

# Achieving USI in Ghana: challenges and lessons

Excerpted from: Abu BAZ et al. *Annals of the New York Academy of Sciences* 2018 Nov 29. doi: 10.1111/nyas.13988. [Epub ahead of print]

This paper reviews existing evidence on exposure to iodine in the food system in Ghana and describes policies, strategies, and programs linked with iodine nutrition in the country.

The salt iodization program in Ghana was much needed at the time of its inception in 1996. A survey had reported iodine deficiency disorders (IDD) in a third of Ghana's 110 districts. The program mandates that all salt produced, imported, distributed, and marketed in Ghana should be iodized and meet standards of quality. In addition, commercial food processors across Ghana may choose to fortify food products with iodine on a voluntary basis, by adding iodized salt as an ingredient (if the product includes salt) or including iodine in food processing, e.g., washing of grains. There is currently no national data in Ghana investigating whether a combination of mandatory and voluntary strategies may lead to iodine intakes in excess of requirement.

To identify current implementation challenges and potential risks of exposure to excess iodine, the authors of this report conducted a scoping review of policies and guidelines, a systematic review of peer-reviewed publications on fortification and iodine consumption in Ghana, and consulted with key stakeholders, including government agencies (e.g., implementing and regulatory), salt and food producers, and medical facilities. They conducted 23 interviews (17 with key public health stakeholders and six with clinical staff from three training hospitals), identified 13 peer-reviewed publications from 1998 to 2017 and additional 13 organizational reports or national surveys, and reviewed policies. Their findings are summarized below.

## A favorable policy environment

In 2005, Ghana renewed its commitment to salt iodization, and the National Food Fortification Alliance (NFFA) was formed. The 2005–2007 policy strategy set the target of reaching at least 90% of households with iodized salt. The 2009–2011 policy emphasized that USI remained a national priority, and linked USI to child survival, universal education, and the millennium development goals. The third and current policy (2016–2020) focuses on expanding production of iodized salt, improving the quality of iodization, and strengthening government commitment. It is worth noting that, although the government supports the voluntary fortification efforts of commercial food producers, there is no legislation regulating it.

## Intake of iodized condiments and iodine status

Although Ghana could meet its annual target of 5 million tons of salt, currently it averages 300,000 tons per year from 82 licensed producers. There are three types of salt producers in Ghana: (i) medium-scale salt factories, (ii) small-scale producers, and (iii) artisanal (micro) producers. Most iodized salt in Ghana is either produced by informal, small- and microscale producers or is imported. Households in rural northern Ghana commonly consume bouillon cubes, providing an estimated 88.3 (50.9–110.4) µg of iodine per day (1). The use of iodine-fortified foods may be more common in urban and peri-urban settings (*See Example 1*). Other iodine-fortified commercial products include cereals, canned tomato paste, and canned fish.

## Example 1: Iodine fortified foods

A food-based initiative, the Affordable Nutritious Foods for Women (ANF4W), is jointly implemented by the German Development Corporation (GIZ), private food processors, and the government of Ghana. ANF4W has introduced three fortified novel food products (biscuits, breakfast cereal, and hot sauce) that aim to improve micronutrient (18 minerals and vitamins, including iodine) intake among urban and peri-urban women in Ghana. The initiative has developed a micronutrient quality seal known as Obaasima (5). The new foods are available in the markets in the Brong Ahafo and Northern Regions on a pilot basis. The current implementation of ANF4W provides no incentives or subsidies for women to purchase them. However, the project embarked on demand creation activities to raise awareness and encourage repeated purchase through education and branded flyers.



A food-based initiative, the Affordable Nutritious Foods for Women, has developed a micronutrient quality seal known as Obaasima.

The government has supported small-scale salt producers to acquire technology to ensure adequate fortification using KIO<sub>3</sub>. However, in 2014 only about a third of the population were consuming adequately iodized salt (15 ppm and above). This correlates with the findings of sub-national studies, reporting varying household coverage of iodized salt. In the Volta Region, a third of salt in the markets and 21.1% in households was adequately fortified (2). In the Central Region of Ghana, studies have reported higher coverage (67%), but also greater variation in the urinary iodine concentration (UIC) among pregnant women: from 5.2 to 1165.9 µg/L, and a positive correlation between individual UIC in excess of 500 µg/L and consumption of iodized salt (3). In the Northern Region, the median UIC in school-age children was 242 (163–365) µg/L. Although this is optimal, household testing showed that 18% and 10% of these children were exposed to iodine levels in excess of 40 mg/kg from salt and bouillon cubes, respectively (1). In the Central Region, IDD prevalence was 42.5% among pregnant women. Another study found that 93.8% of children (2–10 year-olds) had a UIC <100 µg/L in the rural Eastern Region of Ghana (4).

### Other sources of iodine

Iodine content was recently measured in household water and milk products in the Northern Region of Ghana, but only negligible concentrations were found (1). Studies have indicated that fish and shellfish may be a good source of iodine, especially mackerel (4.0 µg/g) and shrimp (3.5 µg/g). High iodine intakes from saltpeter (potassium nitrate) have also been reported, which is used as a food additive.

### Advocacy and awareness about iodine nutrition

Mass media is currently one of the major sources of education for many people in Ghana. In 2014, the GHS and its partners developed a USI advocacy campaign to target consumers and address misperceptions related to iodized salt. The messages were mainly disseminated at the national level, and they did not specify the amount of iodized salt that should be consumed. Available evidence suggests that the campaign had mixed results. In the Volta Region, two-thirds of traders reported knowledge of the importance of consuming iodized salt, and 75% of households consumed iodized salt (1). However, in the Northern Region, only 20% of households reported iodized salt use. The awareness of the fortification law in both regions was low among traders and households (6).

### Challenges and barriers to USI implementation

The enforcement of the regulation on iodization is weak due to multiple factors: the activities of the small-scale artisanal producers are monitored infrequently, the cost of importing KIO<sub>3</sub> is high, the availability of iodine rapid test kits is limited and inconsistent (*See Example 2*), and there is poor enforcement of quality assurance along the value chain. In addition, while the medium-scale producers are more likely to implement quality control, a proportion of their salt is exported to markets outside Ghana. There appears to be inadequate communication and coordination between the regulators and enforcers of the iodization law. The review also highlights some misconceptions about iodine among salt producers, e.g., that the amounts of iodine occurring naturally in mined salt already meet the dietary needs, hence there is no need to fortify salt.

### Example 2:

#### Quality control and capacity gaps

In Nyanyano, a village with a cooperative of microscale producers, the government piloted a salt bank strategy to improve the quality in iodized salt. Artisanal salt produce was aggregated and iodized at centralized locations. Although the pilot was considered successful, the project was not continued due to limited funding. The high cost of the fortificant (KIO<sub>3</sub>) was a challenge. To enforce the iodization standards, the government of Ghana with support from UNICEF have provided iodine rapid test kits (iCheck™ from BioAnalyt, Germany). However, it has been challenging to ensure that they are available and used consistently by regulatory agencies to enforce the standards across all salt production and marketing stages.

### Key findings and recommendations

The authors conclude that the government support for USI, specifically financial and structural support, remains a challenge. There is a need to translate the favorable policy for controlling IDD into a functioning iodized salt production and distribution system with adequate quality control mechanisms in place. There is currently limited coordination and insufficient human capacity to reach 90% of households with adequately iodized salt. Ghana requires a renewed commitment to salt iodization through the National Salt Iodization Committee and the NFFA. All stakeholders should be brought together (government, relevant non-government and international agencies, salt producers and distributors, medical personnel, advocacy agencies and the media) to reflect on the 20 years of salt fortification implementation in Ghana.

Limited evidence suggests that there is potential exposure of households to iodine in amounts greater than 25 ppm from a combination of iodized salt and condiments at the household level. However, it is unlikely that this would result in the intake of iodine above the daily upper limit of 1100 µg. A nationally representative survey should be conducted to capture the total salt intake at the household level in Ghana. Similarly, a national survey on iodine status would capture all sources of dietary iodine (soil, processed foods, extruded snacks, condiments, and salt) and provide data on the effectiveness of the USI program throughout the value chain and identify the implementation gaps.

Future behavior change communication strategies should include specific messages to prevent overconsumption of salt in households and from commercial foods. Consumer education about the risk of excess iodine in meals prepared with condiments is warranted.

## References

1. Abizari A-R et al. More than two-thirds of dietary iodine in children in northern Ghana is obtained from bouillon cubes containing iodized salt. *Public Health Nutr* 2017, 20:1107–1113.
2. Agbozo F et al. Household and market survey on availability of adequately iodized salt in the Volta region, Ghana. *Int J Health Promot Educ*. 2017, 55: 110–122.
3. Simpong DL et al. Assessment of iodine status among pregnant women in a rural community in Ghana—a cross sectional study. *Arch Public Health* 2016, 74: 8.
4. Egbi, G. Prevalence of vitamin A, zinc, iodine deficiency and anemia among 2–10 year-old Ghanaian children. *Afr J Food Agric Nutr Dev* 2012, 12: 5946–5956.
5. Affordable Nutritious Foods for Women' (ANF4W) Brochure. Food fortification as an approach to reduce micronutrient deficiencies of women. Experiences of the develoPPP.de—Project 'Affordable Nutritious Foods for Women'. Eschborn, Germany: GIZ; 2017.
6. Chirawurah D et al. Assessing iodized salt use in rural Northern Ghana: a mixed method approach. *Food Public Health* 2015, 5: 70–76.



**A nationally-representative survey is the only way to capture regional variation in total salt and iodine intake among Ghanaian children.**