IODIZING SALT
IN COSTA RICA

A LEARNING EXPERIENCE
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UNICEF acknowledges USAID, whose funds made possible the systematization of Costa Rica’s experience in salt iodization presented in this document.
In the past, some Costa Ricans used to have “güecho”, or a “güergüero”—a scar similar to a necklace on their throats, as a result of the surgery they had to remove a goiter. The language has since been modified and these two words are no longer in use in Costa Rica. This is why I define the salt iodization program as a wonderful achievement.

– Carlos Bonilla

Salt Cooperative Member
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Foreword

Costa Rica started since the 1940s, with greater intensity in the 1970s, a process to prevent iodine deficiency diseases through salt iodization for human consumption.

There are very few actions that are as cost effective as salt iodization, thus UNICEF and the Ministry of Health of Costa Rica have joined efforts to systematize the experience, proving the high return rate for this investment.

Making iodized salt available for the public to consume in the right amount, as a key strategy to prevent iodine deficiency diseases, is a way to protect and promote the human right to health. At the same time this measure will have positive spillover effects over other areas such as children’s right to education, access to conditions that favor their welfare and comprehensive development.

Perhaps the most important of salt iodization is that it demands from all of us to raise awareness, to get involved, and organize in the pursuit of our own wellbeing.

The experience of Costa Rica could serve as an inspiration and an example of good practices to other countries that have not been able yet to implement in a comprehensive manner, salt iodization for public consumption.

It is our hope that this report leverages the convergence of wills required for a country to prevent iodine deficiency diseases, prevent the economic and social costs that these entail and contribute to the promotion of the rights of children and adolescents.

Tanya Chapuisat  
Representative  
UNICEF

Daisy Corrales Díaz  
Minister of Health  
Costa Rica
<table>
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<tr>
<th>Acronym</th>
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<tr>
<td>CEN</td>
<td>Education and Nutrition Center*</td>
</tr>
<tr>
<td>CINAI</td>
<td>Center for Comprehensive Child Health Care*</td>
</tr>
<tr>
<td>CCSS</td>
<td>Costa Rican Social Security System*</td>
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<td>CNP</td>
<td>National Production Council*</td>
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<td>Costa Rican Development Corporation*</td>
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<td>Institute of Nutrition of Central America and Panama</td>
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<tr>
<td>INCIENSA</td>
<td>Costa Rican Institute for Research and Training in Nutrition and Health*</td>
</tr>
<tr>
<td>INFOCOOP</td>
<td>National Institute for the Promotion of Cooperatives*</td>
</tr>
<tr>
<td>INISA</td>
<td>University of Costa Rica’s National Institute for Health Research*</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>MAG</td>
<td>Ministry of Agriculture and Animal Husbandry*</td>
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<tr>
<td>MEIC</td>
<td>Ministry of Economy, Trade and Industry*</td>
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<td>Ministry of Health*</td>
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<td>Pan American Health Organization</td>
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* By its Spanish acronym
Iodizing Salt in Costa Rica: A Learning Experience is a report coordinated by the United Nations Children’s Fund (UNICEF) and the Costa Rican Ministry of Health. Its fundamental goal is to inform of this country’s experience in the design and implementation of an effective policy for salt iodization. To this end, it describes the story of the alliances between various actors willing to cooperate and launch a successful process. Communities, companies, public institutions, political leaders, legislators, researchers, and other actors recognized the value of salt iodization for human development of the population and to meet their own objectives.

The document narrates significant events that had to take place for this country to set in motion a sustainable policy for salt iodization. This includes legal agreements, the processes for evaluating salt quality, as well as certain turn of events, and the organization of the salt-producing companies. Also, strategies were considered with regard to the targeting of actions to endemic areas and the amendments to the law pursuant to changes that had been occurring in the dietary habits of the population.

In sharing this experience, the intention is that the country itself may learn from its cooperation practices aimed at safeguarding its population’s health and general welfare. It also intends to offer other countries in the world the possibility of learning about an experience that teaches how to work toward a specific health policy for the benefit of its own inhabitants.

One of the main lessons learned is the need to attain a consensus between the different social actors from the public and private sectors. It is not a simple task to reach these agreements and articulate the actors’ wills and interests. But the fact is that the only way to advance in the recognition and care of the population’s nutritional health is consolidating alliances and joining efforts. In order to achieve these alliances, it is of the essence to be clear about the roles that each of the strategic actors must assume. In addition, it implies knowing their responsibilities and strengthening their capabilities so that they may provide a substantial contribution to the process. This report describes the conditions in the midst of which Costa Rica was able to reach substantive agreements to design and implement the policies related to salt iodization.
It goes without saying that the efforts by the actors that helped build such a policy were accompanied by international cooperation. As such, it cannot be stated that Costa Rica’s experience was successful solely by its local merits. Rather, the country received considerable support from international and regional organizations. To begin with, some organizations took it upon themselves to place the topic of salt iodization in the international agenda. This is the case of the World Health Organization (WHO), the United Nations Children’s Fund (UNICEF), and the Food and Agriculture Organization of the United Nations (FAO). But added to this fact, the work of the Institute of Nutrition of Central America and Panama (INCAP)—from its inception in 1949—was critical because of its capacity to offer the country technical cooperation and financial support.

Streamlining the formulation and implementation process of the salt iodization policy in Costa Rica has not been a simple matter. To this end, scarce sources had to be tapped. In fact, it is noteworthy to recognize that a major part of this experience is not documented. For this reason, it was necessary to reconstruct it with the actors themselves who participated, and in certain cases, who continue participating in its implementation. Documented here are the past and current efforts by the various actors.

As can be seen, the success of this policy comes as a result of a joint effort by many individuals and organizations. This document mentions some but not all of these. Nonetheless, it is done in the knowledge that together with those mentioned, many other persons have participated, by working from their communities and in the institutions and companies. The Costa Rican salt iodization policy would probably not be a reality without the valuable contribution of each and every one of these persons. For this reason, this report is also a way of expressing the gratitude that they all deserve.

The document is divided into three chapters. The first offers information and guidance regarding iodine and its relation to health. Iodine is a micro-nutrient that is essential to humans; as such, iodine deficiency disorders constitute serious health problems, limit human and social development of the population, and compromise future generations. Due to this, it is imperative to create the conditions to avoid these disorders. Fortunately, low-cost prophylactic measures can be taken, which demand nonetheless a political will to execute them. It has been proven worldwide that salt iodization is the most efficient way of reducing the lack of iodine in the population, which requires establishing legal provisions and adopting specific actions aimed at putting it in practice.
For this reason, chapter two briefly describes the context within which the salt iodization policy emerged in Costa Rica. Of special importance are the international and domestic factors that contributed to the creation of the platform needed to make it feasible.

Chapter three presents, in a systematic manner, the different stages that were completed to implement the salt iodization policy. First and foremost, the beginnings and the pioneer actors are underscored. Following is the analysis of the alliances between the State and the salt producers, the modernization mechanisms of salt production, and the legal adjustments that were required, as well as the actions focused on the endemic areas of Costa Rica. To a large extent, these stages have been reconstructed thanks to the testimonies of actors who have been fundamental in this process.

Following these three chapters comes a summary of the learning experience lived by Costa Rica in the construction of a sustainable salt iodization policy. These “lessons learned,” appearing at the end of the report, have the intention of serving as inputs for the advancement of food fortification policies in other countries.
I. IODINE
Food contributes the necessary nutrients to the human body for its proper functioning. The system transforms these into energy and it uses multiple substances essential for tissue formation and recovery of the physiological wear and tear. Therefore, for an adequate nutrition, food must be both sufficient and complete. This way, it can provide the body with the total energy required as well as all the substances needed for its physiological balance. Of course, this physiological balance of the body is a condition for development and exercise of the capabilities and freedoms that are inherent of all human beings.

When a person has insufficient food intake, this gives rise to the hunger phenomenon. This results in problems such as malnutrition and even death. In modern times, it is more frequent that people consume food that provides sufficient energy levels, but which is nonetheless deficient in essential nutrients, such as vitamins and minerals, needed to guarantee a balanced health. This deficiency is known as “hidden hunger.”

Among the most important nutrients are proteins, certain fats, minerals and vitamins. One of these minerals is iodine, a particularly important micronutrient, since it allows individuals to have good performance in intellectual activities, be alert, and have an adequate movement coordination. All these capabilities constitute a basic condition for human development.

Iodine is essential for the thyroid gland to produce thyroid hormones. This gland is located in the front part of the neck and consists of two lobes, one on either side of the trachea, as shown in the following illustration.
The thyroid hormones enable the following:

- The energy processes of each cell that makes up the human body
- The functioning of the brain
- The functioning of the nervous system
- The regulation of the energy metabolism

The deficiency of thyroid hormones during pregnancy may give rise to alterations in the physical and mental development of the fetus. In cases of a grave deficiency, a severe mental retardation, known as cretinism, can occur. All of this implies an incalculable loss in human and economic development of countries.

When an iodine deficiency is present, the lobes of the thyroid gland are enlarged in an effort to increase their capacity to capture this micronutrient and supply the system with thyroid hormones. This condition is known as goiter. Goiter is one of the more visible manifestations of the iodine deficiency disorders.

Different types of endemic goiter exist that are linked to its size and manifestations. When the volume of the gland is small, it does not represent a serious health threat. However, when the size is larger, it may produce obstructions and severe asphyxiation. The following image shows a person suffering from goiter.
Iodine, as mentioned above, is fundamental for people’s physical and mental development. The human body requires this substance in small quantities. When average consumption of this mineral is lower than 150 micrograms per day, it is referred to as iodine deficiency.

Iodine deficiency among children decreases their learning capacity. This situation implies a deficient academic performance, and higher grade repetition and school failure. It has been found that in areas registering a moderate iodine deficiency, children lose between 10 and 15 points in their IQ. Iodine deficiency constitutes the main cause of mental retardation which is totally preventable. This deficiency is also linked to a decrease in growth velocity, dwarfism, deaf-muteness, and neurological disorders. The following illustration shows the consequences of iodine deficiency in two adolescents.
In the case of adults, this deficiency is linked to fatigue, low performance at work, low resistance to cold, and a precarious health. During pregnancy, a severe iodine deficiency may cause spontaneous abortions, stillbirths, and affect fetal brain development.

The fetal period and the first two years of life are the stages in which the body is most vulnerable to iodine deficiency. Due to this, during pregnancy the demand for the production of thyroid hormones increases, and hence, the demand for iodine as well.

According to the criteria set forth by the World Health Organization (WHO), endemic goiter is classified as a public health issue, given that its prevalence is greater than 5% among the school-age population. In the 1950s, the Pan American Health Organization (PAHO) identified endemic goiter as a public health issue in all the countries of the American continent, with the exception of Uruguay. They also recognized that since the 1960s there is a growing awareness throughout the region of the nutritional problems faced by the population, as well as the need for implementing preventive measures.

Among the natural sources containing iodine are seafood such as fish, shrimp and shellfish. In turn, the soils adequate for agricultural/livestock farming should be rich in iodine in order to provide this micronutrient through other food.

Nonetheless, in certain places abundant rainfall erodes the soil and washes its iodine content, particularly in mountainous areas. This results in animal and vegetable products with a low iodine content. This is the case of Costa Rica. Thus, it is necessary to provide its population access to other sources to iodine, such as food fortification with this micronutrient.
"Salt iodization is the most selective and inexpensive practice to eliminate iodine deficiency disorders." Declaración de Quito 1994

The deficiencies associated to the absence or dearth of iodine in the human system are preventable with the fortification of salt for human consumption. Experts in public health recognize that salt iodization is the most simple and cost effective health measure that exists in the world.

At the international level, different means have been explored to provide people the iodine needed for staying healthy; however, of all of these, salt turned out to be the most and inexpensive vehicle. In addition, it has the enormous advantage that people’s use of salt on a daily basis.

The idea of achieving a universal salt iodization arose in the year 1831, as a proposal submitted by the French researcher Boussingault. However, it was not until the first decade of the 20th century that Marine and Kimball proved the total effectiveness of iodine for the prevention of goiter. They were later able to introduce iodized salt extensively in Michigan and Ohio in the United States. In the 1920s, the U.S., along with some European countries, began applying this public health measure systematically and extensively.

The entire population’s access to iodized salt constitutes a worldwide objective. At present, many countries apply this preventive measure as a mandatory policy. Nonetheless, there are nations that still have not been able to implement it effectively.
Iodine Deficiency Disorders in Costa Rica

In the case of Costa Rica the endemic goiter issue was identified back in the 1930s. It was Dr. Clodomiro Picado Twight who conducted several studies, jointly with experts in the Bacteriological Laboratory and the Chemistry Laboratory of the then called Secretariat of Health. Among these studies he undertook the analysis of 1,200 autopsies of persons in the San Juan de Dios Hospital, located at the heart of the capital city of San José. In this study, Picado assessed thyroid hypertrophies and was able to identify glands whose weight exceeded 60 grams. In order to have a better grasp of the problem, it is known that the average weight of this gland is 20 grams.

This pioneer investigation conducted by Dr. Clodomiro Picado led to the identification of the endemic goiter as a public health issue. In fact, the study’s results rendered high percentages of goiter—higher than 10% per province. In addition, it reported more cases of women than men. The following graph shows the results found in this study, as per the percentage distribution of endemic goiter in the country’s seven provinces.

“…growing up we already knew that the number of persons suffering from colloid goiter is very high in Costa Rica, and that the inhabitants of our current capital, San José, had been nicknamed ‘güechos’ for this reason… It is not infrequent to find in our region myxedematous dwarfs and quite a few individuals with dry and wrinkled skin, and, to our misfortune, one also encounters one too many typical cretins … ours is one of those countries where colloid goiter should be considered endemic.”

Dr. Clodomiro Picado, 1943
Many years later, during the 1951-1961 period, the Ministry of Health conducted studies with the collaboration of the Institute of Nutrition of Central America and Panama (INCAP). In total, they examined the thyroid glands of 27,768 students from 58 Costa Rican communities. The study found a 16.5% prevalence of goiter among this student population. But even more alarming was the discovery that 30% of the locations examined recorded a prevalence higher than 20%, with values ranging between 20-44% of the population suffering from endemic goiter.

During this same period, a study conducted by the Nutrition Department of the prenatal healthcare service in the San José Metropolitan Area showed that 42% of the 496 pregnant women examined had goiter. All these data evidenced that the problem was serious and needed to be declared a public health problem in order to establish a preventive policy.

The magnitude of the problem was also evidenced in the results of nationwide surveys taken from representative population samples in 1952-55, 1966, 1979, 1989-90, 1996, and 2008. The data resulting from these surveys showed the progressive reduction of the problem. The following chart summarizes the findings of each of these surveys, where the provinces of Puntarenas and Guanacaste on the Pacific stand out as iodine-deficient endemic areas.

Source: Picado, C. Investigaciones sobre Fisiopatología Tiroidea (Investigations on Thyroid Physiopathology), 1943. It should be noted that these results refer to autopsies conducted in a national hospital located in the capital city.
<table>
<thead>
<tr>
<th>Year</th>
<th>Survey</th>
<th>Goiter Prevalence</th>
<th>Iodine deficiency*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952-55</td>
<td>National Survey on Goiter (representative population sample ages 7-18)</td>
<td>Nacional: 16,5%</td>
<td>Not evaluated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puntarenas: 20,3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guanacaste: 25,6%</td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>National Nutrition Survey (representative population sample, all ages)</td>
<td>Nacional: 18%</td>
<td>Iodine deficiency among population (median under 25 μg/g of creatinine, acceptable limit)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puntarenas: 16%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guanacaste: 24%</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>National Survey on Goiter (representative student population sample ages 5-15)</td>
<td></td>
<td>Median above deficiency limit (556.7 μg/g of creatinine)</td>
</tr>
<tr>
<td>1989-1990</td>
<td>National Evaluation of Iodine Deficiency among Students (student population sample ages 6-12)</td>
<td>Puntarenas: 3,3%</td>
<td>Median of 211 μg/l nationwide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guanacaste: 11,3%</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>National Nutrition Survey (representative sample of students at national level)</td>
<td>Goiter was not evaluated</td>
<td>Median of 314 μg/l nationwide</td>
</tr>
<tr>
<td>2008-2009</td>
<td>National Nutrition Survey (representative sample of students at national level)</td>
<td>Goiter was not evaluated</td>
<td>Mediana de 314 μg/l a nivel nacional</td>
</tr>
</tbody>
</table>

* Measured through urinary iodine excretion, indicator of recent iodine ingestion aimed at evaluating the nutritional status of this micronutrient in the system. Urinary iodine is expressed through the median urinary iodine content in μg/l.


The following graph illustrates the decrease in endemic goiter through the years. It evidences how the provinces of Guanacaste and Puntarenas were the less favored, which condition improved through time as a result of targeted promotion and prevention actions (see Stage five—The Creation of the Salt Iodization Policy—further on in this document).
Graph 2. Prevalence of endemic goiter in Costa Rica

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Nacional</th>
<th>Guanacaste</th>
<th>Puntarenas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952-1955</td>
<td>16.5%</td>
<td>25.6%</td>
<td>20.3%</td>
</tr>
<tr>
<td>1966</td>
<td>18.0%</td>
<td>24.0%</td>
<td>16.0%</td>
</tr>
<tr>
<td>1979</td>
<td>3.5%</td>
<td>7.3%</td>
<td>8.50%</td>
</tr>
<tr>
<td>1989-1990</td>
<td>11.3%</td>
<td>3.3%</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Source: National and provincial surveys on endemic goiter.

Graph 3. Percentage of students with urinary iodine excretion above 100 μg/l

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<tbody>
<tr>
<td></td>
<td>86%</td>
<td>91%</td>
<td>92.9%</td>
</tr>
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</table>

Subsequent to 1990 no surveys have been conducted to evaluate the prevalence of goiter. These were costly studies with a particular difficulty in standardizing the diagnoses on the basis of clinical evaluations consisting on the palpation of the thyroid gland. Therefore, it was considered that the urinary iodine excretion was an adequate criterion. Based on this other criterion, two subsequent surveys were conducted in the years 1996 and 2008-2009.

The country was able to significantly reduce endemic goiter, and in 1979 it ceased to be a public health issue. In the year 1996 it was confirmed that iodine deficiency was no longer a public health problem in the country. In the last National Nutrition Survey (2008-09), it was verified that 97.1% of the population consumed iodized salt.

How endemic goiter was finally eradicated and iodine deficiency controlled among the population? What mechanisms gave rise to an effective salt iodization policy in the country? Why has median iodine urinary excretion increased over time? Many external and internal factors explain the Costa Rican experience. But before examining the formulation and execution process of the salt iodization policy, the following addresses the international and domestic context that facilitated such a process.
II. THE INTERNATIONAL AND NATIONAL CONTEXT
In the 1950s and 1960s, a large amount of knowledge was acquired worldwide on the disorders caused by iodine deficiency and guidelines were established for its prevention. Pilot plans were also implemented, applying prophylactic measures in several countries, and progress was achieved in developing salt iodization technology. This served as a basis for defining and promoting policies founded on scientific evidence.

By means of international conferences promoted mainly by WHO, UNICEF and FAO in the decades of the ‘80s and ‘90s, a global environment of consensus and commitment was taking place, aimed at transforming the nutritional problems that the different countries faced.

At the regional level, the Institute of Nutrition of Central America and Panama (INCAP) was created in 1949, under the auspices of the Pan American Sanitary Bureau. This new institution played an essential role in providing technical cooperation and financial support to the countries in the region. It headed the development of research whose findings served to raise awareness among health authorities and governments on the severity of the nutritional problems in the region. In addition, it convinced countries of the need to promote local policies for their prevention.

1 The WHO prompted the streamlining of findings on endemic goiter and its prevention. To this end, a group of experts came together in the 1950s to prepare a monograph (WHO, 1960) with all the knowledge compiled on the clinical manifestations of goiter, its geographic distribution, the prophylactic methods to prevent it, and the legislation on this matter.
INCAP also supported the development of pilot plans for food fortification and promoted salt enrichment with potassium iodate as a pioneer experience in the world. Up until then, salt iodization was done with potassium iodate. However, the field studies developed by this institution evidenced that climatic conditions in the tropical area and the levels of humidity and impurity in salt made the use of potassium iodide for salt fortification unstable. Potassium iodate is relatively insoluble and is a practical way of iodizing salt without using special stabilizers or moisture-proof containers. Its positive impact on the decrease of salt deficiency disorders was clearly demonstrated.

In Central America salt iodization processes were promoted at an experimental scale in Guatemala and El Salvador. Guatemala was the first country selected to launch that experience. Salt fortification with iodine began in that Central American nation in 1956. INCAP gave greater emphasis to working in countries with a higher prevalence of endemic goiter. Costa Rica was not among these. The country had already proven, in its first survey on goiter (1955-56), that the percentage of the population with this disorder was inferior to that of other Central American countries.

The contributions made for conducting national research studies and surveys, as well as the training of health personnel by INCAP, were a key input to the formation of human resources capable of implementing specific programs targeting iodine deficiency disorders in the region. Also, the lobbying efforts with the governments and the different social actors allowed for the advancement in policy making on salt iodization in the region.

However, despite the recognition of endemic goiter as a public health issue since the 1950s, and despite the technical knowledge compiled on its prophylaxis, little progress was made in the effective application of preventive measures in a massive and sustained manner. The Central American countries already had legislation in place that established the mandatory nature of iodizing salt. Nonetheless, the prevailing conditions of the salt production became a strong barrier for its implementation.

In the case of Costa Rica, another two decades had to pass before conditions were developed that made an effective salt iodization policy possible.
INTERNATIONAL CONFERENCES AND AGREEMENTS

1948-56  FAO and WHO organized four Latin American Conferences on Nutrition (Montevideo, 1948; Rio de Janeiro, 1950; Caracas, 1953; and Guatemala, 1956). In the first two conferences endemic goiter was recognized as a serious health problem in most of the Latin American countries and recommendations were issued on salt iodization.

1956  The WHO/UNICEF Joint Committee on Health Policies discussed the problem of endemic goiter and UNICEF gave its commitment to support projects to prevent endemic goiter.

1958  At the XV Pan American Sanitary Conference it was agreed that the PAHO would provide technical support to conduct national surveys on endemic goiter and formulate legislation in this matter.

1961  At the XIII PAHO Board Meeting, the Regional Nutrition Program was approved and recommendations were issued to governments to resume the salt iodization programs.

1962  The XVI Pan American Sanitary Conference agreed to hold a technical meeting to review the problems of implementing the salt iodization programs and define policies for monitoring these.

1972  At the III Special Meeting of Ministers of Health of the Americas, held in Santiago, Chile, goals and action strategies were set forth for the following decade. The Health Plan developed contemplated reducing the prevalence of endemic goiter to less than 10%, eradicating endemic cretinism, as well as establishing effective salt iodization programs.

1974  At the World Food Conference held in Rome, it was recommended that WHO provide support to countries in need of establishing programs aimed at diminishing micronutrient deficiencies, including iodine.

1978  WHO, UNICEF and FAO developed a worldwide campaign targeting the control of endemic goiter in the following decade. PAHO’s Regional Action Plan, which included implementing health strategies for all by the year 2000, includes actions for eradicating goiter in the region.

1990  The World Summit for Children set the goal of virtual elimination of iodine deficiency disorders (IDD), and the 43rd World Health Assembly accepts IDD elimination as a major public health goal for all countries by 2000, accelerating a shift from supplementation to salt iodization.

1994  The UNICEF-WHO Joint Committee on Health Policy endorses universal salt iodization as a safe, cost-effective and sustainable strategy.

2002  UN General Assembly Special Session on Children adopts “A World Fit for Children”. The declaration set the goal of sustainable elimination of IDD by 2005.
Establishing a Political, Social and Economic National Network

The Costa Rican salt iodization policy achieved a strong positioning when it established a favorable context for it. Its implementation came in the 1970s as the result of a convergence of political, social and economic conditions in a synergistic manner. The following diagram summarizes the factors that served as platform from which the promotion and execution of this proposal were possible.
a. National Development Model

In the 1970s, a Development Model was established based on social investment and strengthening of national production. This favored the country’s development in general, as well as public health and the salt industry in particular.

This was an era characterized by the presence of a strong benefactor State that had begun its formation in the two previous decades. The governments at that time promoted measures to distribute wealth on a more equitable basis. Although not fully operational, far-reaching policies were established that brought about substantive changes in human development. This included the improvement of the population’s education level by broadening access to secondary education. In addition, together with education, health was made a basic objective in state investment and both passed on to be promoters of the country’s development. Programs targeting socioeconomic compensation of the most vulnerable groups were also implemented. All these actions were accompanied by new legislation.

b. Strengthened Health System

In the 1970s, a new model of health care services was promoted. The Costa Rican State took on the challenge of achieving the universalization of health care, and investing in health facilities throughout the country.

At the same time, a shift toward the preventive approach in health problems occurred. Primary health programs were put in place, such as the Rural Health Program in 1974 and the Community Health Program two years later. For these to be implemented, health clinics were created throughout the entire territory and technical staff was trained in basic community tasks. This included technicians in primary health, nursing auxiliaries, nutrition experts, and sanitary inspectors.

The communities’ participation in the health improvement strategies constituted a fundamental pillar for these programs. Likewise, home visits enabled the implementation of measures such as health education and the early diagnosis of health problems among the population.

“In the 70s there was a convergence of many things. A worldwide strategy of primary health was adopted by WHO, and in Costa Rica it found fertile ground. The country had national—not foreign—funds, established by the Law of Family Allowances. Health posts started to sprout around what used to be sanitary units, which turned into health care centers, and a complete, sufficiently ample national health network was established. Health care had really reached the people. For this reason, international agencies arrived in the country and well-developed programs were introduced. (…) And this is how everything came together: health care centers, CEN CINAIas, and dental hygiene extended to the entire population.”

Luis Tacsan
Director of Office for Scientific and Technological Development on Health
Ministry of Health
This organization method for the provision of services enabled an approach on the part of the health personnel to the real living conditions of the most impoverished communities with less human development. With this change, progress was made toward the creation of a health care service network that would eventually facilitate nutrition surveillance and monitoring efforts in higher risk areas.

In this context, guaranteeing nutritional health to the entire population became a national priority. The coverage of certain programs was expanded, such as the Education and Nutrition Centers (CENs), responsible for providing supplementary feeding and basic nutritional education and surveillance for the infant population under age 6 and pregnant or breastfeeding women in risk of malnutrition. The same thing happened with the Center for Comprehensive Child Health Care (CINAI), which provide nursery services, supplementary feeding, medical and dental health care, as well as early stimulation for the development of preschool children. The approval of juridical instruments, such as the Law on Social Development and Family Allowances (Law No. 5662), ratified in 1974, conveyed a financial backing to these initiatives.

The fact that the primary health care was positioned as one of the priorities of the Costa Rican State generated a favorable environment to face the dearth of micronutrients through the use of universalistic measures and intersectoral strategies. Food fortification meets the conditions for it. For that reason, it was included in the nutrition programs as a working area, and a food enrichment program was contemplated in the 1974-1980 National Food and Nutrition Plan with three subprograms, one of which was salt iodization for human consumption.

At the same time, the State’s interest in strengthening national production, as explained below, became another pillar of the Development Model.

### c. Protectionist Policies and Modernization of the National Industry

The role of the State and the protectionist legislation passed in the decade of 1970 were key conditions in promoting the development of the national industry. Organizational conditions were fostered for this industry and its technological development was promoted. To this end, autonomous public institutions were created and strengthened, which provided technical and financial support to national salt producers. The following chart shows some of the institutions that played a key role in their support to industrial development. Two of these—the National Production Council and the National Institute for the Promotion of Cooperatives—continue existing to this day. The third one, the Costa Rican Development Corporation, was dissolved in 1996.
All these institutions played a very important role in promoting national production and generating modernization processes in the fledgling national industry. In the case of salt production, this institutional support proved indispensable to be able to take the leap forward that would enable the organization of producers, the improvement of production, and its eventual alliance with the Health Sector in its iodine salt fortification programs.

It is also worth noting the promotion of cooperativism in the country due to the part played in the case of the organization of salt producers.

Among the social rights and guarantees set forth in the Political Constitution, in force in the country since November 1949, it expresses that the State must procure the greatest welfare to the population through the organization and promotion of national production, seeking to ensure the best distribution of

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### Table 1: State Institutions that supported industrial development

<table>
<thead>
<tr>
<th>Institution</th>
<th>Year Founded</th>
<th>Objective and Functions</th>
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| National Production Council (CNP)                                | 1956         | ● Modernize the production activities of the agriculture and livestock sector to guarantee a greater efficiency and competitiveness.  
● Develop training and technology transfer processes, particularly addressed to small- and medium-scale producers.  
● Intervene in the internal supply and demand market by setting prices for their stabilization and purchasing agricultural, livestock or marine products that are considered basic for public consumption.  
● Administrate points of collection and establish outlets for the sale of products. |
| National Institute for the Promotion of Cooperatives (INFOCOOP)  | 1968         | ● Further, promote, finance, disseminate, provide technical assistance, and support cooperativism at all levels                                                                                                                                                                       |
| Costa Rican Development Corporation (CODESA)                     | 1972         | ● Strengthen Costa Rican private companies by supporting the industrialization process, substituting imports and diversification of exports.  
● Provide technical assistance to companies in existence or in process of organization, provide financing to companies requiring it or endorsing these so they can have access to financing, stimulate the capitals market, promote exports and development projects, and participate jointly with national and foreign firms in creating new companies. |
wealth. Article 64 of this Constitution establishes the State’s obligation of promoting cooperativism as a means to obtain better living conditions for its workers.

In 1947 the Law for the Promotion of Agricultural and Industrial Cooperatives was enacted, whereby establishing mechanisms for Banco Nacional de Costa Rica to assume the management, supervision and financing role. From there on, this bank created a section for the promotion of cooperativism, which included technical support, training, dissemination, and credit support for cooperatives. As of the year 1968, the cooperative sector had its own law (No. 4179).

The period of glory for Costa Rican cooperativism was during the 1970s. A pertinent example is that while in 1963 the sector only had 67 active cooperatives, by the end of the 1970s this number had increased to 350.

There were five critical factors that permitted the cooperatives’ sustainability: Cooperative education, capital and credit, sound administrative systems, an adequate legislation, and favorable political-economical conditions.

The idea of forming a salt producers cooperative was entertained since the 1940s. Nonetheless, this initiative did not materialize until the 1970s. The organization and union of salt producers in a cooperative proved essential to successfully get the salt iodization policy underway.

"Just the fact of being admitted in a cooperative organization already conveys feelings of solidarity and very important bases of education."

Rodrigo Facio
Promoter of Cooperativism in Costa Rica
The Organization of Salt Producers

Prior to the 1970s, salt production was the most important source of employment in the Gulf of Nicoya area.

The salt producers worked under extreme and precarious conditions; their production method was traditional and had devastating consequences on the environment. Raw salt was extracted in a brine form and then “cooked” in huge cauldrons\(^2\) using firewood extracted from the mangroves\(^3\). For every ton and a half of salt, a ton of firewood was needed.

This implied working with high-temperature ovens on a daily basis. The people who processed salt this way—usually called “chingueros”—made huge sacrifices. Their work day was extenuating and they were exposed to very risky conditions threatening their health.

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\(^2\) Large, round, shallow metal pot generally used for cooking with firewood large quantities of a certain substances, for example, in the production of “panela” blocks made from sugar cane juice or, in this case, to obtain salt from the evaporation of ocean water brine.

\(^3\) Land in tropical areas covered in water during high tide, with estuaries that form many low-elevation islands, home to mangrove trees that thrive in salt water, crucial for the reproduction and protection of coastal ecosystems.
“Traditional salt production implied ‘cooking’ salt in huge cauldrons heated at high temperatures, using firewood as fuel.”
For the producer, salt was a poorly paid product. Small salt producers didn’t have access to any benefits or incentives for the work they carried out. Neither were they considered credit-worthy to apply for a loan to improve their production conditions.

In addition to this adversity, the country’s entry in the Central American Common Market in the 1960s implied a threat. Costa Rica did not have a competitive salt production in the market. National salt producers were using traditional methods, while other Central American countries, such as Nicaragua, were already using solar evaporation to dry salt.

By the end of that decade, 60% of the salt consumed in the country was imported from Nicaragua. This salt, processed through solar evaporation, had a production cost that was inferior to any locally-processed salt, and did not entail deforestation methods such as those being implemented in the Gulf of Nicoya mangroves. This clearly put Costa Rican salt producers at a competitive disadvantage. For this same reason, they were in danger of disappearing.

The initiative then arose of having the salt producers join efforts in order to improve development opportunities. The cooperative model could provide salt producers a preferential treatment for their activity, based on the policies promoted by the government at that time.

It is with this perspective that on September 27, 1974, a group of 48 salt producers from the areas of Colorado de Abangares, Guanacaste, and Jicaral, Puntarenas came together to create the National Salt Producers Cooperative (COONAPROSL, R.L.). This Cooperative was founded with the basic objective of producing, industrializing and marketing salt.

This process was headed by the Bonilla family, devoted for generations to salt production in the region. They were the largest producers and had a better academic level than the rest of the salt producers. Carlos Bonilla had university studies and assumed the role of general manager of the Cooperative since its inception. He took it upon himself to improve the position of the salt producers in the market and the first challenge he assumed was to train the 48 members in the process of drying salt with solar energy.

The Cooperative imposed this production form. Toward the end of the 1970s, all the associates had converted to the solar salt production process. With this achievement, the traditional and precarious forms of production were eradicated, improving the living conditions of the members of the salt producers Cooperative.

The Cooperative was able to implement its objective of promoting commerce and consumption of its associates’ products in the domestic markets, while developing a base of equality and social balance. Based on this experience of cooperative organization, many benefits have been achieved. Specifically, an individualistic handling was left behind to advance toward an organizational and collective labor scheme.

The Salt Production Promotion Act (No. 6080), ratified in August 1977, became an instrument used by the State to lay the groundwork for involving all the people dedicated to salt production and its marketing. This law dealt with the establishment of a scheme of equitable relations and the improvement of the production processes.
### Transformations that took place after salt producers united as a cooperative

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>Individualistic handling</td>
<td>Organization of producers</td>
</tr>
<tr>
<td>Traditional activity</td>
<td>A salt production industry is created with improved production techniques for its associates</td>
</tr>
<tr>
<td>Salt with a high moisture content</td>
<td>A better, drier salt quality.</td>
</tr>
<tr>
<td>Low price to the producer and profit for the middleman.</td>
<td>Organization for the receiving, marketing and sale of salt</td>
</tr>
<tr>
<td>Producers under a subsistence economy</td>
<td>Training of associates with a business mentality</td>
</tr>
<tr>
<td>Limited means of production</td>
<td>Access to production resources, such as inputs and credit facilities for its associates.</td>
</tr>
<tr>
<td>Persisting threats of disappearing</td>
<td>Financial and social sustainability</td>
</tr>
<tr>
<td>Deforestation due to the use of firewood as fuel for ovens</td>
<td>Environmentally friendly production</td>
</tr>
<tr>
<td>Low competitiveness and growing salt imports</td>
<td>National self-sufficiency in salt production.</td>
</tr>
</tbody>
</table>

This law served to create the Salt Industry Promotion Board as a semi-autonomous regulatory body and driving force for the organization and development of the country’ salt production industry. The Board is made up of representatives from the Ministry of Economy, Trade and Industry (MEIC), the Ministry of Agriculture and Animal Husbandry (MAG), or the National Production Council (CNP), two representatives from the cooperatives or salt producers association, and one representative from the National Banking System.

This Board was key for the modernization and technological development of the salt production industry⁴. It took on

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⁴ The Salt Production Promotion Act No. 6080, dated August 16, 1977.
the functions of technical assistance to producers, granted endorsements and guarantees in credit operations, regulated salt prices, established registration and control mechanisms, and also regulated salt imports and exports.

The support received from public institutions was fundamental for the development of the newly founded Cooperative. With the backing of state agencies, COONAPROSAL, R.L. was able to establish collection points, buy modern truck scales\(^5\), and set up a supply store for its associates. This allowed for an increased capacity for receiving salt from its associates, and slowly but surely the Cooperative created niches in the domestic salt market.

By 1982, the country became self-sufficient in the supply of salt for the domestic market; in 12 years production increased by almost 70%. In 1984, salt producers even had surpluses which allowed them to make inroads in the export market.

The organization of the salt producers, in turn, proved to be a mandatory requirement for implementing the salt iodization policy. This organization encourages dialogue between the State and the producers. If the salt producers are numerous and work in an uncoordinated fashion, agreements and State controls are very difficult to attain successfully.

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\(^5\) Instrument used to weigh or, more appropriately, calculate the mass of freight trucks loaded with merchandise, using their parameters to determine the payload.
III. Formulation and Execution of the Salt Iodization Policy
As in all practices for intended mandatory implementation, the salt iodization policy requires establishing a series of regulations that sets the standards and controls to be observed.

The first regulations in the world concerning the iodization of table salt emerged in two Swiss cantons in the year 1924. Subsequent regulations appeared in Costa Rica (1941), Mexico and the Netherlands (1942), Hungary (1948), and Canada (1949). Most of the Latin American countries approved its first laws in the 1950s.

Costa Rica was the first country to establish mandatory regulations for iodizing salt nationwide. It was Dr. Clodomiro Picado, based on the findings of his research on thyroid physiopathology, who placed on the political agenda the need for taking steps to eradicate endemic goiter in the country.

In his capacity as Director of the National Hygiene Institute, he managed to convince government authorities on the importance of implementing prophylactic measures to prevent this problem.

The President of the Republic at that time was Dr. Rafael Calderón Guardia, a physician who was easily convinced of this need. Consistent with this, he ratified the first executive decree that made it mandatory for salt producers to add iodine to salt (Decree No. 6) in April 1941.

Dr. Picado considered that salt iodization was a patriotic endeavor. Through the years, this spirit accompanied the commitment of different social actors who participated in the promotion of this public policy and upheld it as a national source of pride.
One of the reasons for justifying the decree ratified in 1941 was the need to consider the degenerative pathologies involved. Salt iodization was proposed, and backed by scientific evidence and international experiences. The measure was approved founded on the Public Health Protection Law (No. 52 of 1923). The iodine dose to be added in an homogenous way to salt for domestic consumption was stipulated as 28.35 milligrams per kilogram. This quantity was considered low but appropriate for the initial application of the law.

This decree allowed to place the problem of iodine deficiency disorders on the public agenda. This is how a food fortification standard was established, that was unprecedented in the country or the region. However, its execution faced serious obstacles. At that time, salt producers were numerous and worked under precarious and traditional conditions. All of this made it almost impossible for the regulations to be complied with.

However, the awareness and will of the health authorities and the decision of the Executive at that time were not enough to apply the measure. Thirty more years had to elapse before achieving a true convergence between the political will, institutional capabilities, industrial technological development, organization among producers, sensitization, and social accord in order to implement the salt iodization policy. Finally, in the 1970s, the necessary conditions were met for making it viable. Thanks to the testimony of the actors at that time, the following describes the sequence of events.
Creation of a Sustainable Policy

Based on the studies and initiatives furthered in the 1950s and 1960s by INCAP, jointly with the Nutrition Department of the Ministry of Health, in the year 1970, the initiative of fortifying salt with iodine was revived in the country. In November of that year an executive decree (No. 1341-SPPS) was issued making it legally binding for all table salt to contain iodine in an homogenous form, along with its corresponding Regulations for Iodized Salt (No. 1371-SPPS).

As history had already shown, it was not enough to issue a law and expect it to be implemented automatically. It was necessary to make it viable and thus guarantee its compliance. Following is the description of the various stages that the country went through to effectively establish a sustainable policy for salt fortification with iodine that would have a true impact on the population's health.

Six stages have been identified in the construction process of the salt iodization policy, namely:
Construction of a salt iodization policy: Six stages

1. Establishment of an alliance between the State and the salt producers

2. Modernization process of production and adjustments in legal provisions

3. Evaluation of the policy’s impact

4. Improvement of salt quality and double fortification with iodine & fluoride

5. Actions targeted to endemic areas

6. Adaptation of Legal Provisions to Changes in Dietary Habits of the Population
Stage one: Establishment of an Alliance between the State and the Salt Producers

Pursuant to the Regulations on Iodized Salt in the year 1970, the National Production Council (CNP) was the institution commissioned with the installation of an iodization plant in the region with the highest salt production. It would also be responsible for operating, managing and assuming technical aspects of this plant, in addition to charging the producers for iodization on a cost price basis. The possibility was evaluated at the same time for salt producers to iodize salt at their own facilities, in which case the importation of the machinery and chemical compounds needed would be tax exempt.

According to the decree, the Nutrition Department of the Ministry of Health, jointly with INCAP, would set the proportions of the required mix of potassium iodate and calcium carbonate salts. These were set at 20% and 80%, respectively; in Spanish, this mix is commonly called lime iodine. At that time, a 1:9 ratio was established for table salt, which would later be verified in the final product with a ratio of 100 milligrams of iodine product per 1 kilogram of salt and no less than 67 milligrams per kilogram. The health inspectors would visit the plants and commercial premises to take samples and verify the adequate salt iodization. If the measures were not being complied with, the sanctions foreseen under the Health Code (Law No. 809 of December 1949) would be applied. These regulations would be in force as of the start-up of the salt iodization plant.

To comply with these regulations, it was necessary to build an alliance between the State and salt producers. This was a process wherein a series of elements came together favorably. On the one hand, there were strong State mechanisms and the priority was placed on the population’s health. At the Ministry of Health, both the Nutrition Department, directed by Dr. Carlos Díaz Amador, and the Food Control Department, headed by Dr. Eladio Chaverri, played a critical role in the technical assistance and in the supervisory process for the compliance of the regulations. On the other hand, there was consensus among the private sector for installing their own iodization plant.

The persuasion process and the firm stand by the Ministry of Health on the urgency of iodizing salt were key. The support by CNP was also essential in order to make sanitary provisions viable. But it should be noted that this alliance was not achieved by imposing it, but rather it was built by raising awareness and convincing salt producers about the relevance and impact of this measure on the improvement of the population’s health and in compliance of their own interests.

Eng. Abundio Gutiérrez, general manager of CNP, was the person who promoted the salt iodization decree among the salt producers, carrying out a full-fledged lobbying effort and providing facilitation and support to the salt producers in order to include this measure in their production processes.

At that time, the CNP has 150 outlets and had the power to purchase and set the price of products such as salt. It was the main buyer of most agricultural products in the country and,
as such, was able to condition the purchase to meeting these health requirements. In turn, it had the capacity of supporting the modernization of the production processes.

Salt iodization began implementation as of 1972. The first salt iodization experience was carried out in Colorado de Abangares with the Bonilla family firm6. The first machine for iodizing salt was designed and manufactured at a national machine shop, replicating one provided by INCAP. The latter was being used in Guatemala for salt iodization. The machine consisted of an endless screw that mixed salt and iodine. This technique was in use during five years.

With the creation of the cooperative, the alliance between the State and the salt producers was strengthened. This type of private enterprise presented advantages for the Ministry of Health, since its philosophy enables joint teamwork in favor of public health. An example of this is that COONAPROSAL R.L. was created under the following principles:

“...generate economic growth and welfare of its members, by means of the application of the cooperative principles of Cooperation, Co-ownership, Co-management, Collaboration, Social Responsibility, Economic Democracy, Fairness, Equality, Autonomy and Independence, and Commitment towards the community.” (Sic.)

The vocation for service and social sensitivity of this Cooperative was evidenced in the level of commitment it assumed in favor of the salt iodization throughout the years.

Nevertheless, the conditions that gradually developed at the Cooperative were not the same for the other salt producers. The decree authorized any salt producer to develop its own salt iodization process as long as it complied with the established

“He (the Minister of Health) talked to me about the urgent need for iodizing salt, since there was a substantial problem with goiter among people. But the salt production process was not in the hands of the government but rather the private enterprise. We only had one possibility to make it mandatory: we were the main buyers of salt, so we could demand that they include iodine in its process. At that time, salt producers cooperated with us, although explaining it to them was no easy feat, since they were very simple people. Those calling the shots were the Bonilla family, who had the most power, processed the largest amount of salt, and had better connections with the other producers. So they began to unite forces gradually and eventually formed a cooperative. They were the ones who convinced other producers.”


6 The Bonilla family was pioneer and later acted as promoters of salt iodization among the rest of the salt producers. In fact, they assumed the commission of creating a salt iodization plant instead of the CNP. This was a key family group at this initial stage since they were the salt producers who carried the greater weight in the region, and they later became the promoters for the creation of the COONAPROSAL R.L. cooperative.
proportions. The decree failed to stipulate the specific salt iodization procedures to be followed.

Due to the above, not all the producers used the iodization machine designed with the assistance of INCAP. In the 1970s, there were numerous salt producing companies that operated under very different conditions.

A vast majority used a rudimentary form of iodization known as “shoveling,” which consisted of mixing the iodine using shovels. This procedure did not guarantee a proper distribution of the mix in the salt. The following images illustrate the traditional way of iodizing salt used by the salt producers.

The differences in the salt production methods and its iodization were factors that had a bearing on the decrease in the number of salt producers. When they failed to comply with the sanitary provisions, many companies were forced to close or dedicate their production to livestock salt.

The implementation of the salt iodization decree is part of a government collaboration policy. The state provided support to the salt producers, guaranteeing advisory services, technical assistance, and incentives to decrease the costs that implied fortifying salt with iodine. Technological progress in salt production methods paved the way for a new

“Abundio Gutiérrez was executive president of the National Production Council. He convinced my father of the urgent need of iodizing the salt in Costa Rica; (…) like persuasion among friends.

Later on, we started working with Dr. Chaverri, who was in charge of Food Control at the Ministry of Health. He used to tell me that he had the obligation and the right to do things the proper way (…) The obligation to be an exemplary citizen.”

Carlos Bonilla,
Salt Cooperative Member
stage that later permitted the improvement of salt iodization.

**Stage Two: Modernization Process of Production and Adjustments in Legal Provisions**

Throughout the '70s, changes were gradually incorporated into the salt production, favoring the salt iodization policy. In turn, the legal provisions were slowly adapted to guarantee a proper salt fortification.

As mentioned before, the production method of "cooking" the salt using firewood for evaporation purposes was replaced by the solar drying system. Other developments were incorporated in the manner in which the product was packed and marketed. At the beginning, salt was extracted and stored in sacks. This is how it reached businesses. At grocery stores, a pound of salt would be weighed on a scale, wrapped in paper and sold. Under these conditions, salt was exposed to contamination, and the way it was stored was inadequate for preserving any iodine in the product. It was also impossible to track its origin.

With the modernization process came the use of plastic bags. This enabled the plants to pack and label their salt. Thus, hygiene measures improved in the handling of the product. A few salt producers objected this measure due to the costs involved. However, the Ministry of Health was adamant and did not budge when demanding the implementation of this measure. So the humidity-logged sacks of salt in the stores’ warehouses disappeared and were replaced by salt in plastic bags placed on the stands or supermarket shelves. All this benefited the preservation of the iodine in the salt, as well as guaranteeing the safety of the product offered to and consumed by the population. This was also a great contribution to public health.

The qualitative leap of the salt industry in the country happened in 1980. COONAPROSAL R.L., with CODESA’s support and financing by the Dutch cooperative bank RABO BANK, installed a salt refining plant. This plant introduced the salt washing and drying process. This allowed production to go from a simple marine salt, with a high level of humidity and large contaminated crystals, to a dry, purified and homogenous salt. This finer, better quality salt was very well received by consumers.

A laboratory for bacteriological and quality-control analyses was installed at the Refinery. In turn, with a drier and finer salt, the Cooperative was able to substitute the type of iodine applied for fortification purposes. It began to use potassium iodide instead of the potassium iodate/calcium carbonate mix (lime iodine). In this sense, the change was also favorable to people’s health. This development, however, could not be implemented by all the salt producers, given the irregular quality of salt they were producing then.

On the other hand, the Ministry of Health drew up new legal provisions. A total of six executive decrees were ratified in the decade of 1970. The contributions of Dr. Arnulfo Noguera, as regional advisor for INCAP, were essential in their supporting capacity. INCAP published its criteria concerning the proper salt iodization and, in the process, recommended a reduction in the iodine
concentration. This resulted in the ratification of one of the decrees setting forth the new proportion ranging between 50 and 33 milligrams of iodine per kilogram of salt.

The Food Control Department of the Ministry of Health took on the task of monitoring the salt-producing plants and the businesses that sold it. Sanitary inspectors at local levels were commissioned to take salt samples and to send these to the Ministry of Health laboratory for their evaluation. This is the manner in which sanitary inspection was created. However, the laboratory’s capacity for testing the samples in a systematic way were limited, given the multiple requirements it had to handle for other food products. Added to this, the potassium iodate/calcium carbonate mix, or lime iodine, being applied for fortification produced a film in the measuring apparatus that made it difficult to obtain a proper reading of the iodine dose found in salt.

Given the above conditions, controls were not that stringent. The original decision consisted in verifying that salt producers applied iodine and that the product was placed on the stores’ shelves duly
labeled with the wording: “Iodized Salt for Human Consumption.”

Later on, a new public health initiative modified this situation and reinforced the monitoring of the process, as well as assuring a homogeneous quality of the salt and its fortification. This initiative marked another stage, as described below.

**Stage Three:**
**Evaluation of the Policy’s Impact**

To prove that the measure adopted had had an impact on the population was key in order to consolidate the salt iodization policy. This verification served as an incentive for the salt-producing companies, since they were able to confirm the importance of this sanitary measure and the contribution they were making in favor of the population’s wellbeing.

Several studies evidenced this progress. The National Children’s Hospital and the Carit Maternity Clinic, both belonging to the Costa Rican Social Security Institute (CCSS), were able to gauge the pulse of maternal and child health. University of Costa Rica’s National Institute for Health Research of the (INISA) undertook a study in 1979. This study proved that the percentage of children born with cretinism was reduced by half as compared to the years prior to implementing the salt iodization policy. By the end of that decade, cretinism ceased to be a serious health issue in the country.

Other studies by INISA also revealed that there had been a reduction in endemic goiter, subsequently confirmed in 1979 by the National Nutrition Survey. As pointed out previously, they were able to verify a reduction in endemic goiter down to a 3.5% prevalence nationwide.

The 1979 National Nutrition Survey showed adequate iodine levels in urinary excretions of the population under study, which proved that there was a higher iodine intake than that found prior to the salt iodization. This allowed the calculation that, through salt intake, each individual received 116 μg/day of iodine in a supplementary form—a quantity slightly higher than the recommended daily intake (100 μg/day of iodine).

However, this survey found the existence of a wide range of iodine levels in the salt samples analyzed, as compared to the maximum and minimum values set by the decree. Seventy percent of the samples showed values of 17 milligrams of iodine per 1 kilogram of salt. It should be recalled that the decree established a ratio ranging between 50 and 33 milligrams of iodine per kilogram of salt.

In 1979—the same year as the National Survey—the Ministry of Health carried out a technical and administrative assessment of the National Food and Nutrition Program. This assessment indicated that salt producers applied iodine to the salt, but in many cases, at lower doses than those stipulated in the decree.
Nevertheless, it seems interesting that by mid-1970s health services evidenced that there was an increase in patients experimenting thyrotoxic storms. This fact revealed that salt presented an excessive amount of iodine sufficient to induce a hyperthyroidism epidemic among susceptible persons. The situation was corrected by amending the corresponding regulations thereby decreasing the iodine quantities.

**Stage Four: Improvement of Salt Quality and Fluoride Fortification**

The 1966 National Nutrition Survey identified a high incidence of dental cavities among the population. These findings prompted a group of dentists to organize and work jointly with the Ministry of Health in order to diminish those dental problems.

A new initiative then arose for fortifying water with fluoride, a micronutrient that reinforces and strengthens dental structures. The program was launched in 1976, but it could only be implemented in the Metropolitan Area of Costa Rica. The results were not as positive as anticipated. Technical and financial aspects made the implementation of this measure ineffective. In fact, by the early 1980s the rate of cavities had not varied significantly.

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As such, in 1983 the Oral Health Department of the Ministry of Health assessed the progress achieved with salt iodization and decided to conduct a feasibility study to apply fluoride to salt. To this end, work was coordinated between the departments of Oral Health, Food Control and Nutrition of the Ministry of Health, and the salt producers as well. Also collaborating in this study was the Costa Rican Institute for Research and Teaching in Nutrition and Health (INCIENSA).

The task consisted of carrying out field visits to evaluate the iodization processes at the salt-processing plants. The results found enabled the identification of certain problems, the signs of which had already been seen since

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7 The thyrotoxic storm or thyrotoxic crisis constitutes the organism’s exaggerated response to the increase in thyroid hormones, manifesting itself through a metabolic situation and an overactive sympathetic nerve, showing the following symptoms: tachycardia, arrhythmia, nervousness and restlessness, tremors, ventricular failure, diarrhea and hyperthermia. It may progress to a coma.

8 Indices of decayed, missing or filled teeth (DMFT) ranged between 3.1 to 11 in the rural areas and 1.9 to 7.4 in urban areas.
the late '70s. The doses of iodine being applied were not homogeneous, even in the samples taken from one single company. Iodization was not being done in the most efficient manner, since the technique used caused the loss of this micronutrient.

This study revealed important variations in product quality among the different companies. Some salt companies produced a course, unprocessed salt which was being packaged and sold with high levels of humidity and impurities. Also, iodization was being done empirically with potassium iodate, or lime iodine, using the traditional shoveling method for mixing purposes. This generated serious homogeneity problems in the distribution of iodine.

The conclusion reached by this research was that the majority of the salt producers did not meet the minimum requirements for the fluoridation of their products. This procedure required salt with humidity rates lower than 1% for the micronutrient not to separate. Much of the salt produced at that time had humidity rates exceeding 3%.

Of the 25 salt-producing companies that operated in the country then, the study identified only seven with adequate or improvable conditions for salt fluoridation. Three of these offered the best quality products, as follows: COONAPROSAL R.L., with its “Sal Sol” refined salt; “Sal Diamante”; and COOPEPROSA. The latter two industries already had a ground, dry salt, which in appearance was very similar to refined salt. On the other hand, the companies Sarú, Puntarenense, as well as the salt-producing plants of Paquera and Jicaral, were in the process of improving the quality of their product.

Salt fluoridation requires a better quality salt than that needed for iodization, since a very efficient and homogeneous mix must be guaranteed. On the other hand, the risk of toxicity due to inappropriate fluoride dosage made it essential to ensure quality control at the plants, as well as proper handling of this micronutrient by trained personnel.

In order to implement this measure, the Ministry of Health developed a communications strategy with the salt producers. The goal was to have them accept their deficiencies in order to motivate them toward change. The response of the salt producers to this new health measure was good. They understood that with this new initiative they would improve the quality of their salt, as well as their competitiveness in the market. Incidentally, the iodization process would be more appropriate and would contribute to diminishing the problem of dental cavities in the population. With these sanitary measures aimed at fluoridating salt, the country’s salt industry moved to a new phase where a greater concentration of the production lied in the hands of fewer companies, with improved technological processes and a greater supervision on the part of the State.

The cooperative training, the sense of social responsibility, and the spirit of solidarity among the companies once again assisted in this process. In turn, the unity achieved by salt producers in their joint work at the Salt Producers Development
Board allowed them to join efforts to achieve the implementation of this new health policy.

The strategy implemented by the Fluoridation Program of the Ministry of Health was to develop a theoretical and practical course addressed to salt producers, which would allow them to adapt the conditions for salt production and its fortification. To finance and develop this training course, they had the support of WHO. Several regional and international advisors supported this task, including Dr. Guillermo Roviralto. Dr. Thomas Marthaler was also invited to back this initiative in his capacity as expert on the matter and a pioneer in water/salt fluoridation in Switzerland. Dr. Marthaler visited the salt producers and played a very important role in developing the course.

The training course was accompanied by the progressive installation of the quality control and results assessment processes at the salt production plants. These plants were now equipped with laboratories and trained personnel for handling the specific iodine and fluoride analyses. Part of these costs was borne by the salt producers.

The practical training activities were carried out at the INCIENSA laboratory, since the Ministry of Health laboratory did not meet the necessary requirements. That Institute also took on the responsibility of supporting the installation of small laboratories at the salt-producing plants.

The W.K. Kellogg Foundation was a key ally in this process. It contributed the laboratory equipment and new technology for salt fortification. It also contributed financial resources for the training and promotion of salt fluoridation. This Foundation also provided salt producers with the fluoride needed for three consecutive years. Given the high costs of this equipment and supplies, the Foundation’s contributions were important incentives for the salt producers.

The salt producers worked jointly with the public health officials and participated actively in each of the project’s stages. Different fortification options were put to the test until deciding on the best alternative. The spaces for debate were plentiful, providing satisfactory results for all the parties involved. As a result, the adjustments were gradually defined to attain an adequate dosage and control of the fortification processes with both micronutrients.

“The Ministry of Health was strict with the salt producers, at the beginning with salt iodization, and later with fluoridation.

To fluoridate salt, we needed to change our equipment and even the type of salt for consumer use.

Hence the success of the program and the organization of the salt producers.

If the State is stringent, companies have no choice but to organize themselves accordingly.”

Carlos Bonilla, Salt Cooperative Member
The salt-producing companies installed their own laboratories with INCIENSA’s technical support and financing by the W.K. Kellogg Foundation.
The different actors involved in this process now participated in developing a set of standards to govern the new sanitary provisions. The salt producers themselves pressured for the ratification of an executive decree banning the sale of salt without being properly iodized and fluoridated.

Fluoridated salt hit the market in 1987, but it took two more years for the executive decree to be ratified. The salt producers were convinced and motivated to assume the double fortification, although the legal aspect had not yet been ratified. They knew they were pioneers in the region and hence took on the task with enthusiasm.

In 1989 the Official Standards for Food Grade Salt (No. 18959-MEIC-S) were established, stipulating the quality standards for consumer-grade salt, as well as for the food industry. Criteria were set forth with regard to the components allowed in the salt—such as mineral components, impurities and microorganisms—as well as the degree of humidity that was deemed acceptable.

Salt should be made up of white crystals with a consistent graining pattern. The marketing of coarse, humid salt was prohibited for human consumption. The levels of fortification with potassium iodide were set at 33 to 50 mg/kg of salt, and with fluoride they were set at 175 to 225 mg/kg of salt. Methods for production, packaging, storage and transportation were also stipulated, aimed at eliminating contamination risks. Lastly, provisions for labeling the product were also set forth.

After the Ministry of Health developed the Fluoridation Program, it was transferred to INCIENSA in 1994. This measure facilitated the ongoing and adequate monitoring of salt iodization. The support provided to the salt producers was key to the success achieved. From the onset, there existed fluid communications between the salt producers and the public health personnel. At present, should INCIENSA detect levels of iodine or fluoride that do not meet these standards, it contacts the salt producers in order to study the situation and correct it.

The fluoride program greatly benefited salt iodization. It allowed the supervisory body to resume and implement salt fortification in a systematic manner. In addition, it helped improve its quality. All this occurred at the same

“The salt-producing plants had to make modifications to install the fluoridation cones; practical things were used, for example, COONAPROSAL R.L. has a wood platform and thus the cone was installed on it without any expense involved.

If our technology is compared with that of Switzerland, in the latter everything is computerized, while our method is an adaptation that gradually complied with the requirements. Dr. Marthaler gradually approved everything. This goes into the improvement and development process. We have to back national production.”

Franco Bianchini
Former Director of the Department of Oral Health
Ministry of Health
A more homogeneous mix is guaranteed.

A particular situation took place once the salt production was concentrated in two cooperatives. This scenario made it possible to improve the controls and the advisory capacity provided by the Ministry of Health. It should be stated that a vast majority of the small producers grouped into either of these two cooperatives. This information is significant, since the concentration of production in a couple of companies may prove harmful if it entails the elimination of smaller producers in a single stroke.

However, for the Costa Rican people, the benefits were great. Not only did the purity and quality of salt improve, but it also benefited people with a prophylactic measure for their oral health that helped decrease the existing dental problems.
“We enjoy doing good for others. The Costa Rican food industry is a responsible one. Salt producers were all very responsible—it was more of a Costa Rican trait instead of merely complying with the law. We are very proud of the success achieved by the salt iodization and fluoridation.”

Carlos Bonilla
Salt Cooperative Member

“There is a close community rapport with the salt producers. No policing was ever necessary. Everything happened in a most fluid manner, since the fluoridation program brought about a very collaborative relationship.”

Melany Ascencio
Coordinator of the National Micronutrients Commission
Ministry of Health

“We are very proud. In public health it is very difficult to have such an amazing effect. The product fortification program has most certainly had a visible impact. We can only feel pride in having contributed our own grain of sand.”

Jennifer Lee
Health Regulation Department
Ministry of Health
Stage Five: 
Actions Targeted to Endemic Areas

The new fortification provisions were able to guarantee high-quality iodized salt as the only authorized supply for marketing. By the early 1990s, INCIENSA and the Ministry of Health were able to verify, through the monitoring of salt producers and businesses, the proper implementation of the standards.

As pointed out previously, the Ministry of Health conducted a survey on goiter in 1989, with a sample of school children ages 6 through 12, in the provinces with the greatest prevalence of goiter according to the 1979 survey: Puntarenas and Guanacaste. They also conducted a study on the urinary iodine excretion in a representative sample nationwide to evaluate the presence of disorders.

The results of this survey revealed that in the province of Puntarenas an important decrease of endemic goiter had been achieved, going from an 8.5% to a 3.3% prevalence. In Guanacaste, however, results were not as positive, since the prevalence of goiter increased from 7.3% to 11.3%; in rural areas it even reached 15.8%. This meant that one in seven students in rural Guanacaste suffered from some degree of goiter. For this reason it was declared an endemic area.

These results led the Department of Nutrition and Comprehensive Healthcare of the Ministry of Health to establish a monitoring system in the area, with the cooperation of the local health care centers. This monitoring system was supported by UNICEF and funded by Kiwanis Club, both of whom contributed in the implementation of the Sentinel Schools strategy for selected cantons in Guanacaste.

In 1993 microbiologists and technicians were trained in the Health Centers to carry out the testing of urinary excretions. Also, laboratories were installed in the Chorotega Region for monitoring purposes. Urinary iodine controls were conducted among school children in five cantons in Guanacaste. Salt samples were also collected from homes with the cooperation of the children themselves.

In the studies they found that one in five students presented low and deficient iodine excretions. This particularly affected girls. It was also verified that non-iodized salt consumption was 20% according to the samples in the study. This research also showed that a population group in rural areas was consuming salt for livestock which is not fortified and lacks iodine.

The Ministry of Health, jointly with INCIENSA, undertook several efforts to promote the iodization of livestock salt. However, it was impossible to attain the anticipated objectives. They even tried dyeing livestock salt with an innocuous dye so that the people would not consume it. But there was opposition on the part of cattle farmers; the Ministry of Agriculture and Animal Husbandry did not support this measure either.
Therefore, the decision reached to solve the problem was to promote a dissemination and education strategy to further the use of iodized salt for human intake in the affected areas. The teaching staff at schools and health personnel supported this initiative. Teachers were trained to educate students about the properties of iodine, as well as the functioning of the thyroid gland. To this end, teaching materials were developed, which were distributed among school children. Some of these materials may be seen below.

Teaching materials addressed to students

IODIZED SALT IS GOOD FOR MY HEALTH
Because it contains IODINE and it makes me grow and do well in school
Teaching materials addressed to students

The importance of **IODIZED SALT**
for good health and school performance
Teaching materials addressed to pregnant women and households

Pregnant women also received information during their prenatal control visits at the health clinics. Primary care technicians made home visits where informational pamphlets were distributed for educational purposes.

The importance of IODIZED SALT in pregnant women’s nutrition

Pamphlets distributed among pregnant women during prenatal and home visits.
Teaching materials addressed to families

Informational pamphlet used by primary care technicians during home visits

At the same time, radio spots were created with the collaboration of Radio Nederland, and were broadcast by local Guanacaste radio stations, such as Radio Pampa. These spots underscored the benefits of iodized salt for the development of children and featured local characters which rural people could relate to.

In 1995, the communications strategy was strengthened by a study on the knowledge, beliefs and practices of the population with regard to iodine and its relation to health. This study, conducted in communities with the highest percentage of non-iodized salt for human consumption, showed a low education level among the population and very little knowledge of the origins of the iodine deficiency disorders that they suffered. Also, a series of misbeliefs and prejudices were also identified. It was also discovered that livestock salt was more accessible than iodized salt for people living in farms. It was cheaper and handier to use livestock salt, which was bought in sacks once a year, than buying iodized salt sold in smaller quantities at distant business establishments.

The study’s results provided valuable input to guide the educational campaigns. The radio spots and printed materials with illustrations suited to the context had a greater acceptance by the population, which is why these campaigns were reinforced.

The Sentinel Schools project was an experience that proved very effective for monitoring iodine deficiencies. Also, the
strategies on health education and the campaigns reaped their benefits years later.

The 1996 National Nutrition Survey showed that 97% of the population consumed iodized salt, and 91% of the school children had adequate iodine excretions. This survey revealed that the country had met its goals for iodine and fluoride, as set forth by the World Summit for Children, even some years ahead of the anticipated deadline in the year 2000.

Also, the *Sentinel Communities* were created in 1999 for monitoring the nutritional status of the population in urban and rural areas. To this end, an urban community located in the Metropolitan Area was selected—the district of Damas, Desamparados. A rural community was also selected—San Antonio, Nicoya, a cattle farming district with a disperse population located in the province of Guanacaste.

Studies undertaken in the *Sentinel Community* of Guanacaste revealed changes in the population’s habits and customs with regard to the use of iodized salt. This proved the success of the strategies implemented in the region. The children had managed to transmit their newly acquired knowledge on iodine to their families. National surveys undertaken after this experience confirmed the cultural change in the area.
Stage Six: Adaptation of Legal Provisions to Changes in Dietary Habits of the Population

In the early 1990s, Costa Rica had to face a new challenge: health care centers reported an increase in goiter cases. The mandatory notification of goiter cases on the part of health care services had been stipulated since 1983 (Decree No. 14496-SPPS⁹), and it was through these means that the alert was issued.

The Epidemiologic Surveillance Department of the Ministry of Health was able to pinpoint the most affected areas and begin a research process. In 1994, half the cases of goiter reported originated in the province of Cartago. Faced by this situation, the Ministry of Health and INCIENSA conducted a study in 1996, with a significant sampling of cases reported in that province. They studied the history of goiter individually, running physical and lab tests, and analyzed a sample of the salt used at their homes. Most of the persons were housewives and the highlight of the findings was discovering that, although there was iodized salt in the homes, during food preparation, salt was being replaced by other condiments that included non-iodized salt.

This research study made it possible to identify changes in the population’s nutritional habits that decreased iodine intake. These findings were verified by the 1999-2000 Food Consumption Survey at the Desamparados Sentinel Community. The population was effectively using condensed bouillon cubes and consommés as condiments.

In light of these studies, existing legal provisions were amended. In 2001 a new decree (Decree No. 30032) was passed, stipulating that iodizing all salt used by the food industry and its fluoridation, in the case of salt for producing consommés, was declared mandatory. The levels of salt fortification with potassium iodide were set at 30 to 60 mg/kg of salt, while fluoride levels were maintained at 175 to 225 mg/kg of salt.

The last National Nutrition Survey (2008-2009) conducted showed an absence of iodine deficiencies in the vast majority of the school population. Only 7.1% of the population surveyed presented iodine deficiency excretions. It was thereby concluded that this no longer constituted a public health problem for the country.

The following chart summarizes all the legal provisions ratified throughout the lengthy process of designing and implementing the salt iodization policy in the country.

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⁹ This decree was repealed in 2003 and replaced by another executive decree (No. 30945) whereby the reporting of goiter ceases to be mandatory.
## Costa Rican Legislation on the Subject of Salt Iodization

<table>
<thead>
<tr>
<th>Executive Decree</th>
<th>Title</th>
<th>Date</th>
<th>Main Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nº 1371-SPPS</td>
<td>Regulations for Iodized Salt</td>
<td>23/11/1970</td>
<td>Installation of iodizing plant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Proportion of 100 to 67 milligrams of iodine per kilogram of salt.</td>
</tr>
<tr>
<td>Nº 1391-SPPS</td>
<td>Amendment to Regulations for Iodized Salt</td>
<td>09/12/1970</td>
<td>It is clarified that the salt produced is for human consumption and it must be labeled accordingly.</td>
</tr>
<tr>
<td>Nº 1544-SPPS</td>
<td>Amendment to Measures for Preparation of Table Salt</td>
<td>08/03/1971</td>
<td>The term stipulated for the iodized salt plant operation is extended nine months.</td>
</tr>
<tr>
<td>Nº 3372-SPPS</td>
<td>Amendment to Provisions for Salt Preparation</td>
<td>16/11/1973</td>
<td>A new level ranging from 50 to 33 milligrams of iodine per kilogram of salt is stipulated by law, as per the recommendation of INCAP.</td>
</tr>
<tr>
<td>Nº 9605</td>
<td>Regulations for the Industrialization and Sale of Table Salt for Human Consumption</td>
<td>13/02/1979</td>
<td>All the provisions are taken up again for the new regulations.</td>
</tr>
<tr>
<td>Nº 18959-MEIC-S</td>
<td>Official Standards for Food Grade Salt</td>
<td>27/04/1989</td>
<td>Establishes quality standards for salt and sets forth the doses for iodine and fluoride. Also defines the standards for storage and labeling of the product.</td>
</tr>
<tr>
<td>Nº 30032</td>
<td>Amendment to Official Standards for Food Grade Salt</td>
<td>03/12/2001</td>
<td>Salt iodization and fluoridation are declared mandatory for the food industry in the case of salt used in producing consommés. Iodine and fluoride doses are adjusted.</td>
</tr>
</tbody>
</table>
Current Scenario

At present, the monitoring process of salt iodization in the industry and trade sectors is a responsibility taken on by INCIENSA, jointly with the health inspectors. This institution is accountable for the results to the authorities of the Ministry of Health, especially to the Health Regulation Department and the Health Surveillance Department under said ministry. The following diagram summarizes the monitoring actions, their periodicity, and those responsible for the process.
Diagram 1

Monitoring of the Salt Fortification Process with iodine

INCIENSA

Taking of salt samples

At salt production plants (sales and warehouse) twice a year

At the businesses, two regions per year

Fortification testing at the INCIENSA laboratories (1,000 samples per year)

Test results are sent to the Health Regulation Department, Ministry of Health

Verification of compliance of the Standards

Complies

NO

YES

Transferred to the Health Steering Area, who in turn applies the sanitary measures in industry and commerce.
Imported salt is governed by domestic regulations for its marketing. As such, its importer must submit a certification from its country of origin. It must state that the product meets all the iodine and fluoride fortification requirements in order to enter the country. At present it is an expedite procedure since the Ministry of Health has staffed a special one-stop window for this purpose. The imported salt is also subject to testing by the Ministry of Health/INCIENSA directly in the market. Local salt producers are also vigilant that the imported salt meets the requirements stipulated by law. If it does not comply, they would report it to the Ministry of Health.

In 1998 the National Micronutrients Commission was created by decree (No. 27086-S). This is an agency under the Ministry of Health dedicated to technical assistance and advisory services. Its function is providing advice in policy making on this topic and promoting inter-institutional and intersectoral coordination of actions addressed to the prevention and control of micronutrient deficiencies. It also plays an important part in raising awareness among decision makers, producers and consumers, with regard to the magnitude and importance of micronutrient deficiencies in the population. Moreover, it has the responsibility of regularly monitoring and evaluating the enforcement of the action plans with regard to micronutrients, and recommending mechanisms and procedures to guarantee the quality of food fortification.

The Commission is made up of representatives from the Ministry of Health (in charge of coordination); INCIENSA; the Costa Rican Social Security System; the Ministry of Economy, Industry and Commerce; University of Costa Rica; the Costa Rican Chamber of Food Industry; and the salt, wheat flour, and sugar industries.

On the other hand, at present only two salt-producing industries exist, namely: COONAPROSAL R.L., encompassing 70% of the domestic market, and Brinsa Costa Rica, providing salt to the rest of the market. With the signing of the Free Trade Agreements and the importation of foreign salt, salt producers are once again faced with the threat of disappearing.

Nonetheless, COONAPROSAL R.L. was able to revert the situation by importing salt from Mexico. Its economic advantage lies in the salt-refining equipment it owns in order to fortify salt pursuant to national regulations, also contributing its knowledge of the domestic market. Thus, it was able to control imports and many of the Cooperative’s associates made arrangements to replace their salt production with shrimp farming.

“For us, the monitoring process has been a form of support, since supervisory efforts have failed. The objective is to improve. When a new cone arrives at the salt-producing companies, we go there and calibrate it, always with a view to contributing to people’s health.”

Thelma Alfaro
Bromatology Reference Center at INCIENSA
Also, the Cooperative launched a low-sodium salt, proving it was one step ahead of the global policies to decrease salt intake, aimed at preventing high blood pressure problems in the population.

With this experience, the private sector and public institutions have demonstrated that it is possible to create a robust alliance in favor of the nutritional health of the population. An indicator of a sound public policy is that all the social actors involved in the implementation of salt iodization in the country feel they are responsible for its creation and execution.

“The most important thing is that the State is truly convinced of the need for iodizing salt. Once convinced, it should implement it. In Costa Rica it’s a cultural aspect; people can’t imagine doing it any other way.

It is a way of thinking, of doing things. It has nothing to do with the cost. Everything can be achieved... even if costs are a bit higher; there is a sense of social responsibility involved here.”

Carlos Bonilla
Salt Cooperative Member
Development of Surveillance Measures to Control the Iodine Content in Salt

INCIENSA conducts two evaluations per year, testing the samples taken from both salt industries and businesses. This testing allows to control if the quantities of iodine in the salt are the appropriate levels.

The monitoring conducted by INCIENSA allows to evaluate the efficiency of the salt iodization process.
Lessons Learned

- It is essential to formulate public policies that make salt iodization for human intake mandatory nationwide. This must go hand-in-hand with the government’s decision of enforcing these policies and establishing effective controls.

- Legal provisions should take into consideration the conditions of the salt-producing companies. In addition, improvements in production processes should be promoted to guarantee the safety of the salt produced and the preservation of the micronutrient. These changes are more feasible to the extent that the salt-producing sector is centralized instead of being dispersed.

- The creation and consolidation of alliances among the different sectors and key actors involved constitute an essential process for promoting salt iodization. Alliances such as those taking place between institutions from the economic, productive and health sectors, within the Costa Rican government, as well as those who facilitated the coordination of efforts between companies from the business sector and public authorities, were of the essence in the country’s salt iodization experience. Promotional efforts played a key role in the salt producers’ organization, as well as the willingness shown by leading salt producers with the capacity to exert influence over producers and industrialists who, also convinced of the importance of iodizing salt, furthered the signing of a sectorial agreement. This shared social responsibility is clearly the fundamental pillar of this public-private alliance.

- The political, technical and financial support of the State is doubtlessly vital for the salt-producing companies to include salt iodization in their production processes, thus guaranteeing its effective enforcement. Establishing obligations without offering state support to the producers would be counterproductive. It is also indispensable to promote the modernization of the salt production and facilitate technological development in the companies, in order to modify old traditional processes.

- The development of ongoing research allows us to see the impact of salt iodization globally on the population’s
health. This enables the evaluation of the results obtained. In turn, it is also an incentive for salt producers and a recognition of the value of their collaboration.

- initiatives such as Sentinel Schools and Sentinel Communities have proven their efficacy for watching over nutrition at a lower cost than that of the National Nutrition Surveys. In turn, this alliance between teachers and health officials constitutes a key strategy to motivate the population’s education, thus reverting the situation in endemic areas.

- Salt fluoridation contributed to the improvement of salt quality and forced the implementation of an adequate monitoring system which in turn favored iodization as well. This implied demanding more from the salt producers and the selection of the salt companies that fulfilled the required technical criteria. Thus the importance of considering contingency plans for those salt producers that failed to comply with the standards, redirecting them towards other production sources.

- The epidemiological surveillance and quality monitoring of salt iodization must be sustained over time. Likewise, alerts must be activated in the event of changes that occur continuously in the market and in the nutritional habits of people. Both of these represent challenges that must be addressed.

- The population needs to have information on the benefits of consuming iodized salt; this is a part of their health rights and is also a fundamental strategy for promoting citizen monitoring in favor of the fulfillment of sanitary measures for the marketing of salt.
A series of conditions occurred that spurred the success of the salt iodization policy in Costa Rica. The progress achieved by the country on this issue cannot be attributed to any single isolated factor. The legislation ratified in 1941 did not suffice to guarantee the implementation of this sanitary policy, despite being scientifically founded and a breakthrough in its field. Socio-economic processes were needed in the 1970s to promote its implementation. Later on, in the 1980s, the health policies helped perfect the law. Also, the transformation processes of the salt industry, and its centralization and modernization proved fundamental. All of the above, together with the social and economic development of the country, contributed to the improvement of public health with a measure so simple and sensitive as salt iodization.

However, the successful achievements were not a guarantee of its continuity. If the policy cannot maintain its capacity of facing the threats posed by each era, its permanence will be affected. In this sense, the sustainability of the institutional efforts, as well as the business commitment, constitute fundamental pillars on which this policy is firmly entrenched in the country. The policy, on the other hand, allows for the growth of all sectors involved. Each stage has entailed specific challenges and the deployment of a series of strategies that proved to be fruitful.

From the experience in Costa Rica, four aspects in the national and international context can be underscored, which were essential conditions to achieve a sustainable salt iodization policy. These conditions are the following:
a) The support and advisory services by international organizations such as INCAP, WHO/PAHO, UNICEF, FAO, the W.K. Kellogg Foundation and the Kiwanis Club, made it possible to prepare scientific evidence, develop pilot plans, carry out programs and implement high-impact strategies.

b) The State’s support to cooperativism fostered the development of the salt industry, improved the living conditions of salt producers, and established values of collaboration and social responsibility favorable to the joint development of the policy in question.

c) The development of the public health institutions in the country proved vital to carry out all the processes successfully. In addition, efforts such as the salt fluoridation program represent a clear example of how much sanitary measures can be improved, showing that processes are always susceptible to improvement.

d) Increased education levels in the population guaranteed the success of the information and communication strategies for the use of iodized salt. By being well informed, the population was able to demand the supply of better quality salt from the stores.

These four conditions made it possible to develop capabilities that permitted the design and execution of a successful public policy. Seven of these capabilities that were key to the salt iodization policy are summarized in the following diagram:

Should iodine deficiency in the population not have been controlled, the individual, social and economic costs would have been extremely high. If the percentages of goiter and other disorders caused by iodine deficiency would have remained the same as before salt iodization, human development in a substantial number of persons—not to mention the economic and social development of the country—would have been seriously compromised.

The Costa Rican experience indicates the need for remaining vigilant on an ongoing basis for iodine deficiencies in the population. The developments achieved may well be reversed due to multiple conditions and situations that make or break the success of a food fortification policy such as this. The current challenge lies in guaranteeing that the policies promoted internationally for reducing salt intake do not compromise the effectiveness of such a generous vehicle—salt—with which iodine has reached all the Costa Rican homes, with no distinction whatsoever.
The success of the salt iodization policy

1. Identify the problem and its solution
2. Negotiate and build strategic alliances
3. Organization of Salt Producers
4. Modernize the salt industry
5. Establish legal provisions
6. Implement a sustainable surveillance & monitoring system
7. Develop information and education strategies

The success of the salt iodization policy
Persons Interviewed and Participants in the Document Validation Workshop

Leonardo Aguirre, COONAPROSAL R.L.
Thelma Alfaro, Bromatology Reference Center, INCIENSA
Melany Ascencio, Office for Scientific and Technological Development on Health, Ministry of Health
Rigoberto Astorga, UNICEF
Johnny Berrios, Health Information Management Unit, Ministry of Health
Franco Bianchini, former officer of the Ministry of Health
Carlos Bonilla, COONAPROSAL R.L.
Juan Carlos Calvo, General Office of Health Regulation, Ministry of Health.
Margarita Claramunt, Office for Strategic Planning, Ministry of Health.
Cristian Chavarria, Derivados de Maiz Alimenticio S.A. (DEMASA)
Mónica Elizondo, Costa Rican Chamber of Food Industry (CACIA, by its Spanish acronym)
Cecilia Gamboa, Office for Strategic Planning, Ministry of Health
Abundio Gutiérrez, Social Protection Board
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