Origin and Evolution:

Epidemiological studies, carried out by the Institute of Nutrition of Central America and Panama (INCAP) in 1952, revealed that 38% of the Guatemalan population was suffering of some degree of goiter. In order to improve the iodine status of the population, the government of Guatemala made mandatory the addition of iodine to salt by means of a decree in 1954 (Decree # 115), whose regulation was enacted in 1955. It established a fortification level of 67 to 100 mg iodine/kg from potassium iodate. The same decree made responsible of the iodization supervision to the Association of Salt Producers. The salt iodization program started in 1959.

Goiter prevalence was reduced from 38% in 1952, to 14% in 1962, to 8% in 1964 and to 5% in 1967. In 1967, urinary iodine was determined as 400-µg/L. Guatemala became one of the first countries in the developing world to demonstrate that the goiter and the other iodine deficiency disorders can be prevented by means of consumption of iodized salt.

The salt iodization program was very successful because sea salt was produced by a reduced number of producers; only one company (“salinas Santa Rosa”) was responsible for more than 90% of the national salt production. However, at the end of the 70’s the country initiated the construction of its pacific port (“Puerto Quetzal”), which caused the destruction of the sea salt production fields of that company. As consequence, hundreds of small sea salt collectors originated to all length of the Pacific shore of the country. Concomitantly, the salt iodization program was ruined. By 1979, goiter prevalence raised to 11%, and to 20% in 1987. The mean of urinary iodine decreased to 32 µg/L in 1979 and, although increased to 75 µg/L in 1999, it is still lower than the recommended level of 100 µg/L.

The neighboring countries of El Salvador, Honduras and Nicaragua also have hundreds of small sea salt collectors, but at difference of Guatemala, salt is ground and packaged in a reduced number of facilities (10 to 20), which are subjected to continuous governmental inspection. This practice, although inefficient because the intense use of human and financial resources of the public sector — in most cases depending on UNICEF donations — has achieved acceptable coverage and quality of the salt iodization programs. The same has not happened in Guatemala, where advocacy, workshops, meetings, household monitoring, and social marketing aimed to salt producers, technical functionaries and consumers for the last 10 years, have been unable to improve the situation.

Efforts Aimed at Resurrecting the Salt Iodization Program

In 1991, the program of oral health of the Ministry of Health, with the support of the Professional Association of Dentists, the school of Dentistry of the National University, and other institutions proposed to add fluoride to salt to reduced tooth decay in the Guatemalan population, which is the worst in the Western hemisphere. The “average” 12 year-child has 13 teeth decayed, filled or lost. As comparison, only 1 to 3 teeth are affected in children of the same age from Jamaica and Costa Rica where the program of salt fluoridation has been established.

This initiative of the public health dentists of Guatemala was visualized as a good opportunity to recover the quality of the salt iodization program, because addition of fluoride requires good quality salt that should be produced in a few centers with a minimum industrial development. First, the Congress passed a new Food Fortification Law in 1992 (Decree 44-92 on July 23rd, 1992), which later was accompanied by regulations specific for each type of food, one of which was salt (Governmental Accord 496-93 on September 24th, 1993), which fixed the iodine level at 30-100 mg/kg, and made mandatory the commercialization of salt for human consumption in individual and labeled bags. Interestingly, addition of fluoride was not accepted because, at that moment, there were not industries to carry out this process. The Vice-president of Guatemala during the period 1994-1998, a dentist, took special interest in the establishment of a salt industry (washing, drying and grinding, although not refining) to facilitate the implementation of the fluoridation program together with iodization. The company (Prodisal) was established,
and it has the capacity to process all the sea salt collected in Guatemala (70,000/M.T.). It was conceptualized that the small sea salt collectors would sell their product as a raw material to this company. UNICEF invested and provided support to this idea. Nevertheless, once the salt processing industry started to function in 2000, the small salt collectors headed mainly by middlemen of the salt market refused to sell their product to this industry. Similarly, other relative large sea salt collectors opposed the introduction of fluoridation of salt arguing that it would destroy the means of subsistence of the small salt collectors. Despite the objections, the government who left office in January 2004, passed a new regulation making mandatory the addition of fluoride (175-225 mg/kg) to salt, and fixing the level of iodine from 30 to 60 mg/kg. Thus far, the current government has not enforced the regulation and there are rumors that its application date might be postponed at least two years because the pressure of traditional “large” salt producers and traders. Independently to the introduction or not of the fluoridation program, and despite the regulations enacted in 1993 and 2004, the quality of the iodization program continues being bad.

Current Situation

From 1996 to 1998, USAID provided financial support to INCAP to develop a practical and low cost monitoring system for fortified foods. As a result, salt fortified with iodine, sugar with vitamin A, and wheat flour with iron and vitamins of the complex B were monitored yearly at household level in Guatemala, El Salvador, Honduras and Nicaragua. Later the Initiative of Micronutrients (MI) provided additional resources to prolong the program three years more, and in the case of Guatemala, UNICEF has contributed to keep it until this moment (2004). Quality of the salt iodization program is shown in Table 1.

Quality of the program was not too bad in 1995 and 1997. Salt producers knew that in 1995 a National Micronutrient Survey would be carried out, and in 1996 they were informed about the inappropriate situation found with the household monitoring system. This information helped to improve the quality of the program in 1997. However, a similar reaction from the salt producers was not obtained in the following years. The government did not strengthen its enforcement capabilities either. In 2003 the salt iodization program improved slightly, but it still unsatisfactory (Carolina Martinez, INCAP, personal communication).

In 2002, a characterization of the salt industry and commercialization was contracted to Lic. Oscar Monzón from the “Laboratorio de Análisis y Sevicios (LASER)”. A summary of the findings of this study is presented below:

▲ Seventy four per cent (74%) of the sea salt in Guatemala (about 52,000 M.T.) is collected by 15-20 operations, whereas the remaining 26% (18,000 M.T.) is done by 250±50 small collectors widely dispersed in the Pacific coast. The small collectors constitute a very informal sector, and its members are continuously changing, with an average life of two years. [Personal comment: If 74% of salt is produced by the “large” producers, it means that at least this portion should be adequate fortified. However this is not the case, which suggest that even the “large” salt producers are not complying well with the iodization process].

▲ Most iodization (55-60%) — when done — is made by manual addition of a mixture of potassium iodate with salt (yodosal) –and sometimes with calcium carbonate (yodocal)- and mixing with shovels on the ground; 15-20% of some “large” producers use mechanical mixers, and 25% is fortified by aspersion in the factory Prodisal. [Personal comment: Salt production and iodization in Guatemala is very primitive. Therefore, it is essential to promote the creation of salt processing facility by means of “modernizing” some of the facilities of the “large” producers].

▲ In theory, the dilution factor of the yodosal or yodocal should be 1:1000, or 1 pound over 10 quintals (100 lbs = 1 quintal) of salt, but indeed it was found that the usual addition was 1 pound over 20 quintals. [Personal comment: It explains why iodine content of salt is much lower than expected in most samples obtained at household level].

▲ Salt in the best of the cases is only 80-90% sodium chloride and, with the exception of the salt washed and dried in Prodisal and one or two of the other “large” producers, contains 3-8% humidity. Salt is highly contaminated, and once in solution 10-40% of its weight is insoluble material. [Personal comment:

<table>
<thead>
<tr>
<th>Year</th>
<th>[I] ³ 15 mg/kg</th>
<th>[I] ³ 30 mg/kg</th>
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<tbody>
<tr>
<td>1995</td>
<td>88%</td>
<td>56%</td>
</tr>
<tr>
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<td>49%</td>
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<td>1997</td>
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<tr>
<td>2000</td>
<td>54%</td>
<td>18%</td>
</tr>
<tr>
<td>2001</td>
<td>30%</td>
<td>22%</td>
</tr>
<tr>
<td>2002</td>
<td>40%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Table 1: Quality of Iodized Salt at Household Level in Guatemala (% Samples above cut-off points)
Most salt does not fulfill the standards specifications of even the worst quality of salt for human consumption accordingly to the suggestions of the Codex Alimentarius; its quality is even below the standards of salt for animal consumption.

- The small salt collectors sell salt packaged inside used polyethylene bags in amounts of quintals (100 pounds). “Large” producers and the middlemen in the case of the small producers introduce –mostly by hand- salt in plastic bags labeled as one pound (365 g), when indeed they contain approximately 275 g; only very few brands have the content that is claimed. [Personal comment: Guatemalan consumers are only receiving 75% of the weight that is claimed and, once the purity factor is taken in consideration, only 60% salt].

- Forty percent (40%) of salt is sold without any brand, and most of the “labeled” salt cannot be traced to a responsible person or industry, because they are not authorized brands. Supermarkets in the main cities only sell very few brands of salt, such as Vitasal, B&Z, Atzan, YaEstá, and Radiante. The first is produced by Prodisal, and the rests by the other “large” producers. [Personal comment: In general, there is not a formal commercialization system for the salt in Guatemala. Most salt is completely out of any control].

- Prodisal satisfies most of the salt needs of the food industry. Food industry also buys refined salt from Mexico. [Personal comment: Salt from Prodisal, despite that it represents 25% of the national production, is not reaching the same proportion of consumers, because it is mainly aimed to the industry and the most sophisticated supermarkets].

- Table 2 summarizes the price of salt in Guatemala in the year 2002. [Personal comment: Middlemen are making a large profit, buying salt at very low cost and selling it at high cost to consumers. If price of salt is expressed in terms of “pure salt”, Guatemalan consumers are buying the dirty and impure product at a price equivalent to buy refined and imported salt. Therefore, introduction of 2 to 3 acceptable processing centers of salt would benefit consumers, and it would have minor impact on the small sea salt collectors, who may become providers of “raw” salt for these centers. The sectors that would be affected are the middlemen and the traditional “large” producers, who have enjoyed a big profit (twice to three times the cost) with a very small investment].

## Conclusions and Recommendations

1. Salt iodization in Guatemala will not improve until the sea salt production and commercialization in the country is ordered and put under control. To date, the system is only providing profit to the middlemen and sellers, and negatively affecting the small sea salt collectors who are receiving a very low payment for their product, and consumers who are purchasing a product of the worst quality.

2. The government of Guatemala should authorize for distribution and selling only of salt that complies the minimum standards for human consumption, which should include the stipulated amounts of iodine and, when indicated, fluoride.

3. Packaging centers of sea salt should wash, dry, grind and fortify the salt. Only brands from those centers should be allowed to be commercialized in the country. This decision requires political will and the presence of a strong and reliable enforcement mechanism. The country already counts with an industry of this type, and it seems that 2 or 3 more, convenient located in the Pacific cost, would be easy to develop.

4. Simultaneously with the implementation of the industrially-produced salt, it is important to contact the small sea salt collectors to assure their integration with the industries, and to motivate them to become providers of raw salt for the industry. This contact is also essential to prevent the manipulation of the small collectors by the middlemen, who have impeded the development of this industry in the country.

5. Any promotional or social marketing programs regarding iodized salt, in the absence of a true salt industry and an organized commercialization, will continue being ineffective and a waste of resources.