Across India, women are iodine sufficient
In 2006, UNICEF identified 16 ‘make-or-break’ countries that required additional support to accelerate their efforts towards USI. These were all major salt-producing countries but with a low coverage of iodized salt and high numbers of newborns unprotected against IDD. UNICEF estimated that, if these 16 countries achieved USI, the global household coverage of adequately iodized salt would reach 85% (1). With only 51% of households consuming adequately iodized salt in 2006 and an estimated 13 million newborns unprotected against IDD, India was at the top of this list of ‘make-or-break’ countries.

First national survey of iodine status, iodized salt, and salt consumption
Given the dramatic improvement in the quality and coverage of iodized salt in India in the past 10 years, having access to nationally and sub-nationally representative data on iodine and salt intake has become a pre-requisite for formulating new policy to ensure that the whole population is protected against iodine deficiency and to harmonize salt reduction and salt iodization strategies. In 2014, the GAIN-UNICEF USI Partnership Project provided financial and technical support for the first ever national survey to assess the availability of adequately iodized salt, nutritional iodine status (in women of reproductive age, WRA), and to estimate salt intake in India. The survey was conducted with the help of multiple stakeholders, including the National Coalition for Sustained Optimal Iodine Intake (NSOII), Salt Commissioners Office (Government of India), Ministry of Health and Family Welfare, GAIN, MI, UNICEF, WFP and WHO. The Indian Coalition for Control of Iodine Deficiency Disorders (ICCIDD, the Indian arm of the Iodine Global Network) was the lead agency and was supported by GAIN, the Statistical Services Centre (SSC), Reading University, and Nielsen (India) Pvt. Ltd.

For the purpose of collecting sub-national level data, the country was divided into six geographical “zones” (Figure 1), and each zone was divided further into rural and urban strata. Planning, implementation and data analysis were carried out from September 2014 to August 2015. The survey questionnaire had two components: a household questionnaire (administered to all households) and a questionnaire for women of reproductive age (administered to all WRA in every other household). Samples of salt used for cooking were collected from all consenting households to measure iodine levels using iodometric titration. Spot urine samples, to measure iodine and sodium levels, were collected from all consenting women from every alternate household.

Overall, 5717 household interviews were completed (response rate of 94.5%). A total of 5682 salt samples (response rate of 99.4%...
amongst those interviewed) and 2784 urine samples (response rate of 88.8% amongst those interviewed) were collected.

**Household coverage with adequately iodized salt is higher than ever**

Nationally, the household coverage with iodized salt was 92%, and 78% with adequately iodized salt (≥15 ppm). Only 14% of households were still consuming inadequately iodized salt (iodized at 5–14.9 ppm), and 8% were using salt with no detectable amounts of iodine (<5 ppm). There was significant variation in the coverage across the rural/urban strata: at the national level, 86% of households in urban areas had access to adequately iodized salt, compared with 70% in rural areas. At the sub-national level, the zones that have come closest to achieving USI are North (87% coverage with adequately iodized salt) and North-East (84%). The South zone reported the lowest coverage (62%) (Figure 2). The urban areas of the North, North-East, and Central zones have already achieved the USI target (i.e., >90% household access to adequately iodized salt). However, nationally, India has yet to achieve universal coverage.

It was reported that 67% of households were consuming refined salt, and 33% non-refined salt (including 23% consuming washed salt, 7% crystal salt, and 3% large crystal or ‘phoda’ salt). While the households consuming refined salt have already achieved USI, there is a need to ensure that all types of salt being consumed are adequately iodized. The salt industry, including salt production and iodization, should be consolidated, modernized, and mechanized.

**Urinary iodine levels reflect adequate iodine nutrition**

The median urinary iodine concentration (MUIC) at the national level was 158 µg/L among women of reproductive age (non-pregnant), reflecting optimal iodine nutrition in India. The median varied significantly between the rural (148.5 µg/L) and urban (167.9 µg/L) areas. Sub-nationally, iodine intake was found to be adequate across all zones and in both urban and rural areas. The Central zone reported the lowest median (128.6 µg/L) and the North zone reported the highest (204.0 µg/L), both well within the adequate range. The UICs showed a positive correlation with the iodine content of household salt: the median UIC was 112.4 µg/L in the households with non-iodized salt, 123.4 µg/L in the households with poorly iodized salt, and 168.4 µg/L in those with adequately iodized salt. Access to adequately iodized salt has been increasing steadily, and by as much as 7% since 2009 (Figure 3).

**Geographical and socio-economic differences**

Wide differentials in iodized salt coverage at the sub-national level remain; however, the gap in access between zones appears to be closing when compared to 2009. The South zone (comprising of states of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Telangana) continues to have below-average coverage of adequately iodized salt (62%). Similarly, there is a 16% difference between the urban and rural strata, and a 10% difference between those with the lowest and highest socio-economic strata, both of which must be bridged by designing targeted, specific strategies to enable truly universal SI coverage at the national level.

**Sodium consumption**

By measuring urinary sodium concentrations, the mean salt intake in India was estimated at 11.9 g/day, which is significantly higher than the recommended intake. 90% of respondents were found to be consuming well in excess of the 5 g/day recommendation, which is an issue that should be addressed as a priority.

*The IDD prevention program in India successfully protects women of reproductive age against the effects of iodine deficiency.*
The way forward toward achieving USI in India

As India comes closer than ever to achieving national USI and sustainable elimination of IDD, the survey provides a way forward, with the following recommendations:

1. Adopt a mission approach for greater coordination
   • Include time-bound targets at all administrative levels.
   • Strengthen national and state IDD cells of the NIDDCP:
     o Provide financial support
     o Strengthen infrastructure
     o Build human resources capacity

2. Strengthen the supply chain of iodized salt
   • Streamline policy and regulations from production to consumer level.
   • Consolidate, modernize, and mechanize the salt industry.
   • Give special focus on medium- and small-scale salt producers.

3. Strengthen the regulatory framework
   • “Zero tolerance” and punishment of violators of mandatory salt iodization.
   • Focus on effective implementation of the Food Safety and Standards (FSS) Act, 2006.

4. Quality Control of salt testing laboratories
   • Computerized Management Information System (MIS) in laboratories.
   • Stringent laboratory quality assurance programs.

5. Special focus on vulnerable groups: pregnant women and newborn children
   • Survey special populations and use targeted interventions.
   • Strengthen research.

6. Reaching the unReached
   • Use the Public Distribution System (PDS) for low-cost delivery of adequately iodized salt to marginalized populations.

7. Strengthen information, education and communication
   • Scale up behavior change communication (BCC) activities.
   • Enable communities to monitor the quality of iodized salt through salt testing kits (STKs).
   • Monitor and give regular feedback on STKs.

8. Sustain and strengthen partnerships
   • Continue engagement with development agencies.
   • Target the National Coalition and State Coalitions for high-level advocacy.

9. Track progress
   • Carry out national and state IDD surveys, especially of high-risk populations such as pregnant women and school children.
   • Encourage regular zonal reviews by the Ministry of Health and Family Welfare.
   • Encourage state and district level reviews by the respective administrative heads.

10. Sustain progress
    • Vigorously implement and regularly monitor the program.
    • Develop and achieve political resolve and agreement.
    • Strengthen the Salt Commissioner’s office and foster close collaboration with the salt industry.

References