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Salt Iodization in Haiti: Challenges to Improving Salt Production Quality and Recommendations for Pursuing Iodization

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Contents

• Iodine and Iodine Deficiency
• Iodized Salt
• Iodine Deficiency in Haiti
• Salt in Haiti
• Prior and Current Initiatives
• My Research with the Salt Producers
• Conclusion and Recommendations
• Thanks
Background

• Iodine deficiency is a has become a public health priority in the last twenty years
• Single most important cause of preventable brain damage
• 31% of the world still does not consume adequate iodine
• Treatment can be cost effective and sustainable
Physical need for iodine

• Iodine is necessary for the production of thyroid hormone, especially important to developing infants and fetuses
• 1983 Basil Hetzel uses the term *iodine deficiency disorders* to help people understand its broader necessity
• Adequate levels of thyroid hormone are essential for optimal neurocognitive development
• Iodine deficiency can result in an loss of approximately 10-15 IQ points
An iodine-deficient community

• Indeed in an iodine-deficient population, everybody may seem to be slow and rather sleepy. The quality of life is poor, ambition is blunted, and the community becomes trapped in a self-perpetuating cycle. Even the domestic animals, such as village dogs, are affected. Livestock productivity is also dramatically reduced.

• There is much evidence that correction of iodine deficiency has been followed by a ‘coming to life’ of a community suffering from the effect on the brain of hypothyroidism due to iodine deficiency. Such an increase in vitality is responsible for improved learning by schoolchildren, improved work performance of adults and a better quality of life.

Assessment of iodine deficiency disorders and monitoring their elimination. 2007
Iodine insufficiency in the general population by WHO region, 2003

- Africa: Proportion (%)
- Americas: Proportion (%)
- South-East Asia: Proportion (%)
- Europe: Proportion (%)
- Eastern Mediterranean: Proportion (%)
- Western Pacific: Proportion (%)

Iodine Status Worldwide: WHO Global Database on Iodine Deficiency, 2004
Change in household consumption of iodized salt in Latin America and the Caribbean

Selected countries

Proportion (%)

- Haiti
- Dominican Republic
- Guatemala
- Brazil
- Cuba
- Paraguay
- Bolivia
- Mexico
- Peru
- Nicaragua
- Chile

Around 1995

Around 2005

Sustainable Elimination of Iodine Deficiency: Progress since the 1990 World Summit for Children. 2008
Iodized Salt

- Salt is a good vector for number of reasons
- Universal iodized salt is the primary strategy to eliminate iodine deficiency disorders
- Common agents are iodide and iodate, a stabilizer can also be added
- There is an anticipated loss of iodine from the time of fortification to consumption
Iodine Deficiency in Haiti

• 2004-2005 most recent national survey estimated 58.9% overall. This was broken down into 41.4% in metropolitan areas, 52.4% in urban areas, and 72.5 in rural areas
• Estimated 29,000 children born annually with mental impairment due to iodine deficiency
• Only 2 percent of salt is iodized
Barriers in Haiti to adequate iodine consumption

- Unavailability of iodized salt
- Households typically wash salt before consumption
- Packaging is not ideal for iodine retention
- Environmental challenges to iodine nutrition
- No legislation governing salt fortification
- Awareness of iodine importance
- Salt contains impurities that make iodization inefficient
What has been done

• MSPP began iodization initiative in 1998
• Partnership to form Lolita salt company starts in 2002, bankrupts in 2003
• UNICEF donated 3 iodization plants to government
• University of Notre Dame begins double fortified salt
• Consideration of alternative vectors besides salt
Salt Production in Haiti

• Domestic consumption of salt is estimated to be 30,000 to 45,000 tons annually
• Salt producers experienced a lot damage due to tropical storms in 2004 and 2008
• Traditional salt basins are virtually all single evaporation ponds
• Salt produced in this method contains more impurities which increase the potential loss of iodine from the salt were it to be fortified
Modern serial ponds

- Consists of a reservoir, condenser, and crystallizer
- Separate the precipitation of NaCl from that of calcium sulfate and magnesium salts
- Density needs to be monitored
- More frequent harvests
- More profitable

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My Research

• Production of cleaner domestic salt has been identified by many to be the top priority for achieving iodized salt for the country.
• Specifically, what are the barriers of producers to adopt modern serial pond production?
• Potential issues include:
  – sufficient economic capital
  – perceived benefits of new technique
  – perceived adequacy of land area
  – knowledge of salt iodization
• How will this domestic salt be iodized?
Methods

• Development of a 20-question survey
• Critical input provided by Amber Munger, Dr Magalie Personna (UNICEF)
• Convenience sampling based on participants recruited by AMURT and WFP, with local logistics (translator, transport, etc) to be provided by both
• Salt sample of each producer requested at the end of each interview
Study population

- 34 completed interviews in the villages of Magasin (17), Grande Carrenage (7), and Pointe de Mangles (10)
- Each participant had to be the owner of 1 or more ponds
- 31 males, 3 females
- median age 41, range 23-78
- median basins owned 2, mean 3.1, range 1-9
- Salt producers thought of as being wealthier in community, but not well-off per se
- No one had yet converted their basin to a modern serial pond
Results

- General strong interest in production of salt using modern method. Many believed it would be financially advantageous.
- Primary concern was of initial capital to convert the salt pond.
- Some also believed that they did not have enough land or adequate training.
- All who were asked preferred the idea of carrying out iodization close to their villages. However, knowledge of salt iodization methods seemed poor among participants.
Results con’t

• Generally speaking, the quality of salt from modern serial ponds is superior to that from traditional salt ponds
• In additional to the color of the salt, the salt granularity and packaging play a role in perception of the salt
• Salt prices have been particularly low in the country
• Domestic salt distribution throughout the country suggests larger scale iodization will require additional assistance
Study limitations

- Small sample size
- Convenience sampling
- Limited geography
- Information disclosure prior to interview
Conclusions

• Salt producers do not appear close to forming a cooperative. While a few producers have adjacent ponds that can be transformed into a larger modern pond, a large proportion do not.

• Salt producers need additional training, as there is interest in the new method. Producers need help with initial capital investment.

• Salt producers were willing and eager to take on iodization of their salt.

• By itself, it does not appear that salt produced using the modern method would be entirely excluded from washing practices.
Steps toward iodization

• Education of consumers and producers about the importance of iodized salt
• Additional training in modern salt production could facilitate producers in adopting the new methods on their own.
• Producers need access to additional financing mechanisms. Producers need a stable market to adopt unfamiliar production methods.
• Strategic temporary interventions can assist in the long-term adoption of recommendations from public health and development community
Selected References

• Sustainable Elimination of Iodine Deficiency: Progress since the 1990 World Summit for Children. New York: UNICEF; 2008
• Assessment of Iodine deficiency disorders and monitoring their elimination. 3rd ed: WHO; 2007
• Hetzel B. Iodine deficiency disorders (IDD) and their eradication. Lancet. 1983;2:1126-9
• Mohan R. Salt Iodisation Programme in Haiti: Training Workshops on Salt Iodisation Using Knapsack Sprayers in Haiti. Mumbai, India; 2009
• Iodine Network's Advocacy Mission to Haiti: A Call for a National Coalition. Network For Sustained Elimination of Iodine Deficiency; 2006
• Bollman E. Innovative Delivery: Market-Based Distribution of Double Fortified Salt For Disease Elimination In Haiti: University of Notre Dame; 2009
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