Data from the HCES, which is performed every year by the State Statistical Office, were only available in aggregated form due to a loss of reliability at a more disaggregated level.
- iii. The fact that Macedonia relies on imported processed foods and there is no globally available database to provide information on which food exporters use iodised salt in their processed food products. This makes it difficult to assess the potential contribution to iodine intake from imported foods.

### **Recommendations**

National recommendations to address the programme and strategic gaps identified during implementation of the draft IGN Guidance include:

#### Monitoring and evaluation of population iodine intake

- i. Establish regular assessments of the iodine status of pregnant women by analysing urinary iodine concentration and free thyroxin. This would be implemented by the University Clinic for Gynaecology and Obstetrics in collaboration with the Institute of Pathophysiology and Nuclear Medicine, Medical Faculty, Skopje, at least once every 5 years.
- ii. Continue assessment of iodine status among school children at least once every 5 years. This activity should continue to be implemented by the Institute of Pathophysiology and Nuclear Medicine, Medical Faculty Skopje.
- iii. Continue regular implementation of the Neonatal TSH Screening program by the University Clinic for Children Diseases and include interpretation of the resulting data in population status reviews by the national Committee for Iodine Deficiency.

#### Monitoring food grade salt iodisation

- i. Continue regulatory monitoring and enforcement of food grade salt imports by the Food and Veterinary Agency. Identify and improve practices at border crossings where inspection and enforcement is weak.
- ii. Strengthen inspection and enforcement of the use of iodised salt in the food industry.
- iii. Initiate changes and amendments to the Rulebook for food grade salt, by the Food and Veterinary Agency in collaboration with the Ministry of Health. These changes are aimed at aligning the standards with EU requirements as well as to accommodate new salt products on the market, e.g. salt with non-white colouring.
- iv. Establish an external quality assurance system for the twelve national salt control laboratories to maintain and improve quality in laboratory work and standardisation.
- v. Maintain successful quality control of the National Urinary Iodine Laboratory at the Institute of Pathophysiology and Nuclear Medicine through the US CDC EQUIP programme.

#### Educational and information activities

- i. Continue to use the existing educational modules and improve knowledge through their introduction in secondary education. Conduct an analysis of the quality and impact of existing and proposed educational activities.
- ii. Develop engagement and educational materials on iodised salt for inspection and Customs Authority officials.
- iii. Consider interventions to acknowledge the role of the food industry and to increase awareness and engagement.

#### Scientific work and research

- i. Share information and collaborate with the NCD management team so that data can be used to inform a salt reduction policy and provide a basis for combined monitoring of its impact.
- ii. Continue and establish new working relationship and partnerships with regional or global networks to best utilise human and financial resources for research.
- iii. Potentially undertake additional investigations, such as assessing breastmilk iodine content, establishing the iodine status of children under 24 months of age, assessing iodine status among vegans and other groups with restricted diets
- iv. Conduct an assessment of total salt and iodine intake using 24-hour sodium and iodine excretion among different population groups.

#### Organisational issues

- i. Renew and refresh the membership of the National Committee for Iodine Deficiency, including representatives of institutions identified as important, including Customs Administration and Chambers of Commerce.
- ii. Investigate how to incorporate these recommendations into existing Ministry of Health programmes and action plans. Then renew requests for regular and additional financial support to implement them.



## Republic of Moldova

The EOI submitted by the Republic of Moldova team included the following (paraphrased) rationale for how piloting the Programme Guidance will help address the challenges to sustaining optimal iodine nutrition, based on the accepted increased share of processed foods in the national diet.

*Implementing the Programme Guidance will a) Provide an instrument for national public authorities in Moldova to analyse and understand the potential and actual contribution of iodine from iodised household salt and processed food salt to population iodine status; b) Strengthen engagement with the food industry and clarify the respective roles of industry and monitoring bodies; c) Assist the MoH and the National Food and Nutrition Program with evidence of progress toward the use of fortified foods for healthier diets, given the increased public interest in this issue; d) Provide evidence to international and national partners in Moldova on issues affecting access to micronutrients (iodine) and a potential sustainable large (preventative) scale intervention to improve nutrition and food security status of the population.*

The EOI indicated that the country has optimal iodine status among children, non-pregnant and pregnant women, however, household use of iodised salt is substantially below the internationally recommendation of 90% of households.

### 1. National situation analysis

- i. The 2016 Salt Intake Survey in the Republic of Moldova<sup>22</sup> and the Food Environment (street food) Report 2017<sup>23</sup>, indicate that a wide range of processed foods are produced and consumed in the country. These studies also clearly indicate that industrially processed foods contribute significantly to overall salt intake.
- ii. Household use of adequately iodised salt was below 60% in the 2016 Salt Intake Survey, with a further 20% of households using salt with some (inadequate level) of iodine.
  - o Nationally, 80% of children aged 2 to 3 years and >95% children aged 3 to 7 years consume meals prepared exclusively with iodized salt, as part of the mandatory state-financed pre-school and school education system.
- iii. At the national level, adequate iodine status has been confirmed among SAC (MUIC 204 µg/L) and pregnant women (MUIC 173 µg/L)<sup>24</sup>. There was some indication of inadequate status among pregnant women in rural areas and the Northern region, however sample sizes were too small to be conclusive. Iodine status among non-pregnant women was also optimal at the national level – median urinary iodine excretion in 24-hour urine samples was 190 µg/24 hour excretion (equivalent to 136 µg/L).
- iv. The national NCD Strategy 2014-2020 and Food and Nutrition multi-year Program and Plan, 2014-2020 clearly stipulate the target of 30% reduction of salt consumption and initial supporting activities are being implemented. However, no specific policy is currently in place.

---

<sup>22</sup> Dietary salt intake survey in the Republic of Moldova, 2016, WHO Regional Office for Europe, State University of Medicine and Pharmacy, Ministry of Health

<sup>23</sup> The food environment description in cities in Eastern Europe and Central Asia - Republic of Moldova. Technical report Republic of Moldova October 2017. WHO Regional Office for Europe.

<sup>24</sup> STATUTUL NUTRIȚIONAL ÎN IOD AL POPULAȚIEI DIN REPUBLICA MOLDOVA, 2012. Public Health Centre, Ministry of Health, and UNICEF.

### ***Outcome of the initial situational analysis***

It currently appears that Moldova has not achieved global targets for iodisation of household salt yet has optimal iodine status nationally. In terms of strategy, the national team reported that the existing salt iodisation legislation, standards, and regulations are inclusive of the use of iodised salt by the food industry, however, implementation of the legal and regulatory provisions to implement this need to be strengthened.

### ***National infrastructure for salt and industrially processed food production and import***

All salt in Moldova is imported. Around a decade ago, the salt import market was managed by two-four large importers, however, more recently the number of importers has increased, and the industry become more fragmented. This presents challenges for inspection and enforcement. In terms of industrially processed foods; sources indicate that a significant proportion of processed foods such as hard cheese and pasta, come from imports, including from Russia, Ukraine, Belarus, and EU countries like Romania. Other salt-containing processed foods (e.g. bread, savoury pastries, sausages, salted/smoked fish) are largely produced in-country. However, information on import and domestic food production sites and production volumes was difficult to obtain as there are no established reporting and exchange mechanisms connecting the public health sector to local food importers, producers and industry regulators.

## **2. Outcome of the legislative review.**

The legislation for salt iodisation and associated labelling is stipulated in a dedicated Salt Regulation issued by the Government of Moldova through the Decree nr. 596 of 2011 as follows:

- Is mandatory for “all food-grade salt imported or domestically produced and placed on the internal market of the republic of Moldova”, including salt for immediate human use – table salt, and as an additional raw material in the production of food or as a carrier of additives or nutrients. Non-iodised salt may, therefore, not be imported or domestically produced and distributed.
- Specifically includes provision for ensuring iodisation of food industry salt.
- Does not clearly specify which of 2 relevant agencies (the newly established Food Security Agency and the Public Health Agency) has authority for inspection and enforcement at import, food processing sites and retail.
- Is assumed to be a subsidiary document to the newly endorsed Law on Food Security, 2018, yet the current status of the salt regulation is still not entirely clear.
- Stipulates standards for salt iodine levels, specified as iodine content  $\geq 20\text{mg}$  and  $< 35\text{mg}$  per kg salt.

## **3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.**

### ***Data sources***

The following sources of data were found and assessed for suitability to identify and model foods contributing significantly to salt intake across the population.

- The National Bureau of Statistics conducts Household Budget Surveys (revenue and expenditure) annually. One of the modules included food expenditure information related to a wide range of food, including bread, pasta, sausages, other meat, dried/salted fish, hard

cheese, pickled vegetables and salt <sup>25</sup>. Expenditure data were converted to approximate household consumption.

- The National Bureau of Statistics provided data on approximate per capita consumption quantities for the main food groups from the 2018 survey, in response to a request.<sup>26</sup>
- The 2016 Salt Intake Survey included frequency of consumption questions for types of bread, savoury pastries, processed meat products (sausages), cheeses, salted fish, and salt-containing sauces.
- The Food Environment Report 2017 for Chisinau includes data on sodium (and calculated salt) content of frequently consumed processed foods.
- The Customs Department provided data on non-iodised and iodised salt import volumes for the period 2017-2019.<sup>27</sup>
- The national implementing team approached salt importers and at least 6 large food producers, however only the largest bread factory, Franzeluta Complex (combinat) and one of the main salt importers (Bicsalt), provided an official response about the quantities of iodised and non-iodised salt imported and used in bread production.

### ***Selection of processed food products and modelling the contribution to iodine intake***

- i. The process for selection of relevant salt-containing processed food products was as follows:
  - The Household Budget Survey data provided by the National Bureau of Statistics were used to estimate daily per capita intake (averaged across sex and age groups) of the industrially processed foods specified above, as well as for household salt.
  - Products were assessed to significantly contribute to salt intake among many population groups, because they had either:
    - Low to medium salt content but high overall consumption, e.g. bread, or,
    - High salt content and consumed frequently, even if in low amounts, e.g. brynza cheese.

The final industrially processed foods selected to use in the modelling (see Figures 3a and 3b) were:

- Bread (white and brown)
  - Instant noodles
  - Cheese (hard)
  - Cheese (brynza – feta type)
  - Household (table) salt data were also available and were included.
  - Sausages (boiled)
  - Dried fish
  - Pasta (dry)
- ii. Given the fact that per capita intake estimates for these selected processed foods were available, it was possible to model the contribution of each processed food to per capita salt intake. For the modelling:
    - The salt content of most selected foods was determined based on information from the Salt Intake Survey and the Food Environment Survey, checked against information on food packaging in supermarkets. The Republic of Moldova Regulation on quality of milk and dairy produce gives a threshold salt content for brynza (in fresh and matured brine) of 2 to

---

<sup>25</sup> [http://statistica.gov.md/public/files/publicatii\\_electronice/aspecte\\_nivelul\\_trai/Aspecte\\_nivelul\\_trai\\_2017.pdf](http://statistica.gov.md/public/files/publicatii_electronice/aspecte_nivelul_trai/Aspecte_nivelul_trai_2017.pdf)

<sup>26</sup> NBS Official letter to MOH of 11/09/2019

<sup>27</sup> In response to a request through an MoH Official letter, dated May 2019

6g/100g produce. Given this, the average level of 3.5% was used for the modelling (see Figures 3a and 3b).

- Where needed, sodium content was converted to salt content using the online sodium to salt converter.<sup>28</sup>
- The total estimated daily consumption of cheese was divided equally between hard industrially processed cheese and brynza cheese.<sup>29</sup> Beyond this, it was estimated that half of all hard cheese is locally produced, with the rest imported. Brynza (feta type cheese) is produced locally as a home-produced food, as well as being an industrially produced food. Therefore, although it is included in the modelling, it may not technically all be an "industrially processed food".
- The team used estimates for the percent of salt that was adequately iodised as 30% for bread<sup>30</sup>, 0% for cheese and meat products<sup>31</sup>, and 20% for pasta<sup>32</sup>.
- The model assumed that the iodine content of iodised salt was the average of the national salt iodine standard, i.e. 27.5mg/kg
- A salt reduction target of 30% for table salt and all processed foods was applied to determine potential iodine intake from each product if this target is successfully achieved.

The modelling, the outcome of which is illustrated in Figures 3a and 3b, indicated:

- An average per capita daily intake of approximately 4g household salt, with a further 3g from bread and another 2g from the other products included (combined contribution).
- Just over 100% and 70% of the daily RNI iodine for non-pregnant adults and for pregnant women, respectively, could *potentially* be met if 100% of household and food industry salt was iodised.
- *Currently*, an estimated 50% and 30% of the daily RNI iodine for non-pregnant adults and for pregnant women, respectively, is being met by the use of iodised salt in about 77% of households and as a relatively low percentage of total salt used in production of the selected processed foods.
- If the 30% salt reduction target is met and the use of iodised salt remained at the same level as currently, then these same sources of (potentially iodised) salt would only meet 40% and 20% of the daily iodine RNI for non-pregnant adults and pregnant women, respectively.
- Background information demonstrate sufficient iodine intake (MUIC data) among various population groups suggesting that Moldova has achieved optimal iodine nutrition. However, it should be taken into consideration that:
  - If the percentage of food industry salt that is iodised remains highly variable and poorly enforced, then iodine intake from all salt sources may be reduced/ unpredictable as dietary patterns switch to increasingly consuming salt from processed food sources, and/or in the event of successful salt reduction interventions. This may result in inadequate iodine status among pregnant women, who have higher

---

<sup>28</sup> OxSalt. Sodium to salt calculator. [http://oxsalt.org.uk/db/?page\\_id=37-sodiumtosaltcalculator](http://oxsalt.org.uk/db/?page_id=37-sodiumtosaltcalculator).

<sup>29</sup> Per capita consumption data for cheese included locally produced and imported cheese and mixed data for hard and brynza cheese, therefore, some reasonable estimates had to be made, which can be tested and changed in future versions.

<sup>30</sup> Based on information from Franzeluta and their relative share of the bread market.

<sup>31</sup> Based on estimates by the national team.

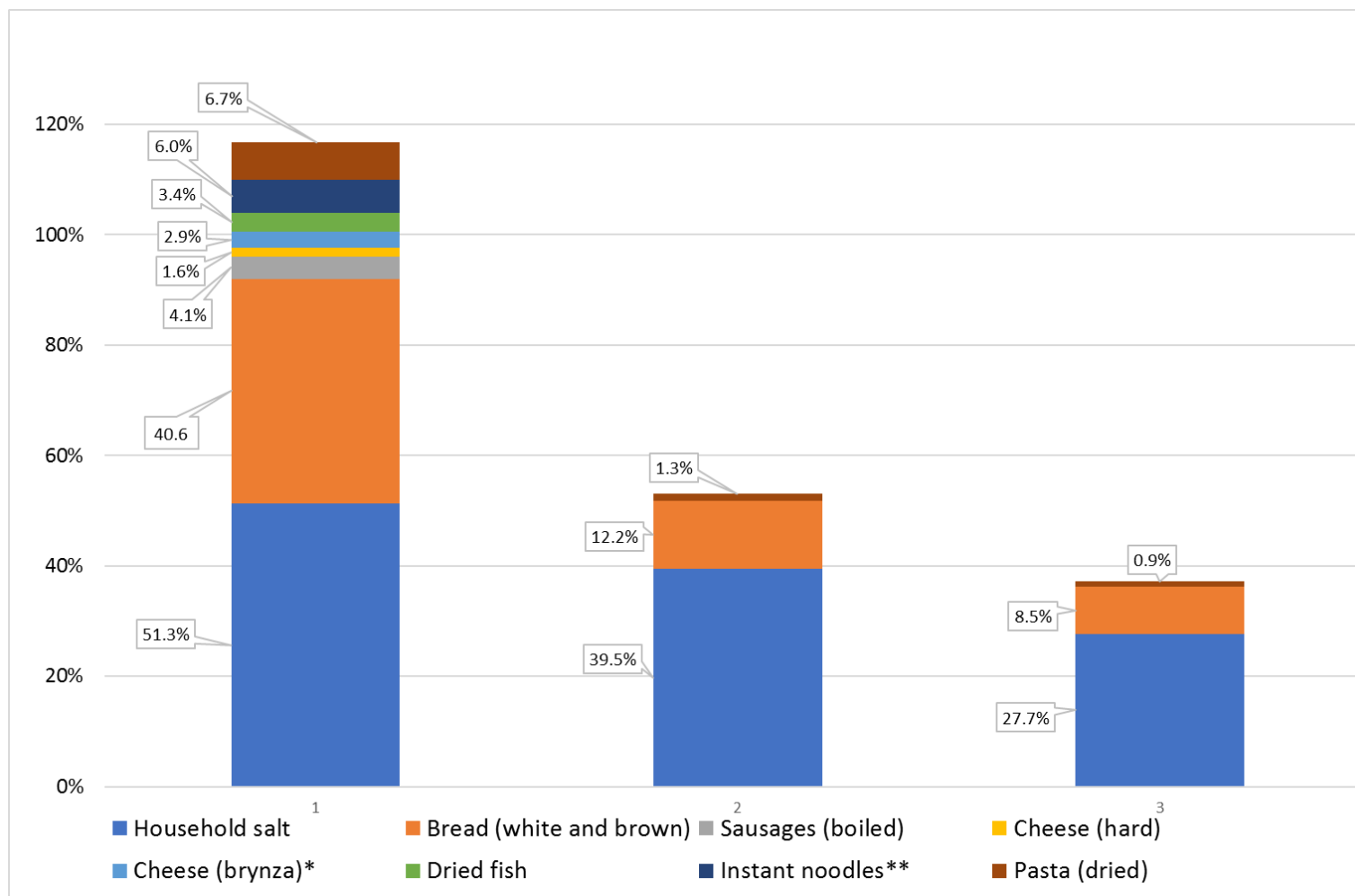
<sup>32</sup> Based on estimated share of the pasta market being imported from Romania where legislation stipulates the use of iodised salt in the food industry.

daily requirements for iodine. Pregnant women in the Northern region and rural areas would be particularly at risk.

- Important other sources of iodised salt, such as foods eaten away from home, are not accounted for in this model and the outcome could be different for other population groups, for example, young children have access to iodised salt as part of the school meal programme.
- There is limited information about other (non-salt) sources of iodine. Other sources include: the natural iodine content of sea fish, and iodine in meat and dairy products, possibly due to iodine or iodised salt enriched animal feed.

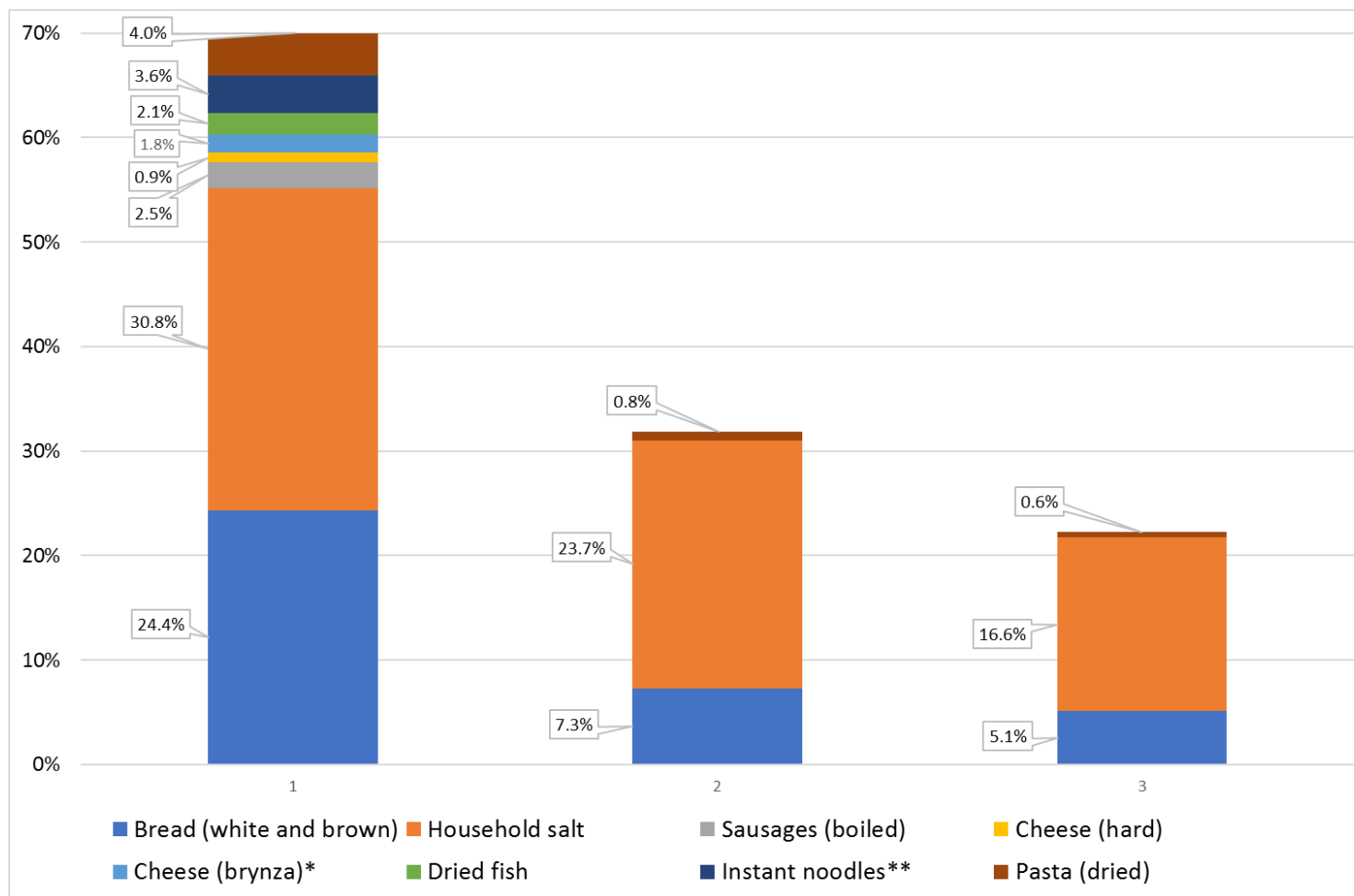
**Figure 3a. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Republic of Moldova, NON-PREGNANT ADULT (RNI iodine 150µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 77% household salt iodised, 30% bakery salt, 20% pasta salt and 0% for other foods), 3 = potential iodine intake if current iodisation levels and salt reduction of 30% achieved.



**Figure 3b. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Republic of Moldova, PREGNANT WOMEN (RNI iodine 250µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 77% household salt iodised, 30% bakery salt, 20% pasta salt and 0% for other foods), 3 = potential iodine intake if current iodisation levels and salt reduction of 30% achieved.



#### 4. Outcome of the enabling environment for USI review

Strengths and weaknesses of the enabling environment were found to be:

- Existing legislation applies to all food grade salt and requires its enforcement.
  - However, food industry inspection responsibilities have not yet been clearly assigned to one of the two agencies that share this role, and protocols do not stipulate enforcement.
- Standards for salt iodisation were developed based on expected iodine intake from iodisation of *all* food grade salt.
- Food control protocols are implemented at the point of salt import, however, the volume of imported non-iodised food grade salt exceeds that of iodised salt, and the quantity of non-iodised household salt in the retail market and non-iodised salt being used by the food industry suggests that protocols (and/or their implementation) could be strengthened.
  - Currently, there are no established or mandatory food grade salt data reporting protocols from food producers or the Ministries of Agriculture or Economy to public health authorities.
- During the period 2007-2011 there was strong intervention to improve awareness, engagement and practices of the food industry. However, this was not sustained or extended to enforce the legislation or to change technical norms for food products, if this is required in addition to the legislation.
- There is a strong history of consumer awareness-building through a variety of approaches in the Republic of Moldova, including, national communication campaigns, mandatory health promotion education in schools and local information events, such as those carried through local youth friendly centres. A 2013 study suggests relatively high awareness of the benefits of using iodised salt<sup>33</sup>. More recently there has been less awareness raising and the current NCD communication campaign focused on salt reduction does not include mention of ensuring that any salt consumed is iodised.
- The National Budget Survey is conducted annually and this includes a register for purchases of processed food products, however, the survey doesn't include data on food frequency or actual consumption and it is not possible to disaggregate the data by sex or age group. This presents a challenge to obtain reliable data for the modelling conducted above and for development of evidence-based nutrition policies.
- Financial and personnel resources to sustain or strengthen the national salt iodisation strategy are seriously limited. There are no paid dedicated staff in this area and responsibilities for implementation of food fortification, including salt iodisation, is fragmented between personnel in three or more departments of the Public Health Agency. At the local level, the recent reduction of posts at district Public Health Centres and added supplementary responsibilities has resulted in less time allocated to nutrition-related tasks.

---

<sup>33</sup> WHO STEPS survey 2013 - > 86% of respondents were aware of the benefits of iodised salt.



## 5. National conclusions based on all above findings

Despite the many challenges and due to dedicated efforts of the MoH, the national Public Health Agency and partners, the programme to achieve optimal iodine status has been successful, based on available MUIC data in the Republic of Moldova. However, low awareness about the mandatory use of iodised salt in the food industry, together with increasing fragmentation of the salt import and food production industries, has complicated regulatory monitoring and enforcement of salt iodisation. The result has been fluctuations in the proportion of household and food industry salt that is iodised, which threatens the sustainability of achievements in terms of iodine status.

### **Challenges**

The **main** areas of programme weakness identified by the national team were:

- i. The unclear understanding and interpretation of existing national legislation for mandatory iodisation of all food grade salt which has resulted in non-compliance by the food industry.
- ii. In addition, the shift from public health (sanitary hygiene) to a food security system approach appears to focus less on the nutritional value of foods. Transition of authority for inspection and enforcement at different levels from the Public Health Agency to the Food Security Agency during this period means that respective responsibilities are unclear.
- iii. A lack of clear national protocol for inspection, enforcement and reporting in database form, of fortified food imports has also resulted in a lack of reliable data on the quantity of salt and iodised used as household salt and in the food industry.
- iv. Some inadequacy of the survey data available to input into the modelling framework.
- v. The fact that the Republic of Moldova relies on imported processed foods and there is no globally available database to provide information on which food exporters in other countries use iodised salt in their processed food products makes it difficult to assess the potential contribution to iodine intake from imported foods.

### **Recommendations**

The **main** national recommendations to address the programme and strategic gaps identified during implementation of the draft IGN Guidance include:

- i. Strengthened engagement with ministries, inspection bodies and the food industry around the existing legislation and implementation of protocols for inspection, enforcement and reporting for import, production and distribution of iodised salt and salt-containing food products.
- ii. Clarifying responsibility for coordinating interventions to sustain optimal iodine status, possibly assigning a food fortification focal point within both the Public Health Agency and the Food Security Agency.
- iii. Engagement with the Food Security Agency and its Consumer Protection Division to develop population and food industry awareness about the importance of purchasing and using iodised salt.
- iv. Promotion of new policy actions (and funding proposals with increased donor engagement) based on a combined approach for national goals on reduced salt consumption, optimal iodine nutrition and sustainable diets.
- v. Working with the Ministry of Agriculture to adjust existing technical regulations to reflect the mandatory use of iodised salt in industrially processed foods.

- vi. Re-establishing the partnership approach with industry (work with major food producers; identify and approach food manufacturers association) for involvement in a renewed dialogue to present evidence, progress, rationale and requirement for salt iodisation, potentially combined with salt reduction discussions. This could include target setting and monitoring and product reformulation.
- vii. Establishing regular assessments of the iodine status of pregnant women and other population groups.

# Sri Lanka

The EOI submitted by the Sri Lanka team included the following (paraphrased) rationale for how piloting the Programme Guidance will help address understand the situation and strengthen strategies to sustain optimal iodine

*It is a good time for Sri Lanka to assess the contribution of iodised salt in processed foods to population iodine intake. It is known that processed food consumption, especially biscuits, has gone up. Understanding the variety of sources of iodised salt will help develop strategies to ensure good coverage of the population, especially pregnant women.*

The EOI indicated that the country has optimal iodine status among children and high household use of adequately iodised salt.

## 1. National situation analysis

- i. A 2018 NCD document<sup>34</sup> indicated that, nationally, up to 25% of dietary salt is from processed foods.
- ii. The 2016 National Iodine Survey<sup>35</sup> reported the median iodine content of household salt across 9 provinces varied between 19 to 27mg/kg, indicating high overall coverage of adequately iodised salt. However, the percent of households using adequately iodised salt (salt with  $\geq$  15mg/kg iodine) at the time of the survey was below 90%, at 79%.
- iii. Adequate iodine status has been confirmed at the national level among SAC (MUIC 233 $\mu$ g/L) from the 2016 survey, non-pregnant women (MUIC 124  $\mu$ g/L)<sup>36</sup> and pregnant women (MUIC 158  $\mu$ g/L)<sup>37</sup>. Iodine status was optimal among SAC in all 9 provinces. Sub-national status could not be reliably determined in the other 2 population groups due to smaller sample sizes.
- iv. There is a national salt reduction strategy 2018 to 2022, which targets a 30% reduction of salt consumption.

### ***Outcome of the initial situational analysis***

It appears that Sri Lanka has, more or less, achieved global targets for iodisation of household salt (based on median salt iodine if not quite at 90% household use) and optimal iodine status nationally.

Based on the situation analysis, the national team were interested to assess how the intake of iodine from iodised salt in processed food may be affected by successful implementation of the salt reduction strategy. Then to review whether changes to the salt iodisation strategy could help alleviate these effects.

### ***National infrastructure for salt and industrially processed food production and import***

About 75% of food grade salt in Sri Lanka is produced by 5 main producers, about 13% is imported, and the rest is produced by smaller scale producers. The Sri Lanka report listed 5 main manufacturers of salt-containing processed foods. Processed foods are also imported.

---

<sup>34</sup> National salt reduction strategy 2018, NCD unit

<sup>35</sup> Medical Research Institute. Fourth National Iodine Survey 2016

<sup>36</sup> Medical Research Institute. Thyroid autoimmunity, volume and function more than two decades after universal salt iodization in Sri Lanka 2018

<sup>37</sup> Medical Research Institute. National nutrition and micronutrient survey pregnant women 2015

## 2. Outcome of the legislative review.

The legislation for salt iodisation and associated labelling:

- Is mandatory for food grade salt “No person shall manufacture, import, store for sale, sell, offer for sale, expose or keep for sale, transport or distribute any type of edible common salt other than iodized or iodized common salt for purposes of human consumption, including salt used as an ingredient of food and for food manufacture.”
- Specifically includes provision for ensuring iodisation of food industry salt, except under the authority of an exemption permit issued by the Chief Food Authority after industry registration with the Chief Food Authority.
- Specifies appropriate regulatory authorities for inspection and enforcement (Network of Medical Officers of Health and Public Health Inspectors).
- Is mandated under the Food Act, No. 26 of 1980
- Includes standards for salt iodine levels (Iodine content  $\geq 15\text{mg}$  and  $\leq 30\text{mg}$  per kg salt).

## 3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.

### **Data sources**

The following sources of data were found and used to verify information so that the best available data were used for identification and modelling of foods contributing significantly to salt intake.

- Household income and expenditure survey (HIES) 2016. This survey report contains estimates for household level and per capita level consumption of many processed food products, with provincial level breakdown for bread.
- National nutrition surveys among pregnant women (2015), school age children (2016) and lactating women (2017) included food frequency modules for a variety of processed foods and estimates of median daily per capita intake of household salt (pregnant women and lactating women) at provincial and national levels.
- The 2016 National iodine survey also included information on household use of iodised salt.
- Market research reports are available, however these were not purchased.
- Salt industry data on production (7 companies) and import (6 companies) volume for food grade salt were available.
- A small number of food industries and the All Island Bakery Association responded with information on volume of salt (and proportion iodised salt) used in production of processed food products and % product content that is salt.

### **Selection of processed food products and modelling the contribution to iodine intake**

- i. The process for selection of relevant salt-containing processed food products from the 2016 HIES report was as follows:
  - Selected products that significantly contributed to salt intake among many population groups, because they had either:
    - Low to medium salt content but high overall consumption, e.g. bread, or,
    - High salt content and consumed frequently, even if in low amounts, e.g. dried fish.

The final industrially processed foods selected to use in the modelling were:

- Bread
  - Biscuits
  - Household (table) salt data, data for which was also available from the HIES and other population group-specific surveys.
  - Dried fish
- ii. Per capita intake estimates were extrapolated from average monthly consumption data from the HIES survey, product salt content information was available from the food industry, and information on the use of iodised salt by the food industry was available from salt producers/importers and the food industry. Therefore, it was possible to model the contribution of each processed food to per capita salt intake. For the modelling:
- The salt content of bread and biscuits was determined based on information received from the food industry. Laboratory data were used to determine the salt content of dried fish.
  - It was assumed that 100% of domestically produced bread and biscuits were made with iodised salt, based on information from the salt industry and the food industry. Dried fish are exempt from using iodised salt as the cheapest non-iodised salt is used in production.
  - It was also assumed that 97% of national household salt was made with iodised salt, based on the 2016 National iodine Survey report.
  - The model assumed that the iodine content of iodised salt was the average of the national salt iodine standard, i.e. 22.5mg/kg
  - A salt reduction target of 30% for table salt and all processed foods<sup>38</sup> was applied to determine potential iodine intake from each product if this target is successfully achieved.

The modelling, illustrated in Figures 4a and 4b, indicated:

- An average per capita consumption for adult women of 8.5g table salt, and 2g salt from other included foods, per day.
- If all salt was iodised, the combined intake of household salt, bread, bakery and dried fish salt could contribute to approximately 110% and 65% of the daily RNI iodine for non-pregnant and pregnant women respectively.
- Based on estimated current intake and use of iodised salt in these food products, the contribution is approximately 90% and 55% of the RNI iodine for these groups respectively.
- If the 30% salt reduction target is met and the use of iodised salt remained at the same level as currently, then these same sources of (potentially iodised) salt would only meet 64% and 37% of the daily iodine RNI for non-pregnant adults and pregnant women.
- Dried fish is the biggest contributor to salt intake after household salt, however, this is made using non-iodised salt so is not contributing to the daily RNI for iodine.
- The other widely consumed processed foods included, bread and biscuits, contribute to approximately 4% and 3% of the RNI iodine for adult women and pregnant women, respectively.
- The background data demonstrate sufficient iodine intake (MUIC data) among various population groups which indicates that Sri Lanka has achieved optimal iodine nutrition. However, it should be taken into consideration that:
  - Iodised salt does not explain total iodine intake, since other foods are also contributing, e.g. the natural iodine content of sea fish, of water in some regions and

---

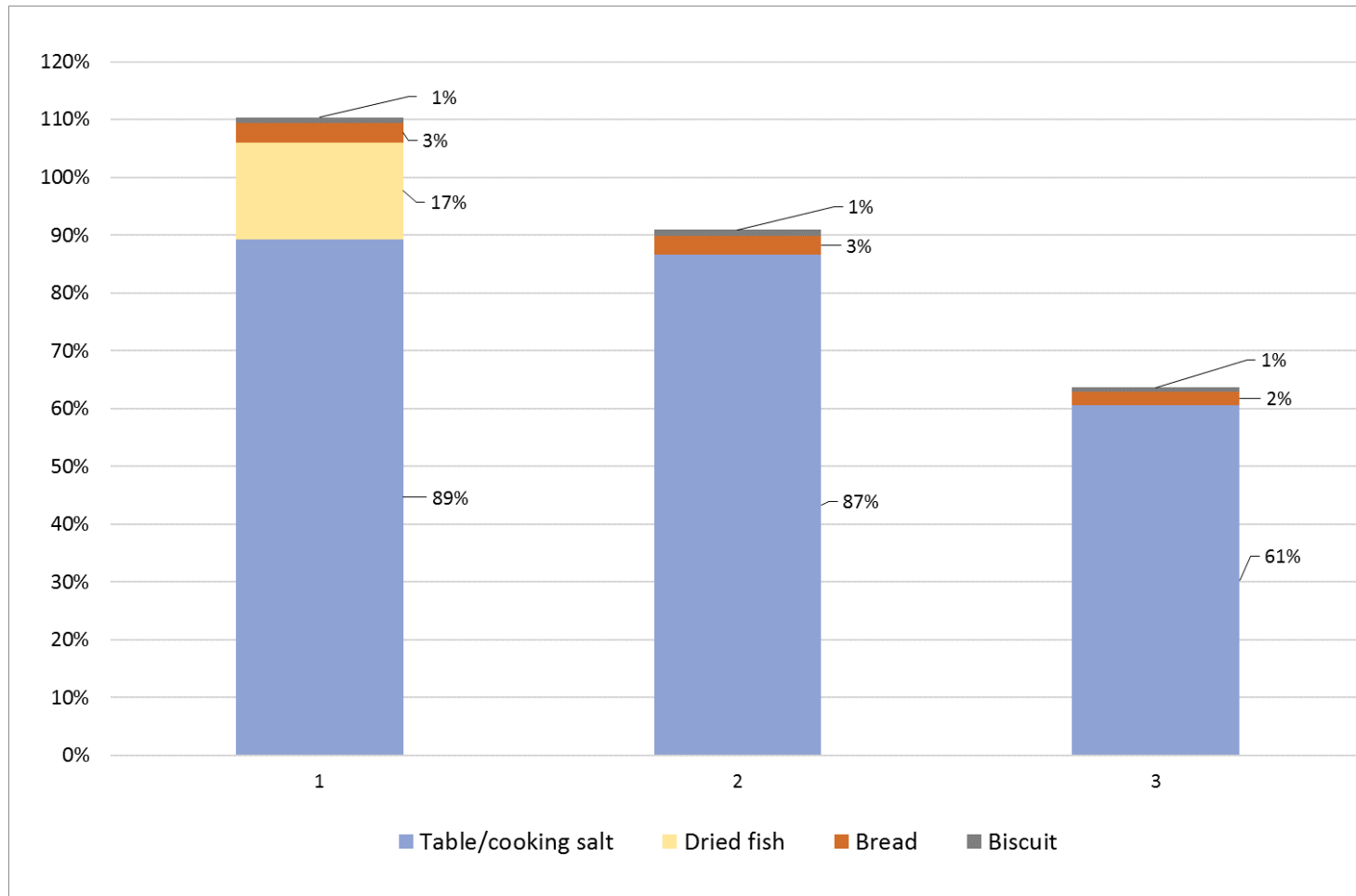
<sup>38</sup> National salt reduction strategy 2018 to 2022

iodine in meat and dairy products, possibly due to iodine or iodised salt enriched animal feed.

The same modelling was conducted with data from provincial level for bread and salt intake estimates (national data for biscuit consumption was used due to lack of provincial data). Total iodine intake from these 3 products (based on assumptions above for current use of household iodised salt and 100% iodised salt use by the food industry) varied from around 60% (Central and Sabragamuwa provinces) to 80% (Northern province) of the iodine RNI for adults.

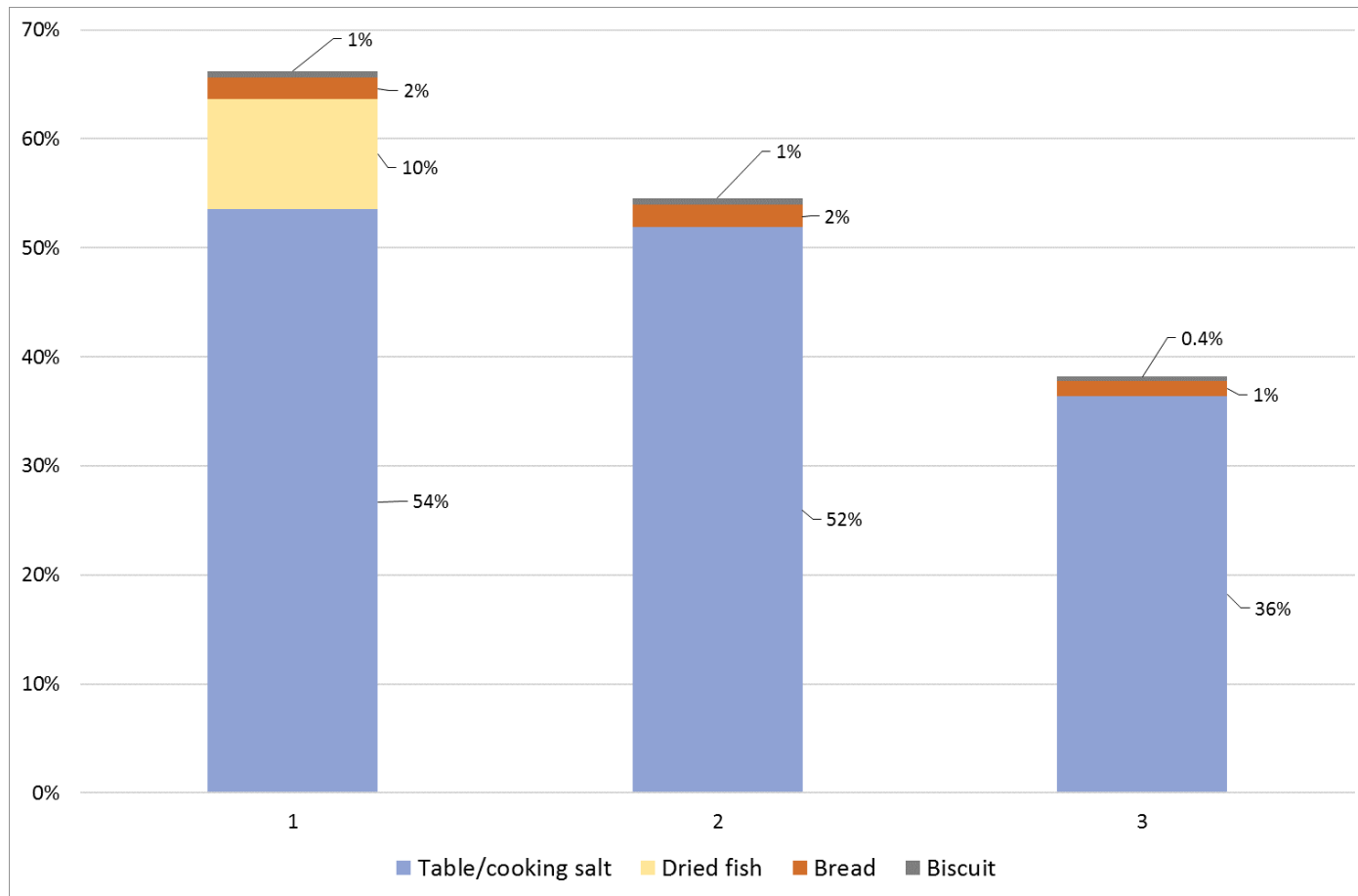
**Figure 4a. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Sri Lanka, NON-PREGNANT ADULT (RNI iodine 150µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 97% household salt iodised, 100% bakery and biscuit salt, 0% for dried fish), 3 = potential iodine intake if current iodisation levels and salt reduction of 30% achieved.



**Figure 4b. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Sri Lanka, PREGNANT WOMEN (RNI iodine 250µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 97% household salt iodised, 100% bakery and biscuit salt, 0% for dried fish), 3 = potential iodine intake if current iodisation levels and salt reduction of 30% achieved.





#### 4. Outcome of the enabling environment for USI review

Strengths and weaknesses of the enabling environment in Sri Lanka were found to be:

- Existing legislation applies to all food grade salt and requires its enforcement. However, dried fish is not considered a processed food and is exempt from using iodised salt.
- Standards for salt iodisation were developed based mainly on household salt consumption estimates.
- Food control protocols are adequate to ensure monitoring, inspection and enforcement of iodised salt production (for distribution to retail markets and the food industry) and of imported salt for the food industry. No specific protocols are implemented at the food industry level.
- Mechanisms to improve awareness, engagement and practices of the food industry are considered lacking and are, therefore, planned for development.
- Communication activities to raise awareness of salt reduction and salt iodisation are under development by the NCD unit.
- The national HIES and various nutrition surveys are designed to capture information on the consumption of key salt-containing industrially produced foods. However, the methodology could be improved to provide more reliable provincial level data in future.
- Financial and personnel resources to sustain or strengthen the national salt iodisation strategy are provided through the Ministry of Health and are considered to be adequate, however, require additional focus on surveillance resources.

#### 5. National conclusions based on all above findings

The programme to achieve optimal iodine status has been successful, based on available data in Sri Lanka. There is clear legislation and enforcement and no evidence that the salt iodine standard needs to be changed. However, iodine status among pregnant women in some provinces is still marginal, warranting close attention to ensure it does not become inadequate in the future if sources and total intake of salt change.

##### **Challenges**

The *main* areas of programme weakness identified by the national team were:

- i. Availability of data on per capita consumption of industrially processed food was not available at provincial level or by urban/rural breakdown for some processed foods.
- ii. Dried fish are a significant source of dietary salt, however the dried fish industry is exempt from using iodised salt in the production process.
- iii. Potential iodine intake from the use of iodised salt in street foods, which are consumed regularly and by a wide range of the population in Sri Lanka, was not captured through implementing the draft IGN Guidance.
  - In developing the Guidance, it was considered that street foods are more likely to be made using household salt, as compared to salt for industrial food processing. However, a better understanding of how street foods contribute to salt intake (presumably iodised based on high levels of food grade salt iodisation) would be helpful to understand all the major sources of iodised salt.
- iv. Another known source of iodine in Sri Lanka, is the ground water in certain areas of the country. This is a more variable source of iodine than food grade salt and cannot be

controlled in the way that salt iodine levels can. However, the potential contribution to iodine status of water iodine when compared with salt iodine in these areas could be helpful to predict, and develop strategies for, the likely impact of improved water sources and/or salt reduction on iodine intake.

### **Recommendations**

National recommendations to address the programme and strategic gaps identified during implementation of the draft IGN Guidance include:

- i. It is important to maintain high coverage of adequately iodized salt at household level as this is the main source of iodine in Sri Lankan diet.
- ii. Ensure that bread and biscuits continue to be made with iodised salt and expand this to other food industries based on future evidence for increasing consumption of processed foods in the country.
  - This could be achieved through improved industry engagement and regulatory monitoring.
- iii. Maintain current salt iodine standards, which have been demonstrated to result in optimal iodine intake among adults, pregnant women and school age children.
- iv. Develop a comprehensive list of recommended actions to further strengthen the salt iodisation strategy over the next three years. These actions should be included in relevant public health and nutrition programmes:
  - Regularly assess iodine and salt intake of the population including contribution from household salt, street foods, and commonly consumed industrially processed food. This would provide evidence for both the salt iodisation and salt reduction strategies.
  - Consider implementing mandatory iodisation of salt for the dried fish industry.
  - Ensure regular monitoring of population iodine status, with an emphasis on status among pregnant women, the group most likely to have potentially inadequate iodine intake if salt reduction initiatives are successful and current salt iodine levels are maintained.
  - Develop a communication plan to alleviate the concerns expressed by surgeons that there is a link between salt iodine levels and increasing auto immune diseases; and to explain to salt producers why the upper limit for salt iodine should be maintained at 30mg/kg for now.
- v. Include an iodine module in all national nutrition surveys to obtain data on relevant dietary practices, with a sample designed to show differences by province and by urban-rural location, and on iodine status of other population groups.
- vi. Strengthen regulatory monitoring of salt iodine levels at salt production and import points, and its use within the food industry, then consider removal of protocols for monitoring household iodised salt at retail level can be considered.
- vii. Ensure collaboration and communication between salt iodisation and salt reduction interventions, with participation of the salt and food industries in both.
- viii. Conduct an in-depth assessment of street food consumption and the source of salt used in food production.

## Thailand

The EOI submitted by the Thailand team included the following (paraphrased) rationale for how piloting the Programme Guidance will help address understand the situation and strengthen strategies to sustain optimal iodine

*The outcomes will be used to assess the contribution of iodine from processed foods to iodine intake among the Thai population. This can be used as the basis for proposing strategic improvements to achieve, monitor, and sustain optimal intake of iodine.*

The EOI indicated that the country has reasonably high use of adequately iodised salt and optimal iodine status among children 1-14 years of age and the elderly. However, household use of adequately iodised salt differs widely by region and iodine status among pregnant women is borderline deficient (varying from deficient in some regions to optimal in others).

### 1. National situation analysis

- i. It is widely accepted that the Thai population regularly consumes a large range of industrially processed foods, including salty condiments, and that these foods contribute significantly to population salt intake.
- ii. The 2018 national surveillance of iodised salt coverage of Thailand reported that 78% of households were using adequately iodised salt at the time of the survey. The 2015-16 MICS survey reported that 70%, 81%, 79%, 57% and 83% of households were using adequately iodised salt in Bangkok, Central, North, Northeast and South regions, respectively<sup>39</sup>.
- iii. Adequate iodine status among children was confirmed through the National Health Examination Survey in 2014. At the national level the MUIC among 6-9 year olds was 180µg/L and among 10-14 year olds is was 157 µg/L<sup>40</sup>.
- iv. Among pregnant women, however, Department of Health data from the iodine deficiency surveillance system in 2016 indicate borderline deficiency at the national level (MUIC 145 µg/L). The MUIC of pregnant women in the North, Central, Northeast, and South regions were 158.3, 155.1, 111.4 and 148.6 µg/l, respectively.
- v. There is a salt reduction policy, led by the Department of Disease Control, which has a target to reduce salt intake by 30% by 2025.

#### ***Outcome of the initial situational analysis***

It appears that Thailand is close to achieving global targets for iodisation of household salt and optimal iodine status nationally, however the Northeast region remains more at risk of low household use of iodised salt and of poorer iodine status than other regions.

Based on the situation analysis, the national team were interested to theoretically test a variety of scenarios constructed to model iodine intake from household salt, processed food industry salt and salty condiments, separately, if all three used adequately iodised salt versus some having no or low percent use of iodised salt. It was also of interest to run these models with different levels of salt iodine, and different potential product salt content, to look at expected iodine intake from iodised salt in each group and how this may be affected by successful implementation of the salt reduction

---

<sup>39</sup> Thailand Multiple Indicator Cluster Survey (MICS 5), 2015-2016.

<sup>40</sup> Iodine nutritional status of children, Thai National Health Examination Survey (NHES V) 2014.

strategy. Then to use these outputs review whether changes to the salt iodisation strategy could/should be recommended.

### ***National infrastructure for salt and industrially processed food production and import***

A presentation about the Iodine Deficiency Disorders (IDD) prevention and control program in Thailand<sup>41</sup> reports that about 75% of food grade salt produced in Thailand is iodised. And that salt is produced across 46 provinces, with 5 main producers, 46 medium producers and 1920small producers. It also reports that fish sauce is produced at 171 sites in 45 provinces, soy sauce is produced at 60 sites across 25 provinces and salty brine is produced at 20 sites across 17 provinces.

The Thai IGN Guidance implementation feedback report states that there are many industrial producers of salt-containing industrially processed foods.

## **2. Outcome of the legislative review.**

The legislation for salt iodisation and associated labelling:

- Is mandatory for food grade salt produced in, or imported into, the country “Food grade salt shall contain iodine content not less than 20 milligrams and not more than 40 milligrams per kilograms”.
- Specifically includes provision for ensuring iodisation of food industry salt, except for fish sauce, soy sauce, salty brine and other condiments derived from hydrolysis or fermentation of soybean protein. A separate legislative document applies for these condiments which requires them to either use iodised salt, meeting Thai standards for iodised salt, or to add iodine directly, prior to bottling, to ensure a level of 2-3mg/L in the final product.
- Specifies appropriate regulatory authorities for inspection (Provincial Chief Medical Officers) and enforcement (Thai Food and Drug Administration) of household salt at retail level. However, authorities for inspection and enforcement of food industry salt are not included.
- Is mandated under the Food Act, B.E 2522 (B.E.1972).
- Includes standards for salt iodine levels (Iodine content  $\geq 20\text{mg}$  and  $\leq 40\text{mg}$  per kg salt).

## **3. Methodology used in selection of processed foods and the outcome of modelling the potential iodine intake from these foods, currently and in the context of possible future salt reduction.**

### ***Data sources***

The following sources of data were used to verify information so that the best available data were used for identification and modelling of foods contributing significantly to salt intake.

- A 2017 Household Socio-Economic Survey<sup>42</sup> assessed household expenditure on food by professional occupation type, at the regional and national level
- A Sodium Chloride Intake Survey from 2009 provided regional and national data from weighed food diaries on salt-containing food groups including condiments, pickled foods, instant noodles, and canned fish.<sup>43</sup>

---

41 2019 Annual report on surveillance and monitoring iodine deficiency, Thai Food and Drug Administration

42 2017 Household Socio-Economic Survey, Thailand, National Statistical Office (NSO), Ministry of Digital Economy and Society.

43 2009 Sodium Chloride Intake Survey for the Thai population. Bureau of Nutrition, Department of Health, Ministry of Public Health.

- The 2017 Food Consumption Behavior Survey<sup>44</sup> used an adapted food frequency questionnaire (FFQ) to estimate recent consumption of different foods, including salt-containing foods, among different age groups by region. The types of food included condiments, instant noodles, snacks, pickled foods, fast foods, and nut products.
- The 2016 Food Consumption Data of Thailand<sup>45</sup> assessed dietary intake using 24-hour recall and a semi-quantitative FFQ for various food products, including salt-containing food products, among different age groups.
- Euromonitor reports on the market share of different processed foods are available from 2018. These were used to estimate market share for instant noodles, snacks and condiments.
- The salt industry provided some data on the quantity of iodised salt produced and distributed for food industry use, however they did not provide information for non-iodised salt or for the amounts of any salt going to specific food industries.
- Data were found for respective market share of specific processed foods by different food industries. However, no data on the quantity of iodised or non-iodised salt used in the production were provided.

***Selection of processed food products and modelling the contribution to iodine intake***

- i. The process for selection of relevant salt-containing processed food products from above reports was as follows:
  - Selected products that significantly contributed to salt intake among many population groups, because they had either:
    - Low to medium salt content but high overall consumption, e.g. instant noodles, or,
    - High salt content and consumed frequently, even if in low amounts, e.g. soy sauce.

The final industrially processed foods selected to use in the modelling were:

- |  |   |
|--|---|
| ○ Fish sauce   | ○ Canned fish                                   |
| ○ Seasoning powder (high salt content)   | ○ Chilli sauce                                  |
| ○ Meat ball (Pork ball, chicken ball and beef ball)                                  | ○ Black soy sauce                               |
| ○ Shrimp paste   | ○ Sweet chilli sauce for chicken                |
| ○ Seasoning powder (medium salt content)   | ○ Suki Sauce                                    |
| ○ Soy sauce  | ○ Nuts  |
| ○ Instant noodles  | ○ Rice/tapioca snack (Dozo, Tawan, Manora)      |
| ○ Fermented fish sauce   | ○ Ketchup                                       |
| ○ Sausage (Sausage, bologna, ham)  | ○ Popcorn/Corn snack (Twisties, Cornae, Toro)   |
| ○ Seasoning sauce  | ○ Potato chips                                  |
| ○ Oyster sauce   | ○ Potato snack (Paprika, Potae, Roller coaster) |
| ○ seasoning powder (low salt content)  | ○ Seasoned seaweed                              |
| ○ Processed seafood (crab stick, fish ball, shrimp ball)                             | ○ Fish snack                                    |
| ○ Household (table) salt data, which was also available from the referenced reports. |   |

---

<sup>44</sup> 2017 Food Consumption Behavior Survey. National Statistical Office, Ministry of Digital Economy and Society

<sup>45</sup> 2016 Food Consumption Data of Thailand. National Bureau of Agriculture Commodity and Food Standards, Ministry of Agriculture and Cooperatives

- ii. Per capita intake of the above products among non-pregnant adults and children were estimated based on data from the Sodium Chloride Intake Survey, 2009, and the Food Consumption Data of Thailand, 2016. Using the data from these reports, it was possible to model the contribution of each processed food to daily per capita salt intake. For the modelling (references to columns relate to Figures 5a-c):
- The salt content of foods was determined based on product labelling and, for some processed foods, food analysis.
  - It was assumed that 100% of domestically produced processed foods (other than fish and soy-based condiments and salty brine) were made with iodised salt, based on information from the salt industry and the food industry, and on Thai FDA Notification, under Food Act B.E. 2522 (1979).
  - For the above condiments that are subject to different regulations for addition of iodine, modelling was done based on the use of 100% iodised salt (Column 1) and for 100% non-iodised salt (columns 2 and 3).
  - Household salt iodisation was set to 78% for the modelling (columns 2 and 3).
  - The model assumed that the iodine content of iodised salt was the average of the national salt iodine standard, i.e. 30 mg/kg
  - A salt reduction target of 30% for table salt and all processed foods<sup>46</sup> was applied to determine potential iodine intake from each product if this target is successfully achieved (Column 3).
  - The modelling included 18 foods with the potential to contribute to  $\geq 0.5\%$  adult RNI for iodine.

**The modelling, illustrated in Figures 5a, 5b and 5c, indicated:**

- An average daily per capita consumption for non-pregnant adult women and children 6-12 years of age of approximately 3g and < 1g table salt, respectively. Together with a further 9g and 4g of salt from other included processed foods, respectively.
- If all salt was iodised, the combined intake of household and food industry salt could contribute to approximately 166%, 80% and 100% of the daily RNI iodine for non-pregnant adults, for children 6-12 years of age, and for pregnant women, respectively.
- Based on estimated current intake and use of iodised salt as household salt and in all food products except the fish and soy condiments and salty brine, the contribution is approximately 92%, 59% and 55% of the RNI for iodine for these 3 groups respectively.
- If the 30% salt reduction target is met and the use of iodised salt remained at the same level as currently (assuming no iodised salt in fish and soy based condiments or salty brine), then these same sources of (potentially iodised) salt could meet 65%, 41% and 39% of the daily iodine RNI for non-pregnant adults, children 6-12 years of age, and for pregnant women, respectively.
- Among adults, fish sauce and (high salt) seasoning powder are the biggest contributors to salt (and potentially iodine) intake after household salt. Among children, meat products, such as meat balls are the highest contributor to salt intake after household salt.
- The background data on iodine status (MUIC data) demonstrate adequate iodine intake among children (data unavailable for non-pregnant adults) and borderline adequacy

---

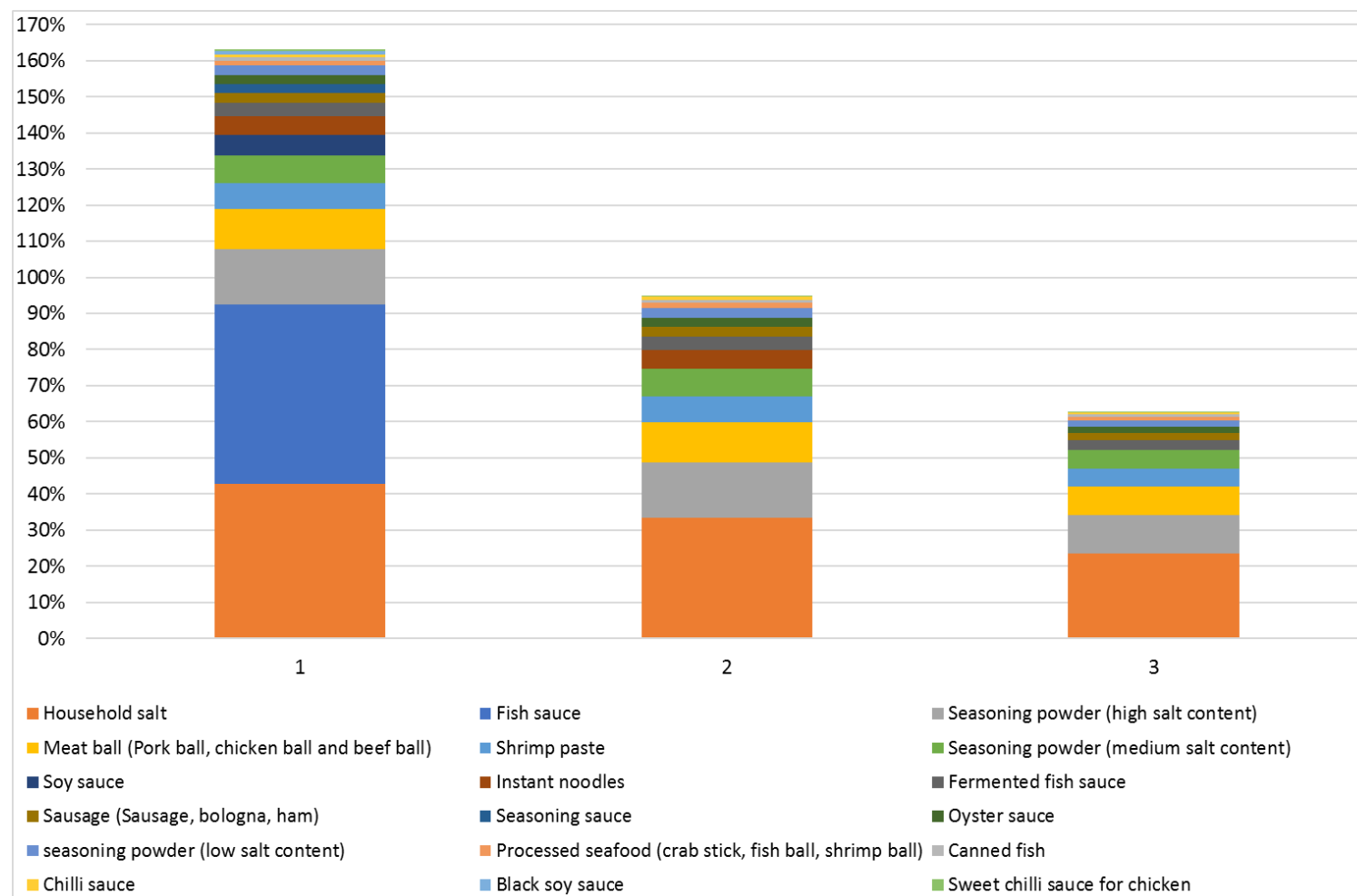
<sup>46</sup> National salt reduction strategy 2017 to 2025

among pregnant women, which indicates that Thailand has achieved optimal iodine intake among children. Given that likely current iodine intake from the main sources of dietary salt (Column 2 in the Figures) is below 100% of the RNI for iodine for children and pregnant women, it should be taken into consideration that:

- Iodised salt does not explain total iodine intake, since other foods are also contributing, e.g. the natural iodine content of sea fish, of water in some regions and iodine in meat and dairy products, possibly due to iodine or iodised salt enriched animal feed.
- The assessment of major dietary sources of iodine that was conducted in Thailand went beyond the assessment of the salt sources detailed in the IGN Guidance. Table 1 below shows the estimated iodine intake from commonly consumed foods based on per capita consumption estimates and laboratory analysis of iodine content. When these data were combined with current estimates for iodine intake from household and processed food salt sources (Column 2 of the Figures), the average daily per capita intake reaches around 125%, 109% and 87% of the RNI for iodine for non-pregnant adults, children 6-12 years of age, and pregnant women, respectively.

**Figure 5a. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Thailand, NON-PREGNANT ADULT (RNI iodine 150µg/L).**

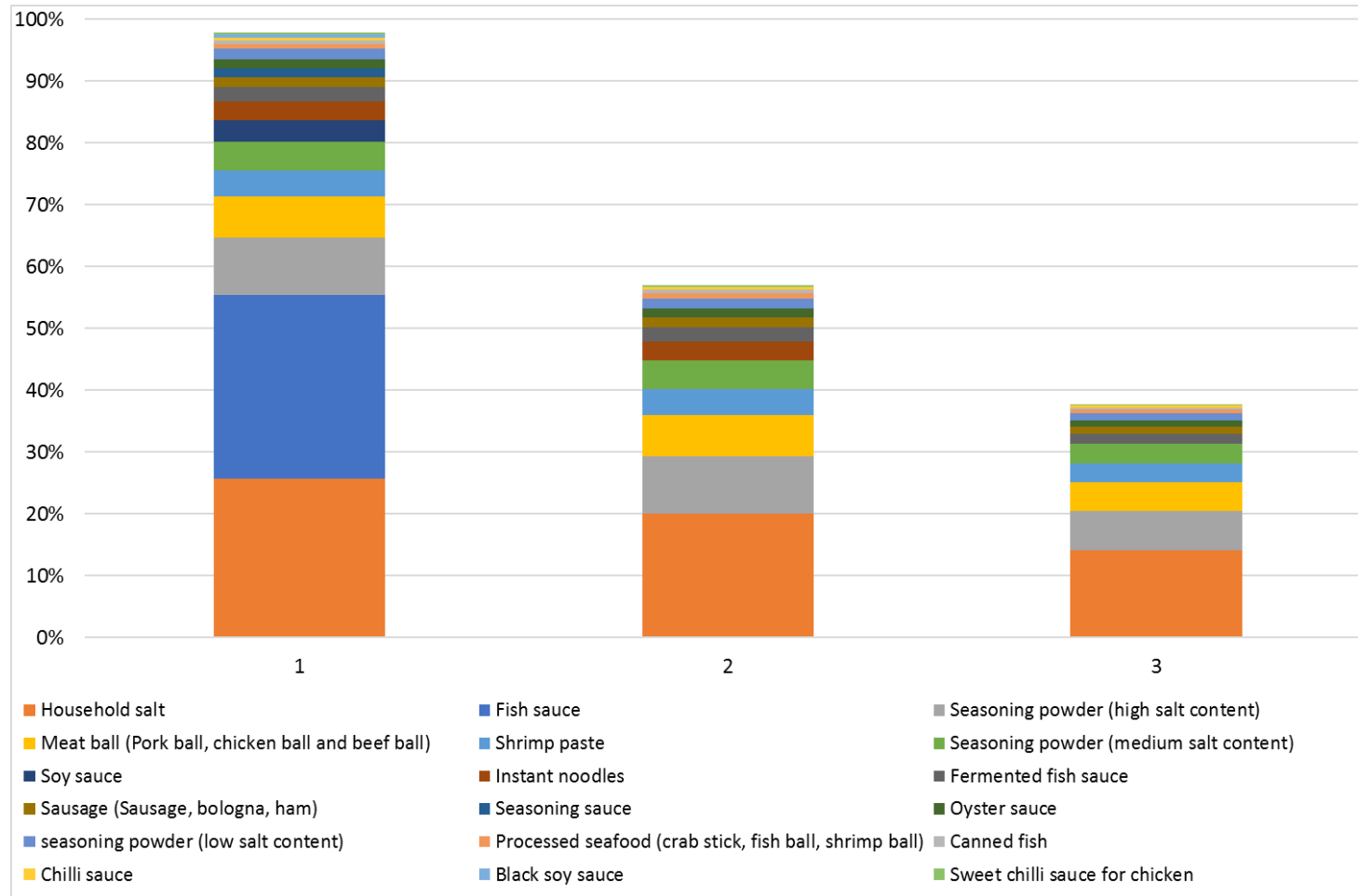
1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 78% household salt iodised, 100% food industry salt iodised, 0% fish and soy based condiments salt iodised), 3 = potential iodine intake if current iodisation levels (as for 2) and salt reduction of 30% achieved.





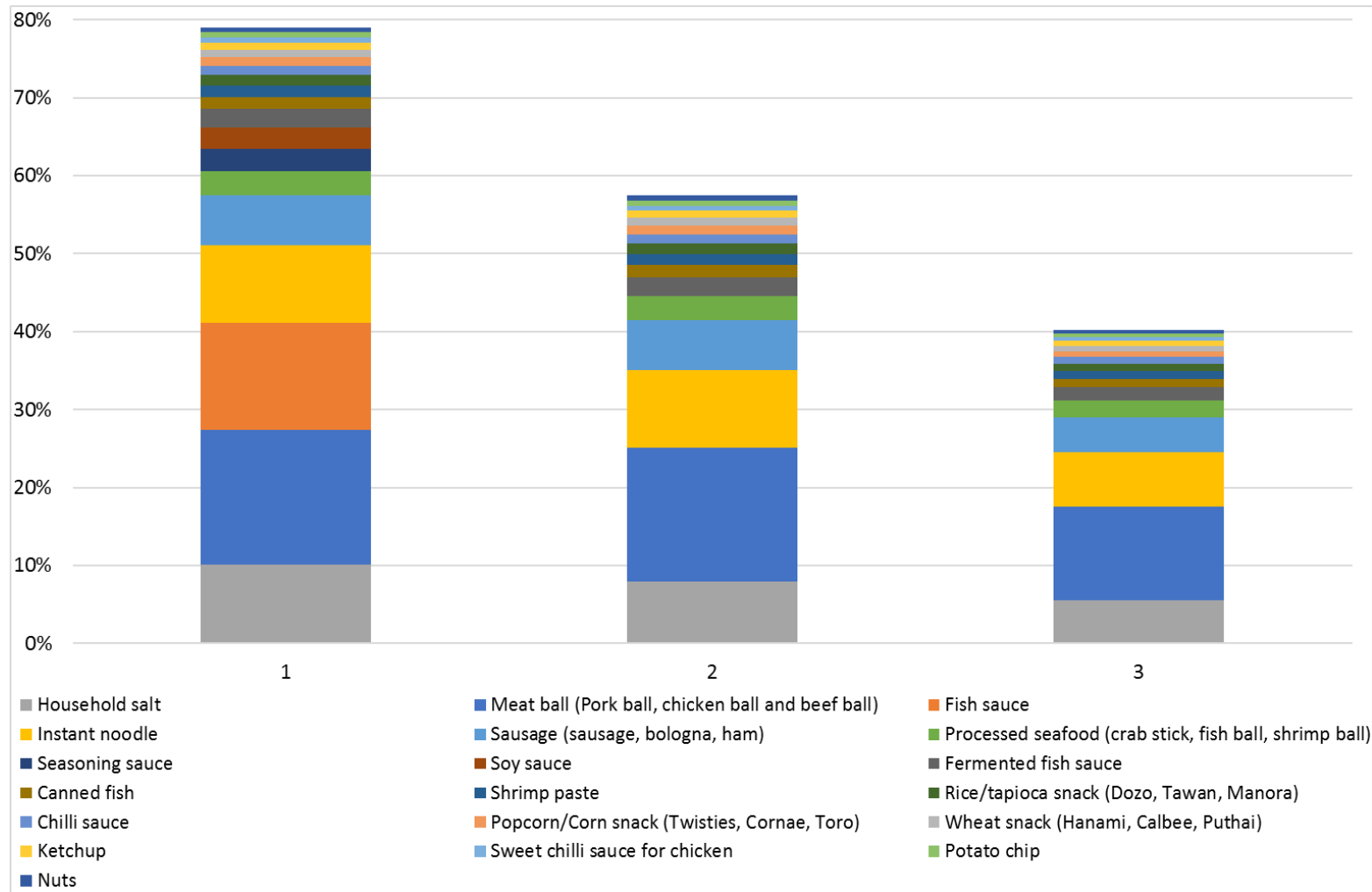
**Figure 5b. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Thailand, PREGNANT WOMEN (RNI iodine 250µg/L). Based on adult consumption estimates.**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 78% household salt iodised, 100% food industry salt iodised, 0% fish and soy based condiments salt iodised), 3 = potential iodine intake if current iodisation levels (as for 2) and salt reduction of 30% achieved.



**Figure 5c. Contribution to % daily RNI iodine from iodised salt from estimated per capita consumption of selected processed foods – Thailand, CHILDREN 6-12 Years of Age (RNI iodine 120µg/L).**

1 = potential iodine intake (if all salt 100% iodised), 2 = estimated current iodine intake (based on 78% household salt iodised, 100% food industry salt iodised, 0% fish and soy based condiments salt iodised), 3 = potential iodine intake if current iodisation levels (as for 2) and salt reduction of 30% achieved.



**Table 1. Estimated iodine intake from commonly consumed foods based on per capita consumption estimates and laboratory analysis of iodine content.**

<b>Food products</b>	<b>Aged population groups</b>	<b>Daily per capita consumption<sup>1</sup></b>	<b>Estimated iodine intake from daily intake of food products (µg/day)<sup>2</sup></b>	<b>Potential % recommended adequate daily iodine intake from food product (%RDI)</b>
<b>Milk</b>	0-5 yr.	148 ml	44.4	49.3
	6-12 yr.	85.9 ml	25.8	21.5
	Non-pregnant adults	42.8 ml	12.9	8.6
<b>Rice</b>	0-5 yr.	115.3 g	9.2	10.2
	6-12 yr.	225.3 g	18.0	15.0
	Non-pregnant adults	250.6 g	20.0	13.4
<b>Egg</b>	0-5 yr.	22.3 g	9.8	10.9
	6-12 yr.	29.0 g	12.8	10.6
	Non-pregnant adults	24.6 g	10.8	7.2
<b>Milk (sweet flavor)</b>	0-5 yr.	37.8 ml	2.6	2.9
	6-12 yr.	26.6 ml	1.9	1.6
	Non-pregnant adults	14.9 ml	1.0	0.7
<b>Mackerel</b>	0-5 yr.	4.8 g	1.0	1.2
	6-12 yr.	7.3 g	1.6	1.3
	Non-pregnant adults	8.1 g	1.8	1.2

<sup>1</sup> 2016 Food Consumption Data of Thailand. National Bureau of Agriculture Commodity and Food Standards, Ministry of Agriculture and Cooperatives

<sup>2</sup> Laboratory Food Analysis, Bureau of Nutrition, Department of Health, Ministry of Public Health

#### 4. Outcome of the enabling environment for USI review

Strengths and weaknesses of the enabling environment were found to be:

- Existing legislation applies to all food grade salt except that used in the production of fish and soy-based sauces and salty brine, and that used in products where salt is < 1% of the product content.
- Standards for salt iodisation were developed based initially on household salt consumption.
- Food control protocols are adequate to ensure monitoring, inspection and enforcement of salt iodisation by large and medium salt producers. There is currently no specific protocol for regulatory monitoring of the use of iodised salt at the food industry level, however, other regulatory monitoring of the food industry is implemented as part of Good Manufacturing Practice audits.
- There are currently good strategies for communication with the Thai population, however there are no established mechanisms to improve awareness, engagement and practices of the food industry. The use of iodised salt by the food industry has been based on strong enforcement of iodised salt production. Such awareness raising and engagement activities could be developed and implemented to improve strategic sustainability.
- The main communication plan for the use of iodised salt is incorporated in the salt reduction strategy.
- National consumption surveys are conducted periodically, not annually. Most surveys do not specifically target the collection of data for salt-containing foods. The national food consumption survey captures information about some of the listed products, however this could be improved to provide data required for the assessment conducted here.

#### 5. National conclusions based on all above findings

The programme to achieve optimal iodine status has been relatively successful, based on available data in Thailand. Iodine status among pregnant women remains borderline at the national level and is deficient among pregnant women in the Northeast region. The fact that the main suppliers of salt are large and well developed has facilitated strong and relatively straight forward regulatory monitoring and enforcement of salt iodisation at production. The result has been relatively high levels of household use of quality iodised salt and the default use of iodised salt by domestic food industries, except for production of the condiments mentioned above.

##### **Challenges**

The main areas of programme weakness identified by the national team were:

- A lack of data on food industry use (and quantity) of iodised and non-iodised salt for the production of key processed foods.
- A gap in protocols for regulatory monitoring of iodised salt use at the food industry level.
- A lack of information about the iodine status of non-pregnant adults.
- Practical difficulties with the addition of iodine to fish and soy-based sauces and salty brine within the standard range, with implementation of regulatory monitoring activities, and with standardisation of monitoring laboratories.

##### **Recommendations**

National recommendations to address the programme and strategic gaps identified during implementation of the draft IGN Guidance include:

- Strengthen enforcement of iodised salt use by the food industry through implementation of specific protocols. Also strengthen technical support for addition of regulated levels of iodine to fish and soy-based sauces and salty brine and regulatory monitoring and measurement of the final level.
- Collaborate with the food industry to raise awareness of the mandatory use of iodised salt in processed foods, and to support the industry to sustain/achieve this as needed.
- Maintain the policy of adding iodine to fish sauce and soy-based sauces and salty brine until regular assessment of urinary iodine status among the most vulnerable population groups, such as pregnant women, confirms sustained optimal iodine status among all population groups.
- Monitor, through regular assessment of, iodine status among adults, children and especially among pregnant women. The North East may be proposed as a region for particular focus.
- Strengthen and expand communication activities to include the food industry, small scale food producers and food stalls.
- Repeat the assessment of the contribution of processed foods to iodine intake whenever new food consumption and food iodine content data are available.