

Tackling iodine deficiency in Lebanon through knowledge and partnership¹

by Dr. Omar Obeid and Charles Wakim at the American University of Beirut.

A critical public health issue

Lebanon, a country grappling with economic and public health crises, faces additional hurdles in addressing iodine deficiency. The health and well-being of children, already under strain due to malnutrition and economic instability, is further threatened by the population's lack of access to adequately iodized salt. While this simple, cost-effective solution has been highly successful globally, its implementation in Lebanon faced critical gaps. This article outlines the process of improving the situation, from discovering the need for action to a year-long program of improvement.

Understanding the problem

The Lebanon Integrated Micronutrient, Anthropometry, and Child Development Survey (LIMA-2023) was carried out to improve understanding of the nutritional challenges faced by the population and covered a nationally representative sample of 6,400 households. Data collected included urinary iodine concentration (UIC) to assess population iodine intake.²

The survey's findings placed Lebanon at the lower edge of iodine sufficiency, highlighting an urgent need for equitable access to iodized salt and targeted action. Less than half (49%) of households

consumed salt with any meaningful iodine content (≥ 15 ppm iodine ~ 25ppm potassium iodate), and only 8% of salt met the national standard of 36 ppm of iodine (60.7 ppm potassium iodate). 35% of households used salt with no iodine at all.

Iodine status (median UIC) was adequate with 131 $\mu\text{g/L}$ among adolescent girls, 108 $\mu\text{g/L}$ for non-pregnant non-lactating women, and 149 $\mu\text{g/L}$ for pregnant women.

Households consuming non-iodized salt or salt with insufficient amounts of iodine showed iodine deficiency among non-pregnant non-lactating women (82 and 98 $\mu\text{g/L}$) respectively. Vulnerable groups, particularly pregnant women were iodine deficient, raising concern over risks to fetal brain development. Rural areas and low-income households were disproportionately affected.



Testing salt at the Lebanese Pearl Food factory

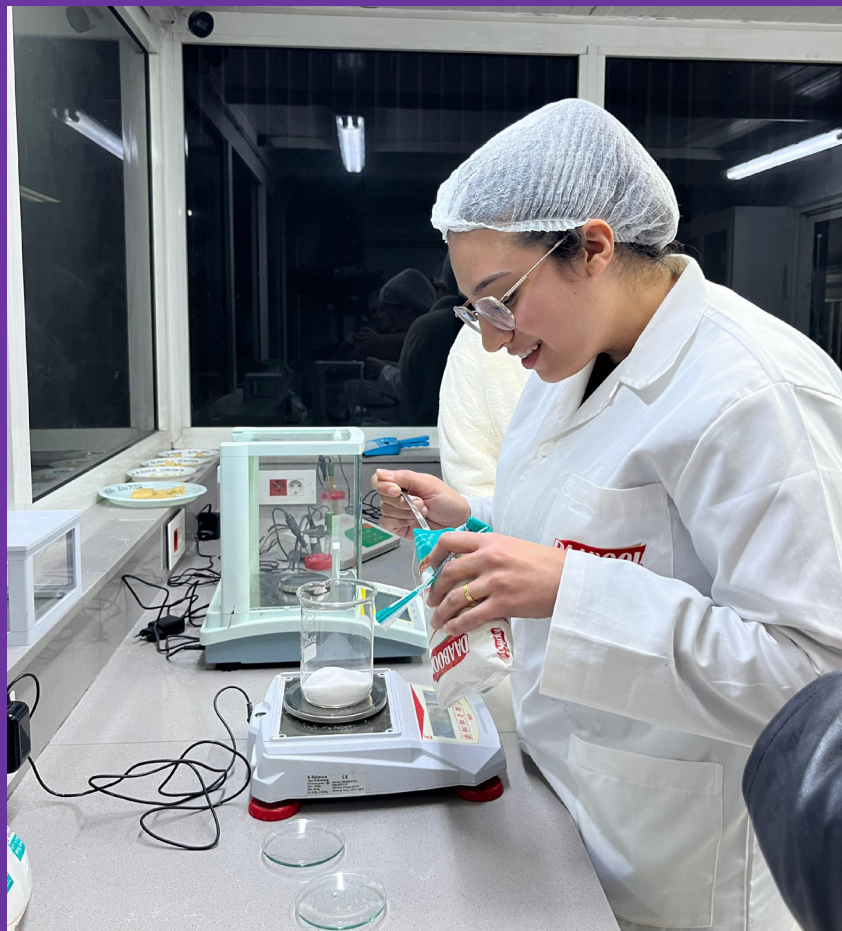
Overall, the survey showed that while progress had been made in some areas, large segments of the population were being left behind, uncovering an urgent need for targeted interventions to ensure that Lebanon's population especially pregnant women and children, receives sufficient iodine to avoid long-term health impacts.

Lebanon's salt iodization program

Lebanon introduced salt iodization laws in the 1990s, mandating minimum iodine levels in table salt, but implementation has been uneven. The survey drew attention to several systemic barriers to effective iodization:

- **Economic instability:**
The ongoing economic crisis has disrupted supply chains, making it difficult for salt producers to source and use potassium iodate.
- **Regulatory gaps:**
Weak enforcement of iodization laws has allowed substandard products to dominate the market, undermining public health efforts.
- **Public awareness:**
Many consumers remain unaware of the importance of iodized salt, often opting for non-iodized alternatives such as coarse salt and Himalayan pink salt.

The study also showed significant potential for progress, concluding that with renewed commitment from policymakers and international support, Lebanon could revitalize its salt iodization program. Investments in quality control, monitoring, and public education can help ensure that every household has access to adequately iodized salt.



Testing salt at the Lebanese Pearl Food factory

A turning point

In early 2024, iodized salt supply in Lebanon was very irregular and often fell below the national standard, as borne out by the results documented in the LIMA-2023 survey. In response, IGN, UNICEF and AUB, together with the Ministry of Economy and Trade (MoET) and the Ministry of Public Health (MoPH) launched an effort to revitalize Lebanon's salt iodization program in early 2024, a turning point in Lebanon's iodine strategy.

Since then, there has been significant progress.

Capacity building

Salt producers and government inspectors were trained on iodization techniques, internal lab setup, and titration methods for potassium iodate quantification, equipping them with practical skills and technical knowledge to ensure consistent salt iodization. The training also fostered trust and accountability between the public and private sectors.

Standardized Operating Procedures (SOPs):

IGN, in collaboration with AUB, UNICEF and ministry partners, developed a full set of SOPs tailored to Lebanon's salt industry, outlining precise steps for salt iodization, laboratory testing, internal record-keeping, and regulatory inspections. The SOPs were officially introduced during the December

2024 national workshop and adopted by all parties. Their implementation has brought consistency, traceability, and a clearer enforcement framework.

Joint factory visits:

Twelve monthly field visits were conducted in partnership with the two government ministries. Salt samples were collected and tested on-site and at AUB's iodine lab (part of the external quality assurance program run by CDC-US (EQUIP), and feedback was provided to factory owners. Joint visits allowed for coaching and technical troubleshooting in real time, leading to immediate correction of errors. These visits helped transform factory practices and progressively improve iodine levels in salt.

Improved coordination:

The program fostered stronger collaboration between the Ministries of Economy and Trade, Public Health, clarifying roles and ensuring more efficient enforcement of salt iodization regulations. Shared monitoring tools and joint communications made inspection efforts more coherent. This institutional alignment is key to the program's long-term sustainability.

Public communication efforts

raised awareness about the importance of iodized salt, encouraging consumer demand and industry compliance within the December 2024 training.

Progress

Over the course of the program, all three major salt producers substantially improved their iodization processes. One producer, which had completely stopped iodized salt production due to lack of potassium iodate and outdated equipment, resumed operations mid-year with external support,

training, and facility renovations. A second who initially repeatedly fell short of standards but eventually achieved compliance through process refinements and tighter lab control. A third producer made consistent progress and was the first to meet national standards, having already implemented in-house testing and applied the SOPs rigorously as soon as they were shared. These varied trajectories underscore the importance of tailored support, persistence, and public-private collaboration in achieving universal salt iodization.

In parallel with factory-level improvements, the program established a key partnership with the Chamber of Commerce, Industry, and Agriculture in Tripoli, the area where all processors are based, to institutionalize quality control. The Chamber now performs potassium iodate quantification by titration to producers

more cost-effectively and with a faster turnaround time than the previous supplier. This improved access to affordable, reliable testing for producers and helped embed QA/QC functions within local infrastructure. It also decentralized monitoring capacity and building sustainability into Lebanon's salt iodization efforts.

Over the course of 12 months, the program included routine and unannounced visits to Lebanon's main salt production facilities. Initial tests showed widespread non-compliance, with potassium iodate concentrations falling well below the required range of 60–80 ppm. As monitoring and technical support intensified, individual factories began improving their iodization practices—first inconsistently, then more systematically. By January 2025, for the first time, all three factories were producing salt within the legal iodine range, marking a milestone in the program's implementation.



Testing salt at the Roi de Sel factory

Month	Factory A	Factory B	Factory C	Notes
(Potassium Iodate Levels)				
March 2024	05.0 ppm	29.0 ppm	36.1 ppm	All factories below legal limit (60–80 ppm Potassium Iodate)
April 2024	11.6 ppm	03.6 ppm	48.1 ppm	All factories below legal limit (60–80 ppm Potassium Iodate)
May 2024	36.5 ppm	64.1 ppm	54.3 ppm	All factories below legal limit (60–80 ppm Potassium Iodate)
June 2024	53.1 ppm	08.9 ppm	42.8 ppm	All factories below legal limit (60–80 ppm Potassium Iodate)
July 2024	60.6 ppm	28.5 ppm	39.2 ppm	Only Factory A compliant
August 2024	–	19.0 ppm	69.5 ppm	Only Factory C compliant
September 2024	20.5 ppm	26.7 ppm	74.8 ppm	Only Factory C compliant
October 2024	12.5 ppm	17.8 ppm	60.6 ppm	Only Factory C compliant
November 2024	41.0 ppm	96.2 ppm	64.1 ppm	Only Factory C compliant
December 2024	37.4 ppm	62.4 ppm	78.4 ppm	Factories B and C compliant
January 2025	65.0 ppm	76.6 ppm	73.9 ppm	All factories fully compliant
February 2025	69.5 ppm	64.1 ppm	78.4 ppm	All factories fully compliant

As a result, the three Lebanese salt processors: **Lebanese Pearl Food Co.**, **SORASEL**, and **Roi du Sel** have successfully and consistently produced adequately iodized salt, meeting national standards. The program has also reinvigorated Lebanon’s commitment to iodine nutrition as a public health priority. (Source: Monthly bulletins, 2024 to 2025).

Sustaining the gains: 2025 Plans for institutionalization and scale-up

Transitioning monitoring to national institutions

The focus in 2025 has shifted toward institutionalizing salt iodization oversight within Lebanon’s regulatory framework. IGN and AUB continue to support MoET and MoPH through bi-monthly joint QA/QC visits to all major salt producers. These visits aim not only to monitor iodine levels but also to continuously mentor government inspectors in applying SOPs and conducting tests.

Validating laboratory capacity

To ensure long-term sustainability, the Chamber of Commerce laboratory in Tripoli, already providing potassium iodate quantification by titration, will undergo formal cross-validation in 2025. AUB, Institut National de Recherche Industrielle (IRI), and the Chamber of Commerce, Trade and Agriculture in Tripoli labs will each analyze a set of 15 matched samples to assess consistency and reliability across labs. A summary memo will be issued to confirm the labs’ technical capacity.

Continued technical assistance to salt producers

In addition to regulatory monitoring, IGN and AUB will continue technical field visits to salt factories, focusing on applying SOPs, strengthening internal quality control procedures, and evaluating the performance of internal testing. A final status report will document progress across all factories, identifying any remaining technical gaps to be addressed in the transition plan.

Strengthening coordination and visibility

2025 will also see efforts to consolidate multi-stakeholder collaboration. Two national coordination meetings—planned for August and November—will bring together salt producers, inspectors, ministry officials, and laboratory partners to review progress and align on next steps. A visual relationship map and strategic brief will be produced to guide long-term roles and accountability.

Complemented by strategic stakeholder events and a dissemination plan, this advocacy tool aims to secure broader public and political support.

Toward a sustainable transition

The final milestone for 2025 is the development and dissemination of a sustainability roadmap for 2026 and beyond. A high-level meeting will convene representatives from MoPH, MoET, and the Ministry of Industry to formally endorse the transition strategy. This roadmap will outline agreed roles for government institutions, ensuring the QA/QC system can function independently and that the gains of the past

two years are protected. With this transition, Lebanon moves closer to full national ownership of its salt iodization strategy, and one step nearer to eliminating iodine deficiency for good.

A healthier future within reach

While there has been substantial progress, continued momentum is critical. Recommendations for sustained impact include:

- Strengthening enforcement of iodization laws and expanding subsidies for potassium iodate.
- Generalizing iodization laws to include the use of iodized salt in processed foods.
- Scaling up monitoring and quality assurance at both production and retail levels.
- Expanding public education campaigns, especially in underserved communities.
- Fostering ongoing collaboration with development partners, salt producers, and civil society.

The LIMA-2023 survey exposed widespread iodine deficiency and major gaps in salt iodization across Lebanon. In response, 2024 marked a transformative year for the country's Universal Salt Iodization Program, with major strides made in standardizing practices, improving factory compliance, and rebuilding regulatory systems. Through sustained technical support, factory visits, SOP development, and cross-sectoral engagement, Lebanon demonstrated that coordinated, data-driven action can yield measurable improvements in public health.

With a clear roadmap for 2025, efforts are now focused on transitioning quality assurance responsibilities to national institutions, validating local laboratory capacity, and reinforcing stakeholder accountability. By embedding these systems into the fabric of public health infrastructure, Lebanon is setting the foundation for long-term success.

The path forward is clear. With continued political will, institutional collaboration, and public awareness, Lebanon can eliminate iodine deficiency as a public health threat, ensuring that future generations are protected from preventable cognitive and developmental harm. The tools are in place, the momentum is strong, and the opportunity is within reach.



Testing salt at the Roi de sel factory

Figure 1. Prevalence of household with adequately iodized salt

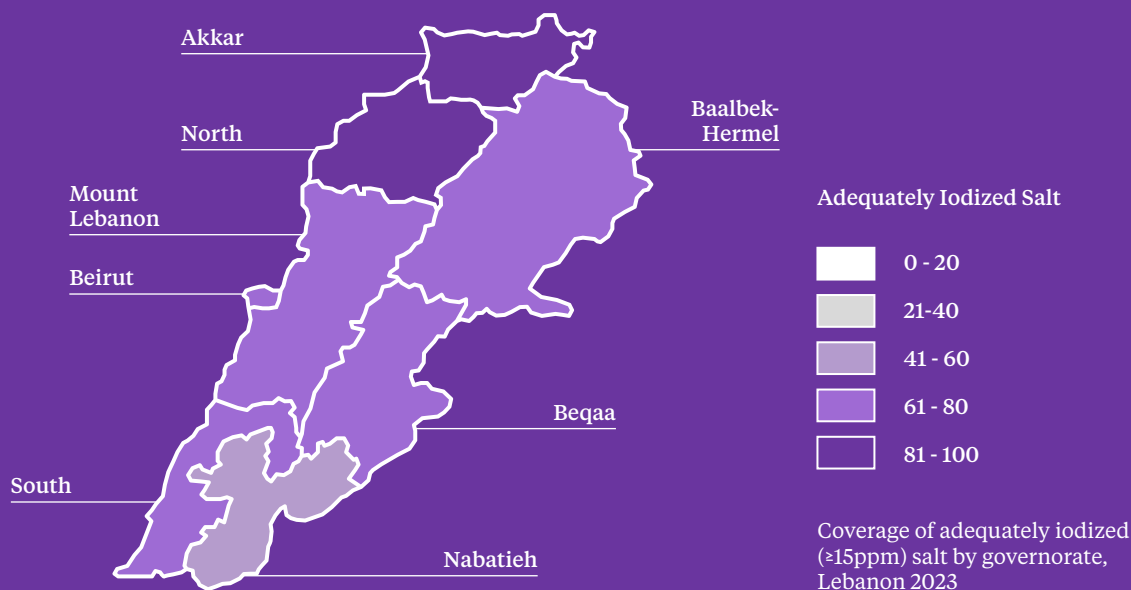
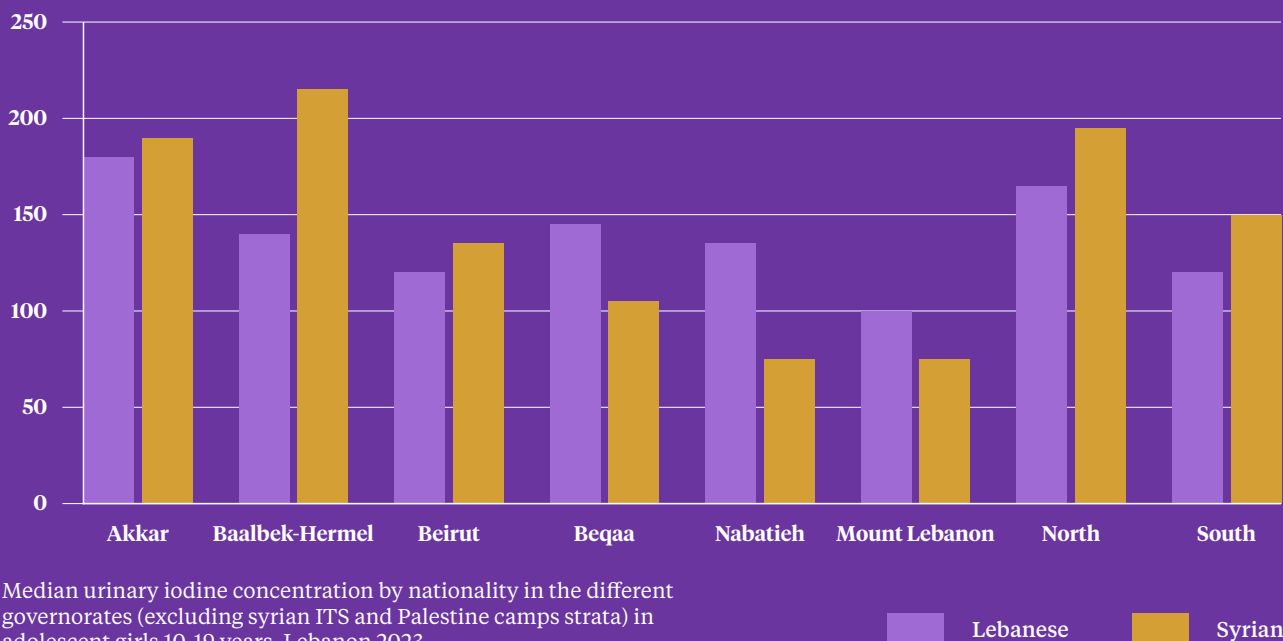


Figure 2. Median urinary iodine concentration by demographic group



References

1. Iodine Global Network (IGN), UNICEF, and the American University of Beirut (AUB), in close collaboration with the Ministries of Economy and Trade (MoET) and Public Health (MoPH).
2. Ministry of Public Health (MoPH) in collaboration with the American University of Beirut (AUB), GroundWork, United Nations International Children Fund (UNICEF), Mercy-USA, the Lebanese Humanitarian Fund, the United Nations World Food Programme (UN-WFP), the Harvard T.H. Chan School of Public Health. UNICEF Lebanon. LIMA Final Report. 12 Sept. 2024, <https://www.unicef.org/lebanon/reports/the-unseen-crisis>

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