

## PAKISTAN'S JOURNEY TOWARDS UNIVERSAL COVERAGE OF IODISED SALT: A NON-SYSTEMATIC REVIEW

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### Abstract

**Background:** Pakistan has grappled with the challenge of Iodine Deficiency Disorders (IDD) however the country has made definite strides towards addressing it. IDD is easily prevented through consumption of adequately iodized salt. This article documents Pakistan's journey on the road to achieving universal salt iodization.

**Methods:** Non-systematic review of Nutrition International's (NI) internal documents, case studies and other articles was used to assimilate findings. Additionally, Situation Analysis of the Salt Sector was also undertaken.

**Results:** There are 1,350 salt processors producing 1.12 million tonnes of salt, of which 54% is for edible purposes and 46% for industrial purposes. Small, medium and large salt processors are categorized based on the production capacities. NNS, 2018 reported a higher household coverage of iodized salt (79.6%), while urinary iodine excretion showed that 7.3% of 6-12 year children were severely deficient in iodine.

**Conclusion:** As Pakistan moves ahead in its journey towards achieving USI, it is important to understand that the focus on the program will gradually shift to sustaining USI. Hence, keeping in mind all the constraints, we need to prepare ourselves for the next stage of achieving and sustaining USI.

Keywords: Nutrium, policy, iodine, supplementation, lower middle income country

## Introduction

Iodine is an important micronutrient required for the healthy functioning of the thyroid hormones. Consequences of inadequate iodine results in mental retardation, goitre, growth retardation, defects in development of nervous system, childhood mortality; these are collectively known as Iodine Deficiency disorders (IDD). IDD can be easily prevented by ensuring that all salt for human consumption is adequately iodized. Salt is a ubiquitous vehicle which is consumed by all population in small quantities every day and is not affected by seasonality (1,2).

The prevalence of goitre dates back to 1908, it was only after 1987 that IDD was considered as a major issue (3). Pakistan as a country is considered to be severely deficient in iodine among other countries in the region and has since long been faced with the challenge of Iodine Deficiency Disorders (IDD) (4, 3). Micronutrient malnutrition is an obstacle to productivity and economic growth and continues the cycle of lowered capacity to work, poor cognitive development among other issues. These challenges predominantly perpetuate the cycle of poverty making it tougher for populations, especially those living in Asian countries (5).

To address the challenge of IDD, the Government of Pakistan (GoP) initiated the Universal Salt Iodization (USI) programme in 1994. The GoP initiated the program in a similar manner as other countries in Asia where the governments realised the importance of consuming iodized salt to address IDD challenges and took subsequent action to ensure salt was appropriately iodized (6, 7). Comparable with initiating other public health program, Pakistan also faced varied constraints like poor production capacity, irregular potassium iodate supply and weak monitoring and regulatory framework, due to which the program could not be implemented as planned (Laillou 2015).

In 2001, the National Nutrition Survey (NNS) reported that 17% households used iodized salt. This result coupled with a majority of women (76%) in reproductive age having urinary iodine excretion of <100mcg/l, which is the minimum cut-off suggested by WHO brought IDD to the forefront (8, 9, 10). Nutrition International (NI) supported the GoP in its efforts in reviving and strengthening the USI program. As a result of advocacy by NI the National Fortification Alliance (NFA) was notified in 2003 to oversee the fortification activities in Pakistan. NI is an active member of the NFA, a technical body which makes evidence based recommendations on health and nutrition policy to the GoP. NI provided support to the NFA to facilitate technical oversight and provide a national level coordination platform to the partners working in the area of fortification. NI dedicated its efforts towards strengthening the policy and regulatory frameworks, capacitating the government to undertake monitoring and enforcement. Alongside, the salt processors were also provided technical assistance to adequately iodize salt using appropriate technology and iodization methods.

Consistent efforts of NI and other partners along with the government have resulted in the increase in household coverage of iodized salt (11). This article documents Pakistan's journey on its path towards achieving USI.

## Methodology

A non-systematic review of NI's internal documents, case studies and other studies/ articles have been used to assimilate the findings. The NNS undertaken by the GoP assessed the coverage of household level of iodized salt and median urinary concentration among women in reproductive age which is taken as a proxy for understanding the population level iodine nutrition levels.

Furthermore, to understand the progress made in the salt sector, NI undertook a Situation Analysis of the Salt Sector in 2018. The analysis included a complete inventory of small, medium and large scale salt processors in the country along with documenting their capacity and iodization levels across the country.

## Results

Pakistan has 1350 salt processors across the country producing 1.12 million tonnes of salt (12). Of this total production, approximately 54% is used for edible purposes while the remaining 46% is used for industrial purposes including livestock feed. Though there is a reduction in the total annual salt production from 1.3 million tonnes, the percentage of salt for edible purposes has increased to 0.6 as compared to 0.55 million metric tonnes in 2010. For the analysis, salt processors were categorised as small, medium and large based on the production capacities of less than 50 MT/month, more than 50-100 MT/month and more than 100 MT/ month respectively (12).

In the NNS 2011, 67% of women mentioned iodized salt as the major source of iodine, higher in urban than rural areas. Of these mothers, only 64% did not know of the effects of iodine deficiency on health. The household level usage of iodized salt was 69%, using Rapid Test Kits. At the national level, the Urinary Iodine Excretion of women and children (6-12 years) was found to be adequate though there were some provincial differences (13).

The NNS 2018, reported that at the household level, the usage of iodized salt was 79.6%. The provinces of Sindh and Punjab, The Azad Jammu Kashmir, Islamabad Capital Territory and Gilgit-Baltistan reported more than 70% households using iodized salt while in contrast it was only 31.6% in Khyber Pakhtunkhwa-newly merged districts. Urinary iodine excretion is an indicator of iodine nutrition in the body, among 6-12 year old children 7.3% were severely deficient. There was a difference observed among the gender, where prevalence of iodine deficiency was more among girls (16.2%) than boys (15.2%). Rural areas (16.9%) were more prone to iodine deficiency than urban areas (14%) (11).

## Discussion

USI has been recommended and adopted by countries as a strategy to address the challenges of IDD (10). A review undertaken by Khattak et. al, revealed that prior to 1994, a small number of studies reported varied prevalences of goitre/ iodine deficiency. (14). The GoP and NI were committed to improving the iodine nutrition of the population. Understanding the challenges related to the initiation of and implementation of the salt iodization program, NI used a dual approach to address this issue; from the side of the government and from the production side based on the loopholes identified from the landscape analysis which was done as the first step.

NI is the only partner who currently supports the GoP in achieving its goal of USI. As a first step, NI worked with the government to strengthen its policy and regulatory framework. NI provided technical assistance to the NFA to introduce laws for fortification of foods including salt as part of the Food and Safety Laws under the Provincial Food Authorities. The Womens' Caucus parliamentarians' focuses on nutrition and women's health, NI used this as an opportunity to sensitize them to the consequences of IDD and importance of consumption of iodized salt. Post adoption of the USI program in 1994, 36 studies in addition to the two national nutrition surveys revealed a prevalence of goitre/ iodine deficiency (14). Though the 1985 national nutrition survey did not provide data on the high goitre situation, the NNS 2001 still reported a very low percentage of households consuming iodized salt (15).

The parallel approach adopted was to capacitate the salt processors; right from appropriate iodization techniques and equipment to establishing internal quality control (QC) systems, NI's field staff has been instrumental (16, 1). The work started in Khyber Pakhtunkhwa province and gradually progressed across the country (14). NI organized regular trainings for salt processors to train them on correct techniques to iodize the salt along with the suitable equipment. NI field staff routinely visited the salt processors and provided them on-the-job support to iodize salt. NI also supported the processors in undertaking technological upgradations, which eventually resulted in improving the quality and quantity of iodized salt. Processors also maintained adequate iodization through routine sampling and testing of the salt in their processing units, this was also taught as part of the trainings conducted by NI. Most salt processors started using Rapid Testing Kits (RTK) to test iodine content of salt, these are also provided by NI. This concentrated effort coupled with the robust monitoring of the production process by NI's field staff could be the reason for the increase in the quantity of iodized salt for edible purposes. These efforts could be correlated to the increased household consumption of iodized salt from 17% to 69% to 79.6% (15, 13, 11). These also relate to the improvements in the urinary iodine excretion of children under 5 years and women in reproductive age (Fig 1).

Countries in Asia, laid down the objectives and detailed plan of implementation and saw a gradual improvement in the consumption of iodized salt at the household level (3, 17, 18). A crucial component of salt iodization is the uninterrupted and regular supply of potassium iodate for salt iodization. Salt can be fortified with iodate or iodide, however iodate is the preferred choice since it is most stable and less soluble (19). Pakistan imports potassium iodate (KIO<sub>3</sub>) and had an irregular supply chain. However, the price of KIO<sub>3</sub> depends on the price in the international market as well as the cost to import the

product. Additionally, KIO<sub>3</sub> is sold in 25kg drums. All of these factors, made it difficult for small and medium scale processors to access KIO<sub>3</sub> and since 75% of the salt processors are small and medium scale, it resulted in a large quantity of salt being inadequately or un-iodized (12). As part of the USI program, the GoP along with NI and other partners innovated the 'Revolving Fund', a supply chain mechanism through which KIO<sub>3</sub> could be accessible and affordable to all salt processors. NI and other partners provided the initial seed funding for purchase of the KIO<sub>3</sub>, which was then repackaged into 1kg bags and sold to salt processors. This demand and supply mechanism of the revolving fund has helped to ensure a sustainable supply of KIO<sub>3</sub> to all salt processors on a cost to cost basis (20).

A successful USI program is one where the government has a monitoring mechanism and enforces regulations as per the policy (18, 8). NI capacitated food safety officers (FSO) and community health workers to collect, monitor and test salt samples and enforce food/ salt law. Routine trainings for the laboratory personnel at the Quality Control Laboratories (QCL) were conducted in appropriate methods to test iodine content in salt. FSOs submit the salt samples collected as part of their routine monitoring to one of the 89 QCL labs, resulting in systematic and regular testing of salt samples. The QA in these laboratories was regularly monitored by NI field staff. The results from these collected samples are routinely shared with NI field staff and FSOs. The government thus started better monitoring and enforcing, which in turn ensured that salt processors adequately iodized salt.

Another component of a successful program, is reviewing and course correcting it on a periodic basis. Setting up competent quality control and quality assurance system is an integral part, and a cascading mechanism is used to review the program from the district to province to the national level (18). These meetings include government stakeholders at each level, the data collected during the routine monitoring by FSO, NI field staff and from the QCL are presented, discussed and appropriate course corrections are made. District and province reviews were conducted where the information was collated and then presented at the annual national level review. The data on iodine content of salt was further analysed and feedback was provided to the GoP during the annual reviews. This feedback loop ensured that appropriate actions were taken.

In addition to this feedback loop for course correction, NI has continued to advocate at the national and provincial level which helps in expediting the process of either mandating salt iodization in provincial assemblies or ensuring it is included as part of the fortification laws as proposed by Provincial Food Authorities.

However, despite the gains made at the household level usage of iodized salt, the progress on the side of the industry has been slow. Our analysis revealed that 75% of salt processing units are small scale and 11% medium scale and 14% large scale. Most of small scale units use rudimentary techniques to iodize salt. Ensuring that household usage of iodized salt is sustained and improved upon, focusing on mechanization of the industry is equally important. NI has been working towards the consolidation of the small scale processors. Consolidation is done in the way of encouraging small scale processors to sell raw salt to medium/ large scale processors as well as become sellers of iodized salt for medium/large scale processors in the market. This process is still in its nascent stages and a lot more ground work needs to be covered before the industry is consolidated.

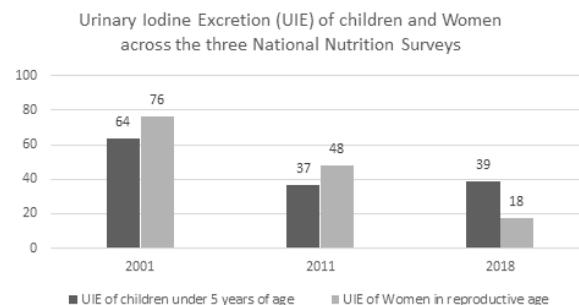
**Conclusion**

As Pakistan that the focus on the program will gradually shift to sustaining USI. Learning lessons from Vietnam, where the rise and fall of USI programs was observed, it is important to understand that sustain commitment and vigilance on part of the authorities and processors is essential in order to sustain and achieve USI (18). Sustainability is being free of any financial assistance from other stakeholders, the government and industry is able to ensure that the program functions smoothly and program indicators are tracked periodically and appropriate course corrections are made. Salt iodization is a successful partnership between the private and public sectors, where the government will work towards guaranteeing a suitable policy and regulatory environment while the industry follows the law and ensures demand and supply of iodized salt.

In Pakistan, NI will work with the GoP, NFA and Provincial Food Authorities to ensure the country moves achieves and sustains USI. NI has made specific recommendations for program, policy and technical assistance to salt processors to make the program sustainable (21). It is

widely known that sustaining a public health intervention is often more challenging than initiating or implementing one. Hence, keeping in mind all the constraints, we need to prepare ourselves for the next stage of achieving and sustaining USI.

**Figure 1**



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