

UNIVERSAL SALT IODIZATION AND SODIUM INTAKE REDUCTION

COMPATIBLE, COST-EFFECTIVE STRATEGIES OF GREAT PUBLIC HEALTH BENEFIT



INTRODUCTION

The United Nations Decade of Action on Nutrition aims to accelerate action to address malnutrition in all its forms, including conditions associated with undernutrition (wasting, stunting and micronutrient deficiencies) along with overweight, obesity and diet-related noncommunicable diseases (NCDs) (1). This commitment will contribute to the achievement of the Sustainable Development Goals (SDGs), particularly Goals 2 (Zero Hunger) and 3 (Good Health and Well-Being). The coexistence of all forms of malnutrition is known as the double burden of malnutrition, and offers a unique opportunity for integrated nutrition action, or “double duty actions” (Box 1) (2).

Box 1. Double Duty Actions

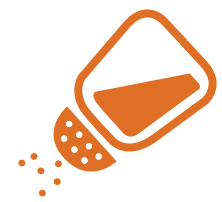
- Aim to simultaneously tackle both undernutrition (macro- and micro nutrient deficiencies) and problems of overweight, obesity and diet-related NCDs.
- Are based on the rationale that all forms of malnutrition share common drivers that can be leveraged for double impact. These drivers include nutrition in early life, diet diversity, food environments and socioeconomic factors.

The World Health Organization (WHO) promotes the implementation of programmes to reduce population dietary sodium intake as one of the cost-effective strategies to reduce the burden of NCDs, as well as Universal Salt Iodization (USI) to prevent and control iodine deficiency disorders (IDD). While the convergence of these policies is relevant in all age groups, it is particularly critical for women’s health, as their babies may suffer the effects of maternal iodine deficiency and women themselves are prone to elevated blood pressure and its consequences.

This brief outlines why and how policies for USI to eliminate IDD and the reduction of dietary sodium intake to prevent and control raised blood pressure – and, in turn, the risk of cardiovascular diseases (CVDs) – are compatible and cost-effective. It calls upon policy-makers, academics and programme managers to bring together the salt fortification and sodium reduction communities to develop and implement double-duty sodium-related policies and actions, which have the potential to deliver significant public health benefit.

SODIUM REDUCTION

WHO recommends a daily sodium intake among adults of less than 2 g (equivalent to 5 g or a teaspoon of salt). For children, the level of intake should be adjusted downward based on their energy requirements according to age (3). The current estimated global average sodium intake in adult populations is 3.89 g to 4.01 g per day. This is equivalent to 9.88 g to 10.21 g of salt per day, which is almost twice the recommended intake (4). Excessive consumption of



WHO recommends a sodium intake of less than **2 grams/day** (equivalent to 5 g, or a teaspoon of salt)

sodium increases blood pressure, which is the leading risk factor for CVD (3, 5). High sodium intake is responsible for some 1.89 million deaths per year worldwide. Many of these deaths could be prevented by using evidence-based strategies for sodium reduction (6).

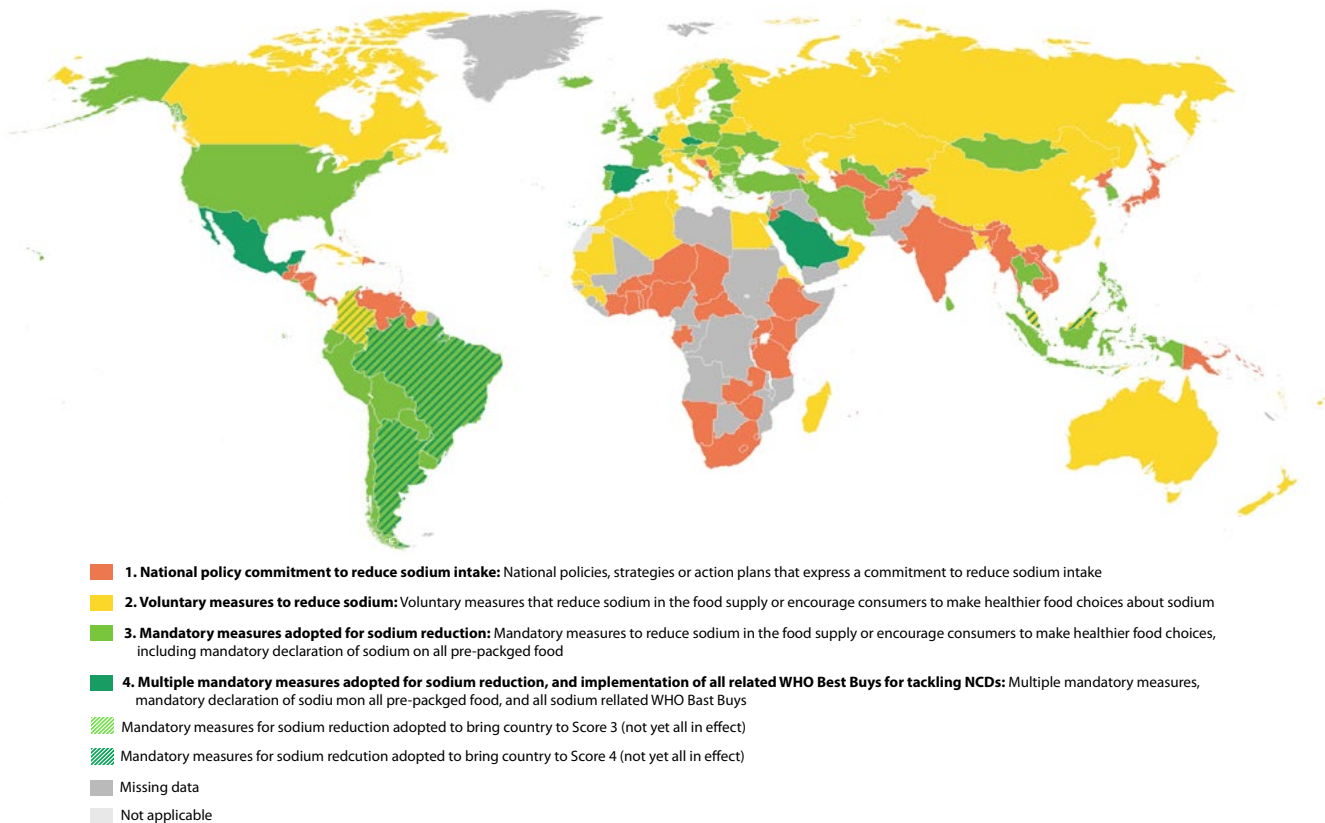
Reducing sodium intake is one of the most cost-effective, feasible and high impact ways to improve health. WHO recommends multiple interventions or measures known as “best buys” for the prevention and control of NCDs (7) to reduce sodium intake. These include media campaigns, public food procurement and service policy limiting salt or sodium-rich food, front-of-pack labeling, and reformulation targets or maximum limits for sodium in food. These interventions or measures yield an estimated return on investment of US\$12 for every dollar invested (8). Consequently, countries are making policy commitments or implementing one or more voluntary or mandatory measures to reduce sodium intake in their efforts to reduce NCDs (Figure 2 on page 3) (9).

WHO developed the [Sodium Country Score Card](#) to monitor countries’ progress on their commitments and measures to reduce sodium intake on a continuous basis. Countries with a **score of 1** have made a national policy commitment towards sodium reduction, as a first step towards taking concrete action to reduce sodium in the food supply or encourage consumers to make healthier food choices. Countries with a **score of 2** are implementing voluntary measures to reduce sodium in the food supply or encourage consumers to make healthier food choices about sodium. These actions are included in this score if specific cut-offs are set for sodium in an underlying nutrient profile model (e.g. a quantified limit for the maximum permissible amount of sodium in food served in schools), or if they specifically target salt consumption (e.g. prohibition of salt shakers in food service areas). Countries with a **score of 3** have made any such measures mandatory and, as a prerequisite measure for actions that rely on a nutrient profile model, are implementing a mandatory declaration of sodium on all pre-packaged food. Countries with a **score of 4** are implementing multiple mandatory sodium reduction measures, a mandatory sodium declaration on all prepackaged foods, and all four of the WHO best buys for sodium reduction (Figure 1).



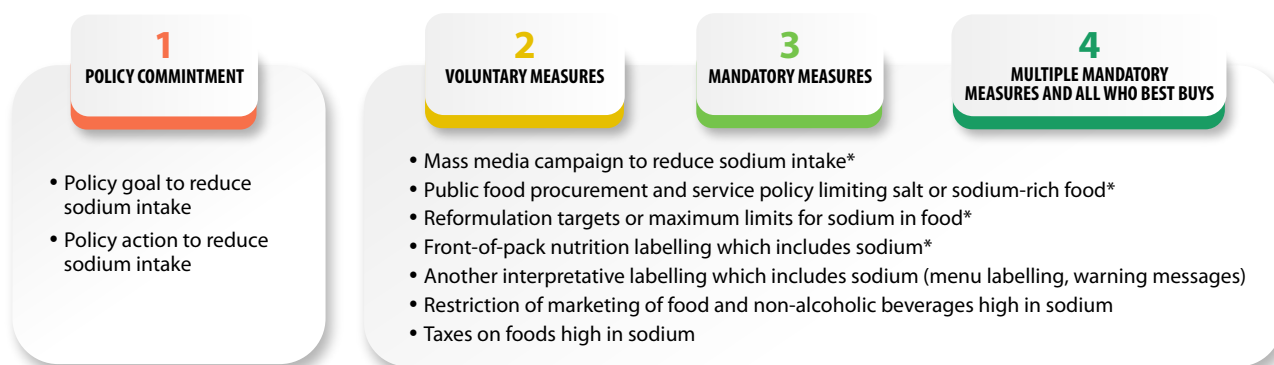
Excessive sodium consumption is a main risk factor for cardiovascular diseases

Figure 1. Status of policy commitments and voluntary or mandatory measures to reduce sodium intake as of May 2022



Source: Global database on the Implementation of Nutrition Action (GINA) (online database). Sodium Country Score Card <https://www.who.int/nutrition/gina/en/>.

Figure 2. Policies and measures for sodium reduction



* WHO best buy for reducing NCDs through reducing sodium intake

UNIVERSAL SALT IODIZATION

The WHO recommended nutrient intake for iodine is 150 µg/day for adolescents and adults, 250 µg/day for pregnant and lactating women and 120 µg/day for children aged 6–12 years old (10). It is estimated that 1.88 billion people worldwide are at risk of insufficient iodine intake and approximately one-third of the world’s population lives in areas with some iodine deficiency (11). Iodine deficiency can cause general functional health and reproductive impairment, as well as learning disabilities in children; severe iodine deficiency can cause stunting, goitre and irreversible brain damage in the foetus and infant, and retarded psychomotor development in children (12). WHO recommends that all food-grade salt used in households and food processing should be fortified with iodine as a safe and effective strategy for the prevention and control of IDD (Box 2) (13).

In 2021, it was estimated that 89% of households consume iodized salt worldwide – in different amounts of salt and with varying iodine concentrations (Figure 3 on page 4) (14). This public health success has significantly reduced the number of newborns affected by IDD. The resulting improvement in cognitive development and future earnings suggest a potential global economic benefit of nearly US\$ 33 billion (15).

Box 2. Salt: a feasible vehicle for fortification

- salt is widely consumed by virtually all population groups in all countries, with little seasonal variation in consumption patterns, and salt intake tends to be proportional to energy intake/requirements;
- in many countries, salt production is limited to a few centres, facilitating quality control;
- the technology needed for salt iodization is well established, and inexpensive - the annual cost of salt iodization is estimated at US\$ 0.02–0.05 per individual covered, and even less for established salt iodization programmes;
- addition of iodate or iodide to salt does not affect the taste or smell of the salt or foods containing iodized salt, and therefore consumer acceptability is high; and
- iodine (mainly from iodate) remains in processed foods that contain salt as a main ingredient, such as bouillon cubes, condiments and powder soups, and hence these products become sources of iodine, however it is important to highlight that products containing iodized salt as an ingredient (e.g. bouillon cubes, bread) should not be considered to be iodine fortified.

WHO recommended nutrient intake for iodine is **150 µg/day**



adolescents and adults

250µg/day

for pregnant and lactating women



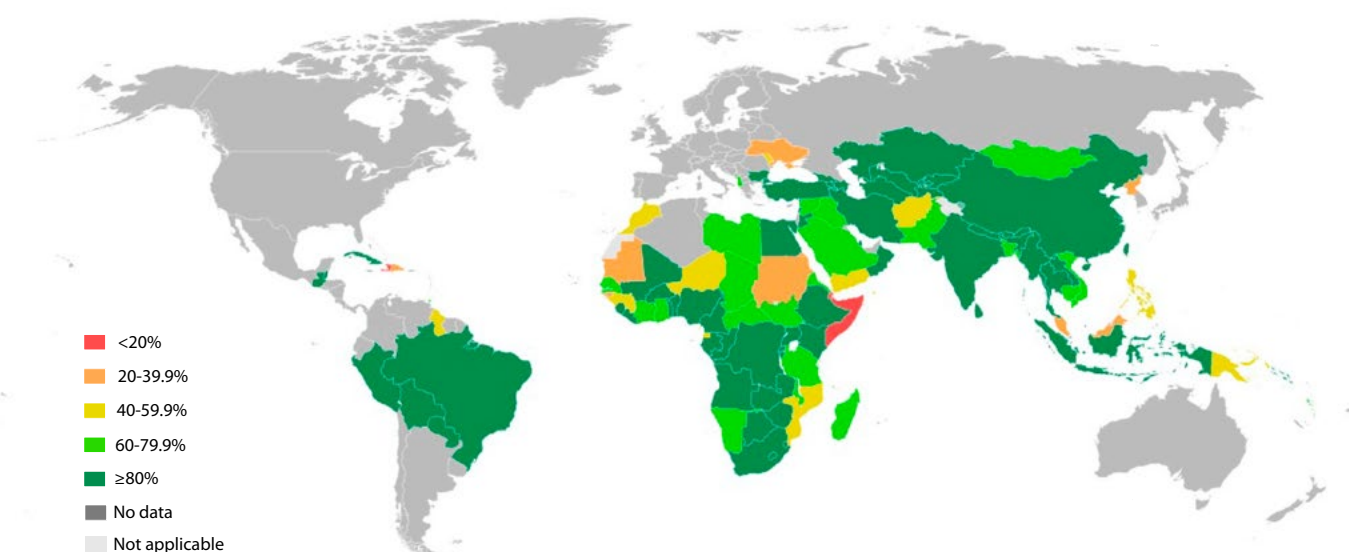
120 µg/day

for children



aged 6–12 years old

Figure 3. Percentage of households consuming salt with any iodine, 2021



Source, <https://data.unicef.org/topic/nutrition/iodine/>

COMPATIBILITY OF UNIVERSAL SALT IODIZATION FOR IODINE DEFICIENCY DISORDERS ELIMINATION AND SODIUM REDUCTION TO REDUCE BLOOD PRESSURE AND THE RISK OF CARDIOVASCULAR DISEASES

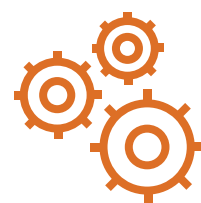
Policies to eliminate IDD through USI and policies to reduce sodium intake to reduce blood pressure and the risk of CVDs are compatible. Both require food industry engagement coupled with measures that aim to change the behaviour of individuals and practices of food service operators, and both use similar surveillance modalities (i.e. dietary surveys and urinary iodine/sodium concentration as an indicator for intake). Dietary salt comes from salt added to food products during processing, from salt added to food during preparation of meals consumed outside the household, and from salt added during food consumption in the home. Effective and compatible policies and other strategies can target any of these steps.

POLICIES TARGETING THE FOOD SUPPLY: SALT IODIZATION AND REFORMULATION OF FOOD PRODUCTS TO REDUCE THE CONTENT OF SODIUM

Policies targeting the food supply should ensure lower sodium content in food whilst maintaining adequate levels of iodine to prevent IDD.

The success of the salt iodization programme greatly depends on ensuring appropriate policies are in place, that iodine concentrations in salt are adjusted as data on iodine status and average salt intake become available, and that the coverage is adequate. Ideally, this means mandatory fortification of all domestic and imported salt with adequate levels of iodine and ensuring that all – large and small – salt producers comply with the policy.

In many high-income countries, and increasingly in low- and middle-income countries, a significant proportion of sodium in the diet comes from processed foods such as bread, cereal and grains, processed meats and dairy products (16). Reformulation to lower the sodium content of food products that are consumed frequently is an effective way to reduce population sodium intake.



Policies to eliminate IDD through USI and policies to reduce sodium intake to reduce blood pressure and the risk of CVDs are compatible

WHO has set specific expectations for global commitments in adopting standardized targets for sodium levels for food categories that are the highest contributors to sodium intake (Box 3)(17). It is critical that countries develop clear legislation or guidance for food producers, especially where the main source of dietary sodium is processed foods. Legislation or guidance should not only cover optimal iodization of salt, but also the sodium content of processed food products so that reformulation efforts do not affect the overall iodine intake.

Box 3. Global sodium benchmarks

To accelerate progress on sodium reduction — and recognizing that the setting of appropriate sodium benchmarks is a highly complex, technical issue — WHO has established a set of global benchmarks for a wide range of food categories (17). The benchmarks were developed through consultation with experts and were informed by data collected on sodium targets set in 41 countries, one WHO region and one WHO subregion. Benchmarks are defined as maximum targets of sodium (in mg per 100 g) for specific sub-categories of food and beverages, and are based on the lowest value for each subcategory from existing national or regional targets. These benchmarks are intended to be complementary to existing national and regional efforts and initiatives, and to serve as a reference for such initiatives.

Around the world, 125 countries mandate salt iodization and 44 countries have mandatory limits or voluntary targets for reducing the salt content in food (9). Sometimes these are contained within the same law.

POLICIES TARGETING FOOD PREPARATION: STANDARDS FOR REDUCED USE OF SALT AND THE USE OF IODIZED SALT

Public food procurement and service policies set nutrition criteria for food that can be served or sold in public and/or private settings. In addition to standards for procurement of food products with lower content of sodium, such policies may set specific standards for the amount of salt to be added during food preparation and to mandate that only iodized salt should be used.

More than 80 countries have public food procurement and service policies, and about half of these set criteria for the sodium content in food served or sold (9). However, only a few countries also specify that only iodized salt should be used.

POLICIES TARGETING FOOD CHOICES AND CONSUMPTION: BEHAVIOUR CHANGE INTERVENTIONS

Policy measures that seek to change food choices include easy-to-understand nutrition labelling (front-of-pack labelling or warning messages, menu labelling in food outlets), fiscal policies, marketing restrictions, or specific interventions to nudge healthy food behaviour (e.g. banning the placement of salt shakers on the tables in food service areas).

Media campaigns and other behaviour change strategies aimed at consumers to reduce the addition of salt to food should be coupled with messages to only use iodized salt, e.g. “Reduce salt intake and always use iodized salt”.

UNIVERSAL SALT IODIZATION MONITORING AND ADJUSTMENT OF IODINE CONCENTRATIONS IN RESPONSE TO A DECREASE IN POPULATION SODIUM INTAKE

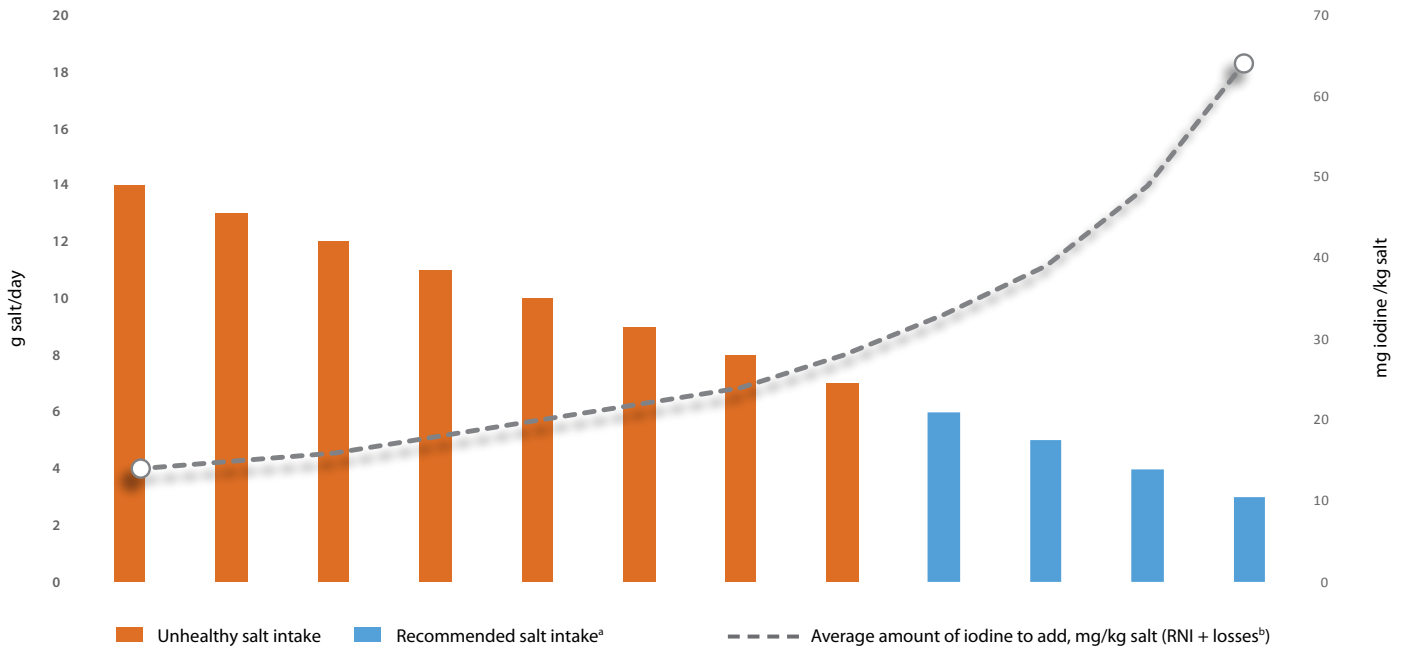
Salt iodization programmes need continual monitoring to ensure consistent delivery of iodine and to allow for adjustments in the amount of iodine added to salt in response to any documented decrease in population sodium intake. With this in mind, WHO has suggested the amount of iodine to fortify salt as per the population’s salt intake (Figure 4) (18). As countries move towards achieving dietary targets for salt intake, the concentration of iodine added to salt needs to be increased to sustain elimination of IDD.



IDD elimination and sodium reduction policies can recognize and reinforce the importance of maintaining optimal iodine levels while reducing sodium intake

Fortification of food grade salt with iodine must be appropriately regulated by governments and harmonized with other local or country programmes to ensure safe delivery within the acceptable dosage range. Particular attention should be given to identifying potential barriers to equitable access to iodized salt among all population groups (8).

Figure 4. WHO suggested concentrations for the fortification of food-grade salt with iodine



^a This includes consumption as table salt as well as salt from processed foods.

^b This fortification concentration was calculated based on the mean recommended nutrient intake of 150 µg iodine/day + 30% losses from production to household level before consumption, and a 92% iodine bioavailability.

Losses depend on the iodization process, the quality of salt and packaging materials and the climatic conditions.

Losses could vary widely and this table presents the value considering 309% losses. The monitoring of urinary iodine concentrations will allow adjustment of the selected fortification concentrations.

RNI: recommended nutrient intake, is the daily intake, set at the estimated requirement plus 2 standard deviations, which meets the nutrient requirements of almost all apparently healthy individuals in an age- and sex-specific population group.

Although iodate is more stable, either potassium iodate (KIO₃) or iodine (KI) can be used. Iodide may be used for dry, low crystal size and washed or refined salts. While iodate can be used alone and in any type of salt quality, iodide is used in very good quality salt and cannot be added alone. Therefore, some salt producers add sodium carbonate or sodium bicarbonate when they iodize salt, to increase alkalinity, and sodium thiosulfate or dextrose to stabilize potassium iodide.

Without a stabilizer, potassium iodine may be iodized to iodine and lost by volatilization from the product.

An estimated additional variability of ± 10% during iodization procedures could be considered at the production site for use in quality control and assurance procedures. This variability depends on the iodization methods used and quality assurance system in place.

FORTIFICATION OF SALT WITH NUTRIENTS OTHER THAN IODINE

Currently WHO does not recommend the addition of nutrients other than iodine to salt.

Fortification of food grade salt with iodine must be appropriately regulated by governments and harmonized with other local or country programmes to ensure safe delivery within the acceptable dosage range



WHAT CAN POLICY-MAKERS DO?

Policies on USI and sodium reduction can reinforce each other to highlight the importance of reducing the intake of sodium while ensuring iodine levels in salt remain optimal (Box 4) (19).

Box 4. Key activities to promote the joint implementation of programmes for reducing sodium intake and those for eliminating IDD through salt iodization

Coordinated policy development and implementation

- Policies to enable the adjustment of iodine concentrations considering population sodium intake
- Policies to legislate not only proper iodization of salt, but also the sodium content of processed food products
- Forums with relevant sectors of the food and catering industry, and academia

Coordinated monitoring, surveillance and evaluation

- Surveillance of population iodine and sodium intake through urinary analysis and dietary surveys
- Evaluations of national salt iodization and sodium reduction programmes
- Cross-disciplinary research programmes geared towards maximizing effectiveness of the implementation of both programmes

Coordinated communication and advocacy

- Messages and joint consumer information and materials emphasizing the importance of optimizing iodine and reducing sodium intakes
- Communications strategies to avoid inadvertent conflicting messages

Coordinated Investment

- Investment to implement the above recommendations. Financial approval for sodium reduction and fortification programmes may sit in different areas of the government. It is critical to find common goals and synergies across the health and food sectors to maximize the impact of sodium-related policies

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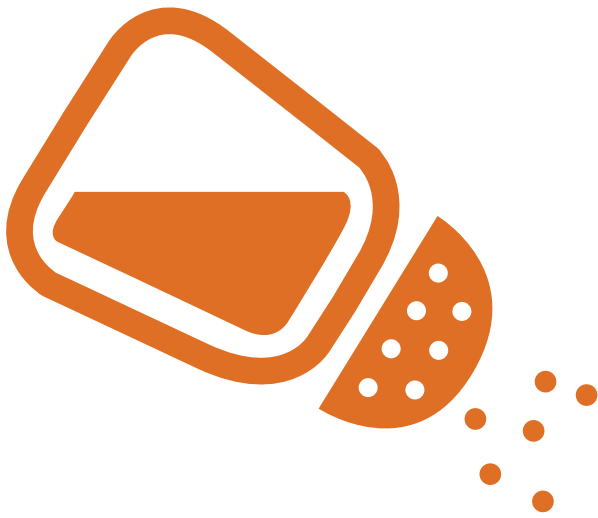
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Reduce salt intake to **less than 5 grams per day** (or a teaspoon) and always use **iodized salt**



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