THE HONDURAN SALT INDUSTRY

AN ASSESSMENT

[PROSPECTS FOR SALT FLUORIDATION]

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Dra Doris Chinchilla, OPS Honduras.
Dra Sandra Gomez, OPS Honduras
Dra Sandra Ramirez, Ministerio de Salud, Honduras.
Ing Jimmy Zuniga, ReSal, Honduras.
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Dra Saskia Estupinan-Day, PAHO, Washington.
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Honduras Fact Sheet

Land Area :	112,088 sq. km, (43,277 sq miles)
Population :	5.83 million
Population Growth:	3.1% per annum 1987-1996
Cities :	Tegucigalpa, pop 750,0000 San Pedro Sula,
Urbanization:	48.6% of population live in towns or urban centers.
Ethnicity:	90%--------Mestizos 7.5%------- Native Indian 2.5%-------Garifunas (Carib and African descendants) 2.5%-------Other (European, Caribbean, etc)
Economy:	Mainly agricultural. Some development of light industry. Move to become export oriented. GDP growth was 3% in 1993. Higher than the average for the Central American & Caribbean Region
Labor Force	1.72 million. Agriculture 62%, Services 20%, Manufacturing 9%, Construction 3%, Other 6% (1985)
Per Capita Income:	U$580. per year (1992)
External debt:	U$2.8 billion (1990)
Exchange Rate	13.1 Lempiras per US$ (Jun-1997)
Fertility	4.8 live births per woman
Crude Birth Rate	37.3 births per 1,000 population (1992)
Infant Mortality	41.4 deaths per 1,000 live births (1993)
Crude Death Rate	6.8 deaths per 1,000 Population (1992)
Life Expectancy at Birth	68.1 Years (1993)
UNDP-HDI	0.524
DMFT	2.24(1997), 8.34 (1987)

1. Activity Summary

The PAHO consultant arrived in Tegucigalpa at 11:30 AM Tuesday Oct 7th. Dras Doris Chinchilla and Sandra Gomez Ventura of the Honduran PAHO office and Dra Sandra Ramirez Archbold of the Ministry of Health's Oral Health Division, met the consultant on arrival. The party set off immediately for the provinces of Valle and Choluteca where the salt production activity is concentrated on the Pacific coast in the Gulfo de Fonseca. A tour of Refinadora de Sal, the largest capacity producer in Honduras, a meeting of Salt Producers and tours of other smaller producers took place. After returning to Tegucigalpa, meetings with the head of the Food Control Division and the Deputy Minister of Health and her Staff were held on Wednesday Oct 8th.

2. Meeting with Salt Producers

A meeting was held in San Lorenzo with close to 20 salt producers from the region. A survey conducted in 1994 revealed that there are 210 salt producers in Honduras. Two types of salt are produced from seawater. **Solar salt** or **sal solar** is made by the solar evaporation of seawater. Evaporating brine to dryness in large vats or vessels makes **"Cooked" salt** or **sal cocida**. Heat is supplied by burning a variety of fuels including propane, but charcoal and wood are the most widespread

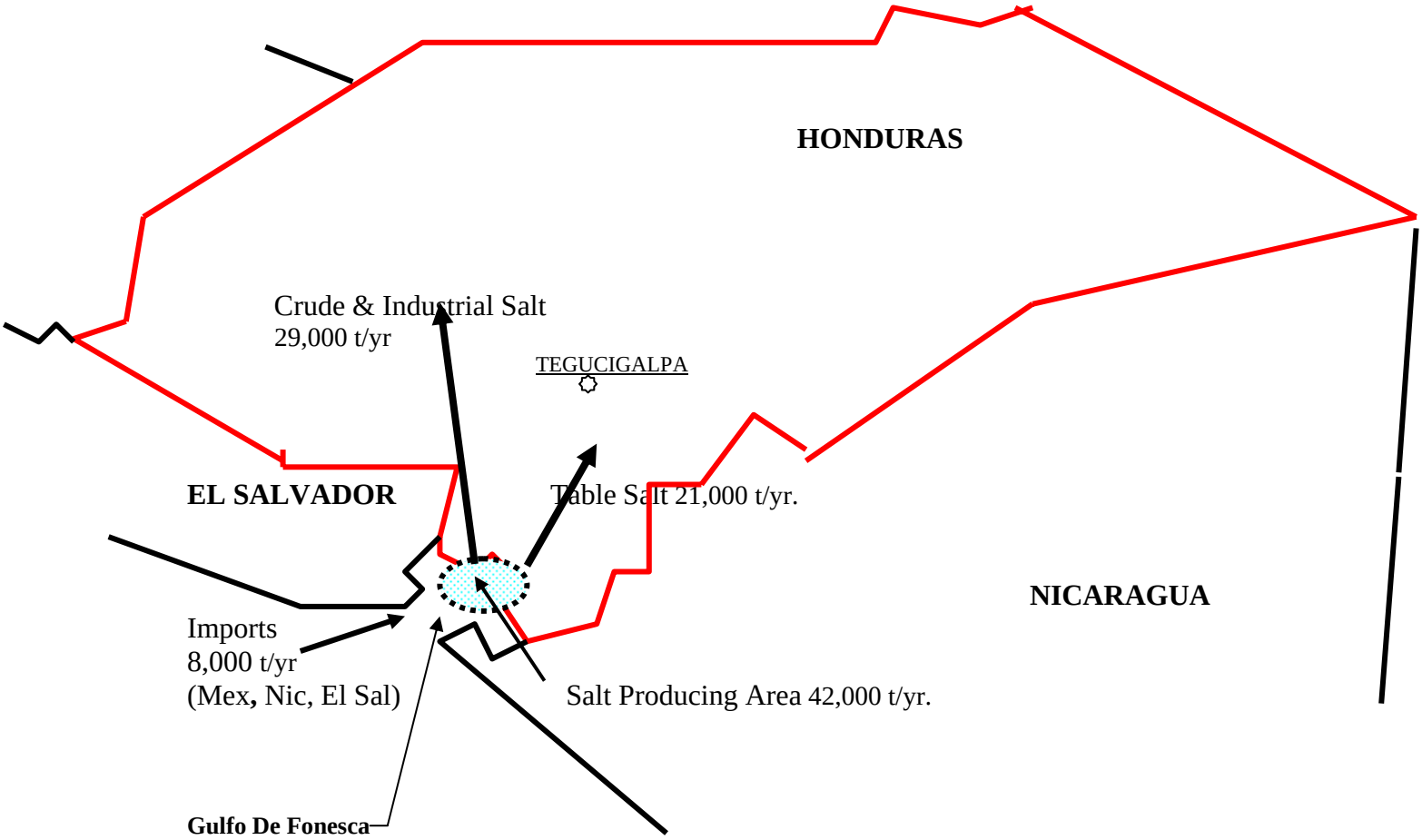
Consumption of salt in Honduras is estimated to be in the order of 50,000 ton per annum. This represents the total of salt for household consumption and salt for industrial use. Local production is about 42000 ton per annum. That is, about 84% of Honduras' salt requirements are produced locally. The 16% or 8000 ton per annum shortfall is made up by importing salt from Nicaragua, El Salvador and Mexico. The exact quantities and proportions imported from each country are not known. See **Table 1** and **Fig 1.**

Table 1: Annual Salt Flows and Balance for the Republic of Honduras (tons)

IMPORTS		PRODUCTION		CONSUMPTION	
Mexico		Solar Salt (Sal Solar)	31,400	Household/ Domestic/ Table (Direct Human)	21,000
El Salvador		"Cooked" Salt (Sal Cocida)	10,600	Industrial Food/ Bakery/ Canning. (Indirect Human)	29,000
Nicaragua				Industrial Non-Food (No Human Consumption)	
TOTAL IMPORTS	8,000	TOTAL PRODUCTION	42,000	TOTAL CONSUMPTION	50,000
TOTAL IMPORTS + TOTAL PRODUCTION	50,000			TOTAL CONSUMPTION	50,000

Salt surveys have shown that the average per capita consumption of household salt is 10 gm per person per day. This level of consumption would account for about 21,000 ton of salt per year.

Figure 1: Diagram Showing Salt Flows for the Republic of Honduras



The production methods and techniques employed for the manufacture of salt in Honduras may be described as mainly artisan. The producers realize that their operations and product quality need much improvement. There is agreement that better equipment and techniques must be employed in order to produce an improved finished product. This is becoming especially critical as the threat of better quality imported salt from Mexico and Colombia looms over them.

The producers have many concerns, some of which they expressed as follows.

1. High level of interest rates, (40%) in Honduras to borrow money for plant modernization.
2. The unavailability of money to finance modernization and/or expansion of their plant and equipment.
3. They would require financial assistance or concessions for the provision of the fluoride chemicals.
4. They want to be able to participate in any changes in the law for salt fluoridation.

The participants pointed to their relatively good record on **iodization** of salt and feel that if given the facilities they can do a good job with fluoridation. The facilities they refer to is that of concessionary financing in order to improve their plant and equipment.

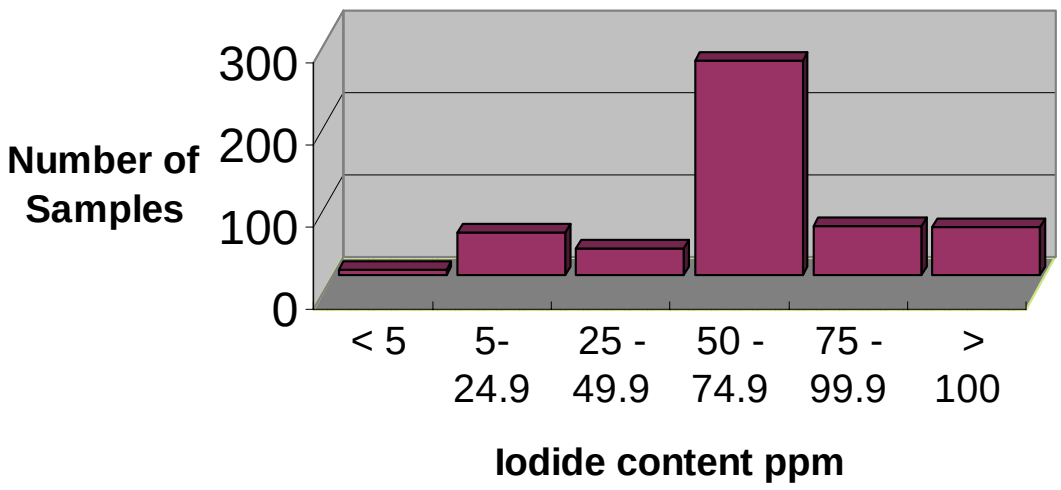
Iodization of salt is done by adding a premix of Potassium Iodate and Calcium Carbonate called **"Yodocal"**. Yodocal is made up of 1 part Potassium Iodate to 9 parts Calcium Carbonate. During the iodization process the equivalent of 4.4 gms of Potassium Iodate, or 44 to 50gm of Yodocal is added and mixed into each quintal i.e. 45kg bag of crude salt after being milled. This amount of pre-mix targets an iodine content of 60 parts per million in the packaged salt. Various producers, depending on their degree of sophistication employ different mixing techniques. These range from simple shovel and stir, to screw conveyor-mixers and converted portable cement mixers.

Despite the rudimentary nature of the iodization process, control of iodide addition is good and the proportion of salt to which iodide is being added is growing steadily. Up to 1994 about 8900 ton or about 42 % of **household salt** was iodized. It was estimated that a further 2,000 ton were iodized up to 1997, resulting in approximately 50% of salt for **direct human consumption,** (household salt), being iodized in 1997.

Concerning control of iodide levels, the results for 1997 are encouraging. See **Table 2**. 55% of the results are within the target range, with greater than 80% of results being greater than or above target, with less than 20% of results being below target.

It may be concluded therefore that the salt producers have done a reasonable job with respect to iodization of salt and will be able to handle the challenges that will confront them with fluoridation.

Table 2: Republic of Honduras Iodide Content of Table Salt (1997)



The other issue raised was the financing of laboratory facilities for fluoride analysis. In the case of iodine addition no quantitative testing of the finished salt is done at the plants. Quality control of iodine addition is achieved by:

1. Mixing the approximately correct proportions of salt and iodine pre-mix.
2. Testing for the **presence** of iodine qualitatively by a simple color reaction to starch-iodine solution.
3. Random testing by the Government of Honduras Food Control Division.

The quality control of salt fluoridation will be more complex than that. It will therefore require the setting up of some analytical facilities at the plant sites to do regular quantitative checks of the fluoride concentration.

3. Meeting with Public Health Officials

Meeting with officials of Division of Food Control

Present from the Food Control Division were **Sra. Sonia Benitez**, Head of the Food Control Division, and **Sra. Vilma Estrada**, Co-ordinator of the Division's Laboratories.

Their main concern were the strategies to improve salt quality so that fluoridation of salt could be started. They had already sponsored the sending of some of the salt producers to Costa Rico to observe the operations of their plants. It was suggested that on the next occasion mechanical and process engineers should be included. Persons with these skills might be the best able to suggest how to adapt the techniques and equipment used in Costa Rico to the specific Honduran situation.

On the question of large-scale industry wide improvement, it was suggested that investment would have to be made in capital equipment, at least in **a wash, mill and dry plant (lavada, molida y secada)**. This needs a certain minimum capacity to be viable economically. Normally the minimum economic size of such a plant would be about 60,000 ton per annum or 10 ton per hour. Under special circumstances a 30,000ton per annum or 5 ton per hour plant could be feasible. A plant this size could satisfy all the table or domestic salt needs for Honduras. Ideally this would mean one plant for Honduras which washed, milled, dried and packaged all the salt. The health officials did not believe that that was feasible because of the following:

1. Unwillingness on the part of the existing producers to unite in order to carry through such a proposal.
2. Lack of availability of reasonable sources of financing for the required investment.

Information was also obtained on the work of UNICEF with the salt producers. One aspect has been a revolving financing scheme to purchase iodide chemical. They are also active in organizing a regular conference of Central American Salt Producers.

Meeting with Deputy Minister of Health

Present along with the Deputy Minister of Health, **Dra Virginia Espinoza** were **Dr Enrique Zelaya** Director of Population at Risk and **Dra Sandra Ramirez Archbold** of the Department of Oral Health.

The meeting participants were updated on the consultant's activities. The PAHO consultant articulated the main challenge as obtaining the necessary financing to upgrade salt product quality and to be able to convince producers that it was in their interest to come together to make the necessary process improvements. Any assistance that was required in the consultant's field of competency was offered.

4. Refinadora de Sal

General:

The Refinadora de Sal or ReSal facility is located near Nacaome in Valle province. It is owned by Antonio Tavel and is run by the very capable and progressive thinking Jimmy Zuniga who is the Production Manager. It was built in 1987 and has an installed capacity of 15,000 ton per annum. Present production averages about 4,500 ton per annum. ReSals CRIS-SAL brand of table salt is one of the more popular brands in Honduras. See **Figure 4,** pg 13.

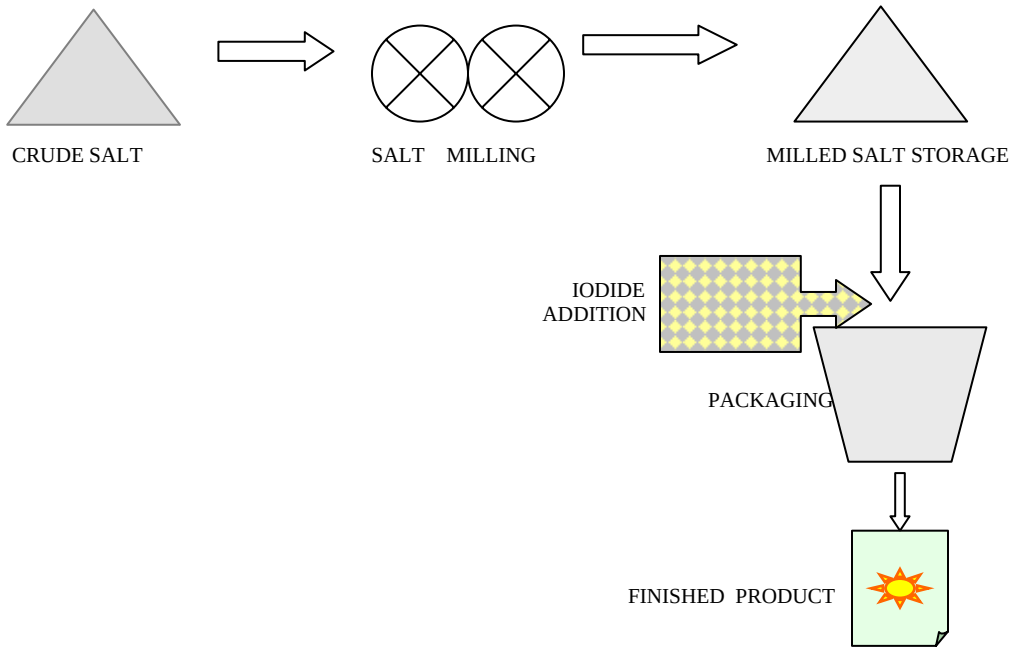
The facilities consist of the following:

- A covered storage area of approximately 100 $m^{2.}$ This area is used to store crude salt, in both quintal, (45kg), bags and loosely.
- A workshop and factory area with bathrooms and supervisors offices.
- A finished product and raw material warehouse with loading bay for delivery to trucks.

Process:

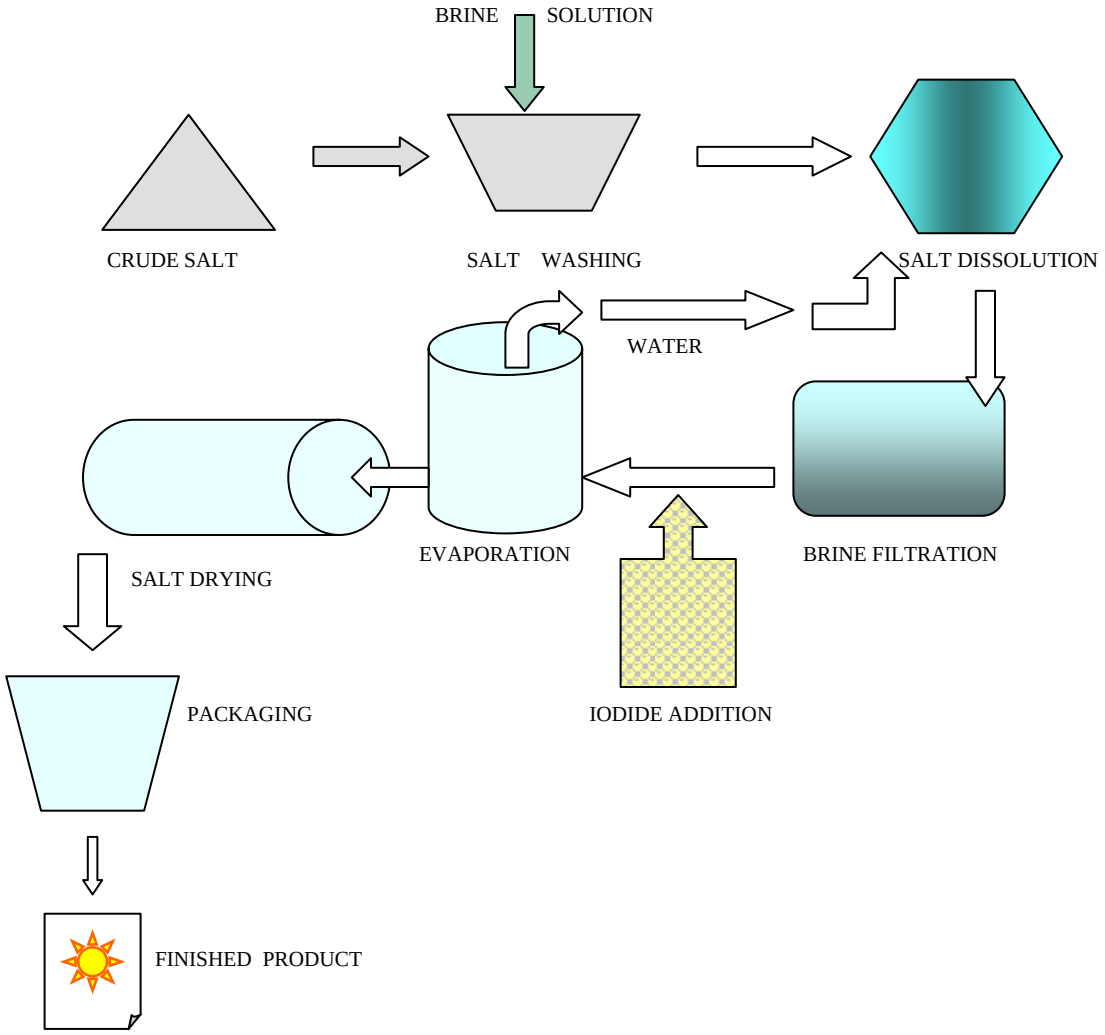
ReSal was built in 1987 as a modern salt refinery using the **evaporative refining process** to produce high quality, clean, dry, regular sized salt. This process however is no longer used by ReSal, as in 1995 a key piece of equipment, the steam boiler, was rendered useless in an accident. Instead ReSal uses the same process used by the rest of the Honduran producers, which is shown diagrammatically in **Figure 2** below:

Figure 2: Diagrammatic representation of the Mill and Package salt process.



This compares with the originally built plant, which used the **evaporative refining process** shown diagrammatically in **Figure 3** below:

Figure 3: Diagrammatic representation of the Evaporative Process for salt refining.



The present **mill and package** process first mills, by way of an adjustable roller mill, the crude salt. This crude salt is obtained from salinas owned by ReSal, and from purchases of crude salt from small producers. Crude salt varies in quality both chemically and physically. Chemical impurities include calcium and magnesium sulfates. Physical impurities include dirt, small stones and sand, as a result of the reaping methods employed.

After milling, the salt is then transferred by bags to the packaging area. The salt is emptied into a screw conveyor. Iodine in the form of **yodocal** is added. The required proportion of this premix, 45 to 50 gm is added per quintal (45kg) bag of milled salt that is added to the conveyor. The conveyor serves to mix the iodine premix with the salt. Tests reveal that a good degree of mixing and adequate level of dosing is obtained.

The salt is then transferred to packing tables. Packaging is done manually with women using their hands to scoop the required amount of salt into the package. They work in teams of 5 to scoop and fill the salt and to seal the package.

Packaging rates vary depending on the package size being produced. For 8 oz, i.e. 1/2-lb packs, rates per team will be between 3.4 to 3.7 tons per day. That is equivalent to 15,000 to 16,300 packs per 8 hour day, or each team packing at the average rate of 32 packs per minute. Peak rates, although not sustainable for long, will sometimes peak at well over 65 bags per minute per team.

For 1 lb packages, total weight packed per day will be in the range 4.5 to 5.4 ton per day. That is equivalent to 10,000 to 12,000 packs per day. More tonnage is packed because less overall time is taken up per lb for larger packs, e.g. one seal per lb for 1 lb packs as against 2 seals per lb for 1/2 lb packs. Average rates for the 1 lb packs are a respectable 23 packs per minute per team.

Quality

The present process results in a lower quality salt than previously manufactured. The salt is neither washed, nor dried. Typical analysis for the packaged salt is as shown in **Table 3** below.

Table3: Typical ReSal Packaged Salt Analysis.

Description	Analysis wt %
Moisture	4.0
Insolubles	1.0
NaCl	94.0
Other	1.0

ReSal is very concerned about their salt quality and have taken the following steps to improve it.

- Imported dry salt from Mexico for repackaging. This move has proven to be very unpopular among the other salt producers in the area.
- Formulating plans to improve their plant process. Specifically they want to move to a mill, wash, dry and package system instead of the present mill, package system that they now operate.

Figure 4: Refinadora de Sal's popular CRIS-SAL brand

Appendix I provides more data on Refinadora de Sal's operations.

5. Empacadora de Sal La Tortuga and Empacadora de Sal Pato Azul

These two salt packers were visited to observe first hand the operations of the typical medium to small producer. All aspects of their facilities and operations are typical of the vast majority of the medium and small salt producers. The brands **Pato Azul** and **La Tortuga**, are very popular. See **Figure 5**, overleaf. The production output of these plants is as follows.

Empacadora de Sal La Tortuga:	2,200 to 2,500 ton per annum.
Empacadora de Sal Pato Azul :	1,800 to 2,000 ton per annum

Facilities consist of a shed of about 55 m^2. One end of this shed serves as a packing area, whilst the other end is used to warehouse finished product. Typically raw material is stored in another covered area adjacent to this main shed, or at the salinas in crude storage sheds.

Mobile adjustable space roller mills typically having 15 to 20 HP electrical or internal combustion motors, mill crude salt. Crude salt is added a quintal (45kg) bag at a time. Milled salt is again bagged for storage or for transportation or conveyance to the packing area. Through this process crude salt particle size is reduced from an average size of 90 % of particles > 0.125 ins to 90% of particles < 0.05 ins.

Just prior to packing the milled salt is added to a screw or paddle mixer. As each bag is added a proportion of **yodocal,** iodine premix, is added. The salt is then finally transferred to the packing tables.

Women use their hands to scoop salt into preprinted plastic bags. The bags are then sealed by foot or hand activated, clamp heat sealers. Package sizes are normally 8oz (1/2 lb) or 16oz (1 lb). Net salt weights are only approximate, as labeled 8oz packs normally weigh closer to 6ozs. On some brands the weight declaration states "**approx**". With some brands there is no net weight declaration at all.

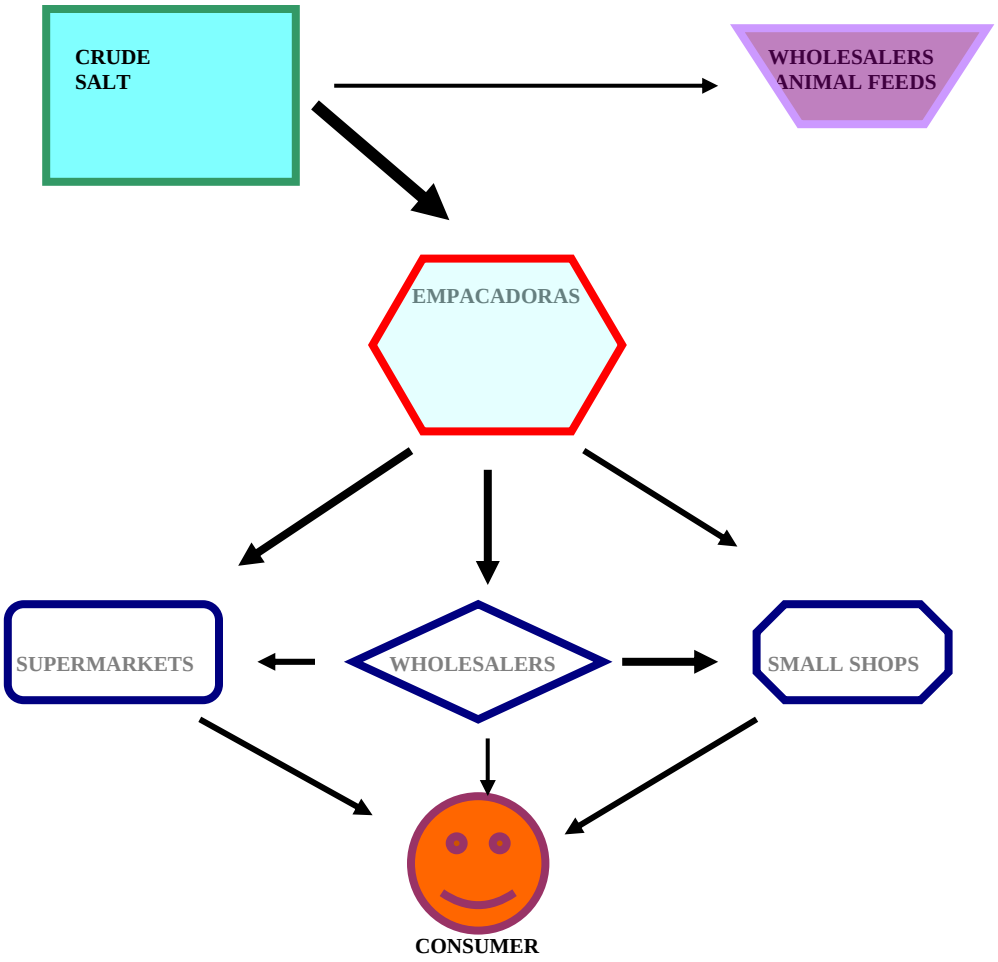
Distribution of the salt is made directly from the plant's warehouse. In most cases salt is sold at the same price regardless of quantity purchase.

Figure 5:
Sal El Pato Azul made by Empacadora de Sal Pato Azul and Sal La Tortuga made by Empacadora de Sal La Tortuga, two very popular brands in Honduras.

6. Salt Marketing and Distribution

The **figure 6** shown overleaf outlines the distribution channels and marketing arrangements for salt. More study is needed to quantify the various streams. Some salt bypasses the Empacadoras and is sold directly for animal feeds and for bulk distribution at wholesalers. Salt that has been milled and packed with iodide added is sold mainly to wholesalers and supermarkets, but there is some amount of direct selling.

Figure 6: Salt Distribution Channels



7. Analysis of the Honduran Situation

The Honduran Salt Industry may be characterized for the main part as still utilizing traditional techniques and methods. The following lists the main characteristics of this industry.

1. **Operations are highly manual.**
   This is so for all areas of the operation. In the production of crude salt all tasks except for the pumping of seawater are performed manually. In the packaging plants although machinery is employed, all transfer points, and storage activities are manual. Only in the transportation of salt is machinery in the form of trucks or vans utilized consistently.

2. **The industry is highly fragmented, consisting of close to 200 producers.** The **Table 4** below shows the number of producers in each production capacity cohort.

Table 4: Number of Producers Categorized by Size and Respective Production

Category of Producer	Number of Producers	% of Total Producers	Production (ton)	% of Total Production
Small < 225 t per annum	151	79.9	13,200	31.4
Medium 225t to 550t per annum	21	11.1	6,800	16.2
Large > 550 t per annum	17	9.0	22,000	52.4
Total	189	100	42,000	100

The size categories may be considered overgenerous by international standards. Only one producer encountered, ReSal, has the level of installed capacity, to be categorized as a small plant by international norms. The other producers, even those stated in this table to be large producers, would be considered micro-producers by international standards.

3. **The price of salt to the consumer is in the range of U$ 0.43/kg to U$ 0.21/kg.** The majority of brands are priced in the lower range of U$ 0.21/kg, but higher quality imported brands and local brands that are well known are priced at a premium. See **Appendix 3.**

4. **The salt quality is below what can now be considered normal international standards**. No producer in Honduras is able to present local salt to the consumer at less than about 4% moisture. Appearance and particle size suffer from inconsistency. Package weights are normally far below the declaration. However packaging quality and the consistency of Iodide levels are considered satisfactory.

5. **There is no capacity among the producers to carry out any quantitative analysis on raw material or finished products**. There is an absence of analytical facilities at the producer level.

6. **The producers have demonstrated the capacity to change and improve.** In the case of the iodization program there has been good co-operation on the part of the producers.

Most of the above stated characteristics will increase the level of difficulty of trying to start a sustainable salt fluoridation program. For one such to succeed, conventional wisdom dictates that a higher level of salt quality is required. This is especially so with respect to moisture content, a dry, (<0.25 % moisture), salt being required.

The important questions therefore are:

1st. What strategies can be used to bring Honduras's Salt Industry to a stage where it can begin a sustainable program of salt fluoridation?

2nd. How long will it take to be effective?

3rd. Are there alternate means of providing fluoridated salt?

Production processes will have to be improved in order to efficiently produce an acceptable quality salt. This is so for two reasons:

1. To be able to start a regime of Salt Fluoridation.
2. To be able to compete effectively with imported salt from highly efficient producers such as Mexico, Venezuela or Columbia.

The obstacles that are in the way of, and suggestions in order to achieve the goal of improved production and productivity are:

A. Interpersonal:

It will be necessary to reduce the hostility and to improve the relations between various camps of the salt producers. It is paramount that the producers see that their individual interest is best served in the long run by forming strategic alliances with each other. There is the fear however that the short term view of "trying to go it on my own", is likely to be the prevailing one. Changing that view through sensitive and sophisticated handling will have to be foremost on the agenda of a Salt Fluoridation Program.

B. Financial:

The improvements necessary will require investments in plant and equipment. Some of the producers have an estimate of U$650,000 for a 5 ton per hour plant. The cost of

a plant can vary considerably depending on the specific features of the plant and options such as the local fabrication of, or purchase of second hand equipment. A 5 ton per hour plant's cost could vary between U$300,000 and U$700,000, and a 10 ton per hour plant between U$400,000 and U$1,000,000. It is possible though for the fabrication of a micro-plant of capacity 1ton per hour or 5,000 ton per year for approximately U$100,000. This size plant has been erected successfully in Venezuela.

At the present interest rates in Honduras, investing in, or borrowing money to invest in a salt plant, could not be justified on purely financial grounds. Concessionary interest rates would therefore have to be applied for this type of activity. It is a possibility that funding through multi-lateral funding agencies could be obtained given the social benefit that could result.

C. Institutional / Organizational

The production methods and techniques in Honduras are highly artisan. It will be important to provide the levels of exposure and training needed to upgrade the producers' knowledge of more modern techniques and methods.

8. Recommendations:

It is recommended that the following strategies be pursued.

1. That more full time effort be placed on managing the process of improving and modernizing the salt industry. This will require a multi-disciplinary committee with understanding of the social, economic and engineering issues involved.

2. That a formal association of salt producers be formed. There are about 8 existing producer cooperatives. However an overall producers association is required, in order to disseminate information and improvements and in order to set the stage for the possibility of producers merging and becoming more efficient. The possibility of offering some incentive should be explored in order to ensure active participation of as many of the producers as possible.

3. That Refinadora de Sal be approached/encouraged to accelerate their program of quality improvement. This company is the best poised, in all respects to begin a program of salt quality improvement and the addition of fluoride. It may be necessary to grant assistance in the form of engineering design, procurement of equipment and analytical facilities.

4. That the Honduran Government/ Salt Fluoridation Committee develops a detailed strategic plan to bring about the necessary changes to the salt industry in order to make fluoridated salt available to the population. This plan would involve looking at a number of scenarios.
    a) The development of a single large, (10 ton per hour ?), plant.
    b) The encouragement of the small producers to modernize along the lines of the Venezuelan "***Micro Plants***".
    c) Importing table quality salt already fluoridated or for dosing with fluoride and packaging.

5. That PAHO develop a "Travelling Seminar " to expose the Honduran Producers to appropriate developments in salt process technology.

6. That a detailed study of the salt distribution and marketing system be made.

7. That PAHO explore the possibility of obtaining funding for improvement of salt production methods and for setting up of analytical facilities for fluoride analysis.

APPENDICES


CORTES
SANTA
BARBARA
COPAN
LEMPIRA
LA PAZ
FRANCISCO
TEGUCIGALPA
EL PARAISO
COLON
GRACIAS A DIOS

APPENDIX 1

Data on Refinadora de Sal

NAME OF COMPANY: REFINADORA DE SAL, S.A.

ADDRESS: Km 2 Carretera a Nacaome; Nacaome, Valle , Honduras, C.A.

TELEPHONE: 504-81-4310, FAX: 504-81-4311

OWNERSHIP: Ing. Antonio Tavel O.

MANAGEMENT: Ing. Jimmy Zuniga, Gerente de Produccion

WORKFORCE: Total employed = 30
Consisting of 4 Managerial, Technical and Supervisory
2 maintenance
20 packers
4 other production

PROCESS METHOD: Originally: Dissolve And Evaporate Salt Refining Method.
Present: Mill And Package.

PLANT CAPACITY: 3 ton per hour or 18000 ton per annum based on 24hr per day 5 day per week, 50 weeks per year.
Or 6000 ton per annum based on 8hr per day 5 day per week, 50 weeks per year.

PLANT PRODUCTION: 4500ton per annum, average over last three years.
Plant utilization approx. 25 %.

PRODUCTS: Brands

Cris Sal → 8 oz, 1lb

Sal Sol → 8 oz, 1lb

Nevada: → 8 oz, 1 lb

El Cisne → 8 oz, 1 lb

Del Pacifico → 8 oz, 1 lb

Sal Industrial → 100lb

Figure 1a:
Re Sal product selection showing 1 lb and 8 oz (1/2 lb) package sizes

QUALITY: Typical analysis of the finished salt are:

Description	Analysis wt %
Moisture	2.5 - 4.0
Insolubles	1.0
NaCl	94.5 - 96.0
Other	0.5

Table 1a: Analysis of Typical Packaged Salt

Iodide content: Typical. range: 0.005% to 0.010% as Iodide ion.

Sieve size US mesh	Wt % retained (cumulative)
16	10
40	75
60	100

Table 1b: Typical Salt Particle Size Analysis

APPENDIX 2

PARTIAL LIST OF HONDURAN SALT PRODUCERS

Name	Brands	Business Phone	Name of Company or Organization
1 Sr Marcio Rodimiro Molina	Sal Corinto	(504)-812435	Empacadora de Sal Corinto
2 Sr Rutilio Ortiz	Sal La Selecta	(504)-812139	Empacadora de Sal La Selecta
3 Sr Pablovicente Sierra	Sal Morena	(504)-812383	Empacadora de Sal Morena
4 Sr Bartolo Banegas Hernandez	Sal Marina	(504)-812143	Empacadora de Sal Marina
5 Sr Arcadio Calderon Corrales	Sal La Tortuga	(504)-812178	Empacadora de Sal La Tortuga
6 Sr Jeral Jose Linaron		(504)-812485	
7 Sr Bienardino Hernandez	Sal Pato Azul		Empacadora de Sal Pato Azul
8 Sr Jose Maria Osorio	Sal Blancamar	(504)-812181	Empacadora de Sal Blancamar
9 Sra Esperanza Dominguez	Sal El Barquito	(504)-812228	Empacadora de Sal El Barquito
10 Sra Mariana Banegas	Sal La Macarela		Empacadora de Sal La Macarela
11 Sra Rosa Maura Montoya	Sal La Muneca	(504)-812447	Empacadora de Sal La Muneca
12 Sr Miguel A. Estrada Valdez	Sal Yodada La Peria y Calamar	(504)-812244	Empacadora de Sal YodadaLaPeria y Calamar
13 Sr Pedro Rafael Molina Garcia	Sal Yodada Sirenita	(504)-812207	Empacadora de Sal Yodada Sirenita
14 Sr Jimmy Zuniga	Cris-Sal,Sal Nevada, Sal-Zol, Sal del Golfo	(504)-814310	Refinadora de Sal, S.A.

APPENDIX 3

PRICE COMPARISONS OF VARIOUS BRANDS
OF SALT AVAILABLE IN HONDURAS

	Brand	Product	Country of Origin	Pkg. Size	Price Lps	Price * U$	Price*/kg U$/kg	Price*/lb U$/lb
1	Sal Corintos	Iodized	Honduras	6.0oz	0.50	0.038	0.223	0.101
2	Sal La Tortuga	Iodized	Honduras	6.0oz	0.60	0.045	0.267	0.121
3	Sal Pato Azul	Iodized	Honduras	6.0oz	0.50	0.038	0.223	0.101
4	Sal El Barquito	Iodized	Honduras	6.0oz	0.50	0.038	0.223	0.101
5	Sal Yodada de Peria y Calamar	Iodized	Honduras	6.0oz	0.50	0.038	0.223	0.101
6	Sal Yodada de Sirenita	Iodized	Honduras	6.0oz	0.50	0.038	0.223	0.101
7	Cris-sal	Iodized	Honduras	500gm	2.75	0.208	0.417	0.189
8	El Cisne	Iodized	Honduras	6.0oz	0.50	0.038	0.223	0.101
9	Sal Nevada	Iodized	Honduras	6.0oz	0.60	0.045	0.267	0.121
10	Sal Venus	Iodized	Costa Rico	500gm	3.15	0.239	0.477	0.216

* NB 1 U$ is equivalent to 13.20 Honduran Lps

APPENDIX 4

Map of Honduras Showing Salt Production Areas

GULFO DE FONESCA
Salt Production Area

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