

## Twenty two years of IDD elimination efforts in Sudan: An alternative approach for national USI legislation is needed

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*This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.*

### Abstract

The aims of this paper are (1) to review the progress made in Iodine Deficiency Disorders (IDD) control in Sudan since 1989, and (2) to propose an alternative approach for national USI legislation in Sudan. Although three federal ministerial decrees requiring salt manufactures to fortify all edible salt with Iodine and three states have laws prohibit selling of non-iodized salt in their jurisdictions. But none of these decrees and laws implementation was enforced. Utilization of existing National Standardization and Metrology Law (2008), National Public Health Law (2008), and Food Inspection Law (1973) provide legal frame for this alternative approach. Collaboration between MOH and SSMO to issue a national compulsory salt specification and develop monitoring and surveillance systems is highly recommended

**Keywords:** Sudan, Universal Salt Iodization, Iodine Deficiency Disorders, USI legislations.

### 1. Introduction

Elimination of iodine deficiency contributes to six of the eight Millennium Development Goals (MDGs) agreed by UN Member States in 2000 (UNICEF, 2008). It is not only a public health problem, it is also a development issue which has social and economic consequences. UNICEF estimated that more than 38 million newborns every year in developing countries are unprotected from the lifelong consequences of brain damage associated with iodine deficiency disorders (IDD) (UNICEF, 2008). The mean IQ score for iodine deficient children is 13.5 IQ points below that of the non-iodine deficient groups as many studies confirm (Delange & Hetzel, 2004; Hetzel, 2004). Also IDD increases the risk of cretinism, stillbirth, miscarriage and infant mortality (Delange & Hetzel, 2004).

Since 1994, WHO and UNICEF Joint Committee on Health Policy recommends the Universal Salt Iodization (USI) strategy to ensure sufficient intake of iodine by all individuals as a remarkably cost effective public health strategy (Mannar, 2004; WHO, UNICEF, & ICCIDD, 2007). In 2008, UNICEF estimated that almost 70% of the world's human and livestock salt is iodized (Mannar, 2004), compared to the situation in the early 1990s where less than 20% of households in the developing world were using iodized salt (UNICEF, 2008).

Around 120 countries were implementing salt iodization programmes in 2006 (UNICEF, 2008). In the Middle East and North Africa (MENA) region only three countries have achieved the goal of universal salt iodization; the Islamic Republic of Iran, Lebanon and Tunisia ("Global Scorecard 2010," 2010). More than 50% of households are consuming adequately iodized salt in six countries; Algeria, Egypt, Jordan, the Occupied Palestinian Territory, Oman and the Syrian Arab Republic. Sudan, Iraq and Yemen remain with challenges ("Global Scorecard 2010," 2010; UNICEF, 2008).

### 2. Objectives

The aims of this paper are (1) to review the progress made in IDD control in Sudan since 1989, and (2) to propose an alternative approach for national USI legislation in Sudan.

### 3. Design

This study was based on the revision of officially published and unpublished data about IDD/USI situation in Sudan and our understanding of Sudan legislation and policy environment.

#### 3.1. Setting

National IDD/USI Control Programme in Sudan.

### 4. IDD situation in Sudan

Administratively, Sudan is governed by a decentralized federal system. The signing of the Comprehensive Peace Agreement (CPA) by the Government of Sudan and the Sudan People's Liberation Movement (SPLM) on 9 January 2005 ended the last civil conflict in the South that started in 1983(The Comprehensive Peace Agreement between The Government of The Republic of The Sudan and The Sudan People's Liberation Movement/Sudan People's Liberation Army, January 2005). Accordingly a new country is formed by the separation of the Sudan ten Southern states to become an independent state on 9 July 2011 named officially Republic of South Sudan. This is important because most report discusses Sudan situation as North Sudan and South Sudan due to the armed conflict in the South(Gaffar & Mahfouz, 2011). This paper will discuss the situation in Sudan (previously known as North Sudan).

The IDD Control Program in Sudan started in October 1989 and the country adopted Universal Salt Iodization (USI) as the long-term national strategy in 1994("Global Scorecard 2010," 2010). According to the WHO/UNICEF/ICCIDD recommendation, the median Urinary Iodine Concentration (UIC) of 100 – 199 µg/L indicator adequate iodine nutrition(WHO, et al., 2007). In a sub national sample in 1997, the median UIC ranged from 19.9 µg/L in Darfur zone to 97.9 µg/L in Eastern zone. The percentage of population with UIC below 100 µg/L ranged from 97.8% in Upper Nile zone to 52.0% in Eastern zone(Mohan, 2005). In 2006, a national survey showed that the overall median urinary iodine concentration was 65.5 µg/L, with the lowest median value found in Kosti city (27 µg/L), situated in the centre of the country, and the highest (464 µg/L) in Port Sudan, on the Red Sea coast(Izzeldin, Crawford, & Jooste, 2007; Medani, Elnour, & Saeed, 2011). These reports reflect that some population groups still suffer from iodine deficiency while others may face the risk of excessive iodine intake. This also indicates the crucial role of iodine nutrition status surveillance in protecting the population from both deficiency and adverse consequences of excessive iodine intake.

The Total Goiter Rate (TGR) increased from 22.0% in 1997 to 38.8% in 2006 (6, 10, 11). In 2006, a national study showed that the prevalence of TGR reached 38.8% and ranged from 12.2% to 77.7%(Medani, et al., 2011).

Only less than 0.6% of households were consuming iodized salt in Sudan in 2000 ("Multiple Indicator Cluster Survey (MICS)," 2001), while in 2005, 10.0% of households in Sudan were using adequately iodized salt (>15 parts per million-ppm) with wide variation between states(Gaffar & Mahfouz, 2011; "Sudan Household Health Survey (SHHS)," 2006).

The total salt requirement in Sudan in 2007 is estimated at 165,000 Metric Tons (MT). The bulk of Sudan's required salt (>90 per cent) is produced by solar evaporation of Red Sea brine in Red Sea State by 18 salt units. Only one salt refinery produces approximately 3,000 MT of iodized salt. In addition, a small quantity of iodized salt is imported from Saudi Arabia, Turkey and countries in the Middle East(UNICEF, 2007).

### 5. USI related legislations in Sudan

Sudan national IDD Control Program started in October 1989 by using Lipiodol in some highly endemic regions of the country. In 1994 the country adopted salt iodization as the long-term national strategy(Mohan, 2005). Since 1994, three federal ministerial decrees were issued by the Federal Ministry of Health requiring salt manufacturers to fortify all edible salt with Iodine. These decrees were issued in 1994, March 1995, and July 2003 under the Public Health Act of 1975(Bani, 2007). Many attempts were done from the national nutrition department to issue national law for food fortification and salt iodization. But none of these attempts succeeded. Almost all federal ministerial decrees emphasized:

- Fortification of all edible salt with Iodine both for human and animal consumption so as to conform to the norms prescribed by the National Nutrition Directorate;
- All salt producers should adopt and launch salt iodization for all salt produced locally for human and animal consumption; and

- All related Ministries and Government Institutions should be involved in Universal salt iodization to ensure the success of the strategy(Bani, 2007).

The last ministerial decree has prescribed iodization at a level of 30 ppm Iodine, using Potassium Iodate or Potassium Iodide(Bani, 2007; Mohan, 2005).

Also, three states namely South Darfur, West Darfur, and Sinnar succeeded to pass laws that prohibit selling of non-iodized salt in their jurisdictions. State ministries of health and health authorities at locality level are responsible for the enforcement and implementation of these laws.

## 6. Discussion

After more than 22 years from the establishment of IDD Control Programme and 17 years of adoption of USI strategy, MOH failed to issue a national salt iodization law that prohibit selling non-iodized salt and enforce salt manufacturers to fortify salt with iodine(Bani, 2007; Izzeldin, et al., 2007; Medani, et al., 2011; Mohan, 2005). This situation reflects low policy maker awareness and weak political commitment and the need for concrete advocacy and communication strategy to create demand for iodized salt and proper monitoring.

USI legislations regulate salt fortification with iodine, quality control system at production sites, entry port, community level and surveillance of iodine nutrition status in the population. Failure of monitoring of salt quality may put the population at risk of excessive iodine intake, as demonstrated among schools children in Port Sudan in Red Sea State(de Benoist, McLean, Andersson, & Rogers, 2008; Izzeldin, et al., 2007; Medani, et al., 2011; Mooij, de Wit, & Drexhage, 1994).

Although three federal ministerial decrees requiring salt manufactures to fortify all edible salt with Iodine and three states have laws that prohibit selling of non-iodized salt in their jurisdictions. But none of these decrees and laws implementation was enforced. As a result of that the IDD situation in Sudan is deteriorating as shown by declining population median UIC and increasing TGR(Bani, 2007; Medani, et al., 2011).

As many developing countries Sudan health system resources is not sufficient to provide basic curative health care. Lack of human and financial resources and competing priorities for population health needs specially management and prevention of communicable diseases hamper the implementation and enforcement of such laws by MOH.

For these reasons utilization of another alternative approach is proposed here. Instead of struggling to issue new salt iodization law by MOH, it is better to utilize the existing national laws. Many IDD control programmes in the region have only utilized Standardization and Metrology agencies for implementation of USI with notable success as in Saudi Arabia, Oman, Kuwait, UAE and other countries("Food Grade Salt," 2007). Utilization of the National Standardization and Metrology Law (2008)("Sudan National Standardization and Metrology Law ", 2008), National Public Health Law (2008)("Sudan National Public Health Law ", 2008), and Food Inspection Law (1973)("Sudan Food Inspection Law," 1973) will be an effective and efficient alternative approach. Food inspection law provide the authority for all concern governmental agencies including health, veterinary, agriculture, custom and municipality the right to inspect any food material and take the corrective actions in needed("Sudan Food Inspection Law," 1973). The Public health law state the right of concern agencies mainly Ministry of Health to implement needed health protective, preventive and promotion measures("Sudan National Public Health Law ", 2008) . The Standardization and Metrology Law provide legal authority and resources to SSMO as the agency concern with issuing and monitoring all standards and specification in all fields("Sudan National Standardization and Metrology Law ", 2008).

Ministry of Health can work in collaboration with Sudan Standardization and Metrology Organization (SSMO) to issue a national compulsory salt specification with only potassium iodate to facilitate programme monitoring. It is better to work to issue and implement one national approach instead of many states level laws. SSMO has the authority and resources all over the country to enforce the implementation of the national compulsory salt specification at production sites, ports, and markets (Box 1).

Box 1: Comparison between existing and proposed USI legislation approaches

Existing approach (try to issue new Salt Iodization/food fortification Law)	Proposed approach (utilization of existing laws and agencies)
<ul style="list-style-type: none"> <li>- Issuing new national laws takes very long time and involves complicated process with technical personnel, legislators and politicians (took 17 years in our case without success).</li> <li>- Any law requires resources for implementation and enforcement. Ministries of Health don't have these resources and already have competing priorities in developing countries.</li> <li>- No resources assigned for enforcement of already issued federal ministerial decrees and state laws.</li> <li>- The salt manufacturers and some politicians resist the proposed salt iodization law.</li> </ul>	<ul style="list-style-type: none"> <li>- Issuing national compulsory salt specification by SSMO under the National Standardization and Metrology Law is a pure technical issue and will take a shorter period.</li> <li>- Advocacy of communication efforts of the IDD programme can be more focused to convince SSMO leaders about the need for this compulsory specification.</li> <li>- SSMO have the required resources to implement and enforce the compulsory specification. No competition of priorities exists because this is the domain of the agency work.</li> <li>- SSMO works at the entry points, manufacturer, and market level.</li> <li>- This approach works successfully in many countries.</li> </ul>

Ministry of Health can use the IDD control programme resources to monitor the community iodine nutrition status and other activities. Salt industry will benefit from this as it has the potential to grow further, collaboration with all stakeholders to pave the way for salt industry can even contribute to the national income through salt export to the international market. But some issues should be addressed like high taxation and consequent uncompetitive price in international markets (Mohan, 2005).

Sudan has the potentials to achieve USI and sustain the elimination of IDD if active collaboration of all stakeholders is sustained. In terms of its salt supply Sudan is self reliant, so effective iodization of all salt production could result in high levels of coverage across the country. The international community technical and financial support is available for all national authorities to achieve USI goals.

### 7. Conclusion

Considering the previous failure experienced in Sudan with USI legislations since 1994, utilization of another alternative approach is needed. Utilization of existing National Standardization and Metrology Law (2008), National Public Health Law (2008), and Food Inspection Law (1973) provide legal frame for this alternative approach. Collaboration between MOH and SSMO to issue a national compulsory salt specification and develop monitoring and surveillance systems is highly recommended because SSMO has the authority and resources to enforce the implementation of such specification.

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