Romania

High prevalence of goiter and cretinism throughout the mountains and hilly regions of Romania (1) led to a program by MOH in 1947 to distribute potassium iodide tablets to school children (once a week) and pregnant women (twice a week) in mountainous areas. In 1956, MOH issued a directive for the supply of iodized salt at 9-15mg iodine/kg in the 30 most affected districts although the sales of non-iodized salt remained permitted in the same areas. In 1986, however, a survey among >135,000 school children aged 6-14y, coordinated by the Institute of Endocrinology, found persistent goiter throughout the country, reaching >5% not only in the mountainous and hilly districts (Fig 1).

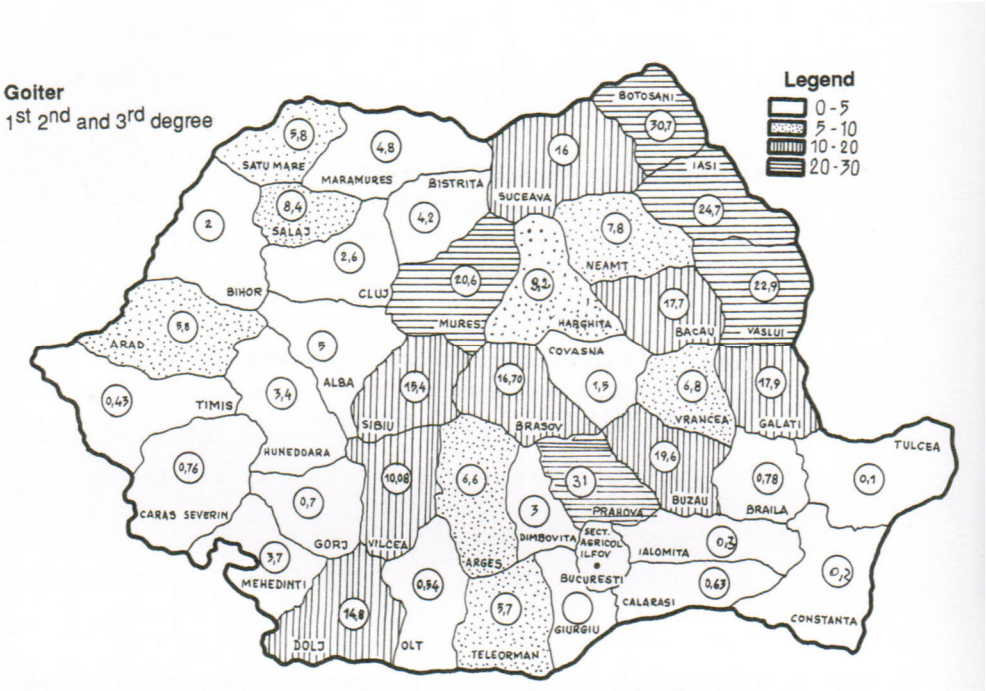

Figure 1: National goiter survey in school children, Romania, 1986

A Government Ordinance in 1995 increased the mandated iodine level in table salt to 40-50mg KIO_3/kg (24-30mg iodine/kg) and ordered that this salt should be made available for retail in the entire country. The Ordinance prohibited the use of iodised salt in the food industry and specified that the label should contain a warning against its use in food preservation and a contraindication for people with certain thyroid conditions (2). Monitoring in 6-16y old children during the period 2000-2002 by the Institute of Endocrinology found median UI levels <100μg/L in 19 of 22 (86%) high risk districts studied (3). The UI levels among pregnant women were uniformly characterized as being “alarmingly low”. As a result, the realization was increasingly taking hold that the approach of targeted iodine supplements together with the voluntary supply of iodized table salt did not succeed in securing adequate iodine nutrition for the population in Romania (4).

During the 1990s, UNICEF started collaborating closely with the Government, salt industry, medical professional groups and grassroots institutions to help promoting the USI strategy. The Institute of Mother and Child Protection conducted an in-depth review of the iodized salt supply in relation to the iodine nutrition situation in the population, which helped laying a basis for a proposal for true USI legislation in 2000. From salt supply monitoring, which demonstrated significant differences in iodized table salt quality among districts, the analysis concluded that the underlying causes for iodine deficiency in Romania were the stark inequities in distribution and use of iodized salt among districts, compounded by the absence of iodized salt use in the food industries and the loss of iodine during production, transport, storage and use of iodized salt in the households.

The causal analysis of the iodine deficiency situation in Romania was complemented in 2000 by an external review that encouraged significantly increased advocacy and communications to support the promotion of compulsory legislation for USI (5). In early 2002, UNICEF contracted a reputed NGO to develop and execute a communications campaign, based on special focus group research and robust pre-testing of messages tailored for target groups among professional groups, the general public and households. The communications campaign was conducted in 2003-2004, overlapping with the time that the Government enacted the new legislation for USI. The campaign contributed greatly in raising the public awareness of the IDD problem and the benefits of iodized salt.

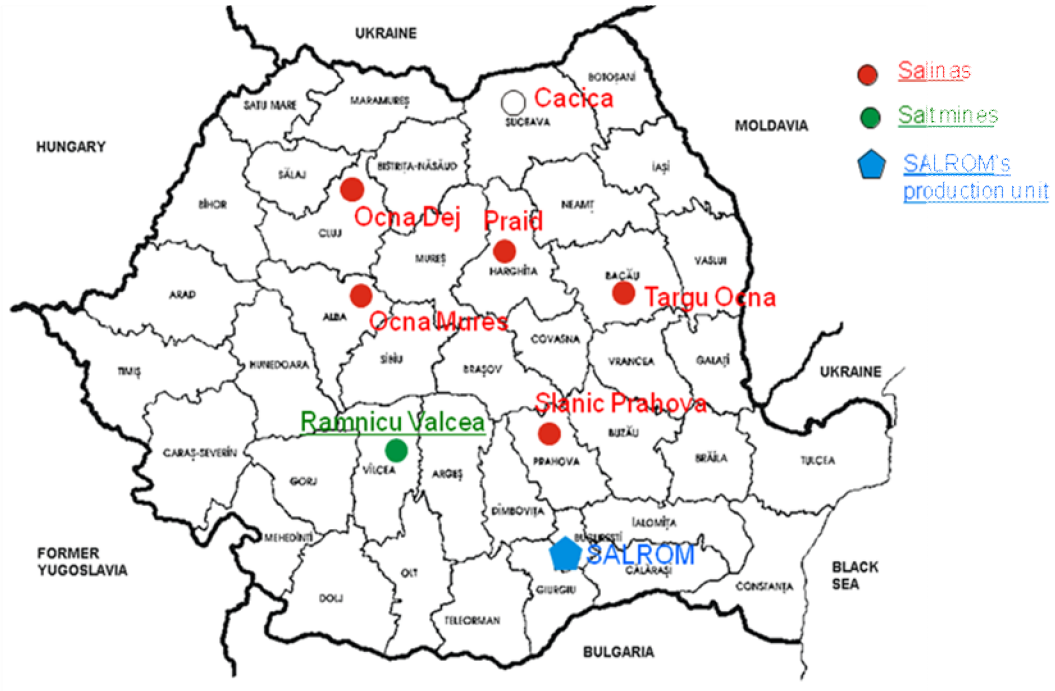

Figure 2: SALROM salt industry locations in Romania

The National Salt Company of Romania SALROM (Figure 2) is a joint stock company with state capital, although it is administered like a private company. The company manages major salt deposits in 7

branches with a range of products for the food and other industries, water purification, road de-icing, livestock breeding and human consumption by up-to-date technology (6). Depending on the location, salt iodization is performed by either the wet or dry method. Some of the SALROM branches are using UNICEF-provided equipment. According to a salt situation analysis in 1999 (7), SALROM produced ±2 million MT salt in 1998, about 10% of which was food grade salt, while ±30% of the food grade salt was iodized. A note of SALROM's technical director in 2002 articulates a supportive position of SALROM in the national efforts to reach USI (8). SALROM's capacity is sufficient for supplying all the national salt needs. The company also exports its products to Moldova, Macedonia and other nearby countries. On the other hand, non-iodized "industrial" salt from Ukraine has since long undercut the sales of SALROM before as well as after the time that USI in Romania was made compulsory.

The Government Decision #568, issued in June 2002 and named "Regarding universal iodization of salt for human and animal consumption and for use in the food industry", stipulates that all the edible salt in Romania should be iodized at 20±5mg iodine/kg, while permitting both KI and KIO_3 as a fortificant. The decision allowed for a phased introduction, starting with table salt from 1st January 2003, followed with salt for food industry and animal husbandry from 1st January 2004. The Decision banned the import and sales of non-iodized salt in Romania and it maintained the provisions for labelling of iodized salt with warnings against its use in food preservation as well as the contraindications, as defined in 1995.

In May-June 2004, the Institute of Mother and Child (IOMC) conducted a cross-sectional nutrition survey of the Romanian population, enrolling pregnant and parturient women, their newborn infants, under-5y children, and 6-7y schoolchildren. Trained survey teams visited schools and interviewed child caretakers about their children's use of iodine supplements. The children were invited to bring a salt sample from home and to volunteer a urine sample. The salt and urine samples were analyzed for iodine by standard laboratory assays in IOMC. The English summary of the report does not give details of the survey design, sampling frame or accuracy of the laboratory results (9).

Based on criteria proposed by ICCIDD/UNICEF/WHO experts, the survey results indicated that iodine deficiency had started to decline in Romania. The average iodine content in table salt was 25.3mg/kg, and 74% of the 2,051 salt samples had an iodine content ≥15mg/kg. The median UI level in 6-7y old children was 102µg/L, suggestive of a just sufficient iodine nutrition status. In a separate group of pregnant women, however, the median UI concentration was 68µg/L, i.e. significantly lower than the international recommendation for women who are pregnant. Further analysis showed a significantly ($p<0.001$) lower iodine content of the table salt in rural (mean 21.8mg/kg) as compared to urban households (27.4mg/kg), which was in agreement with the finding of lower UI levels in the children of rural (median 100µg/L) than of urban households (105µg/L). Also the body weights of the children in this survey were measured, which permits the calculation of iodine intake estimates by the formula published by the U.S. Institute of Medicine (10):

Estimated iodine intake (µg/day) = Body weight (kg) x Urinary iodine concentration (µg/L) x 0.0235

The histogram of iodine intakes in the Romanian children of the survey is illustrated in Figure 3. The median iodine intake of the 2,326 children was 56.5µg/d (95% CI: 54.1 – 57.8); the intake estimates of

80% of the children was below the RDA of 90µg/d recommended by ICCIDD/WHO/UNICEF and 59% of the children did not attain the average iodine requirement of 63µg/d for 6-7y olds.

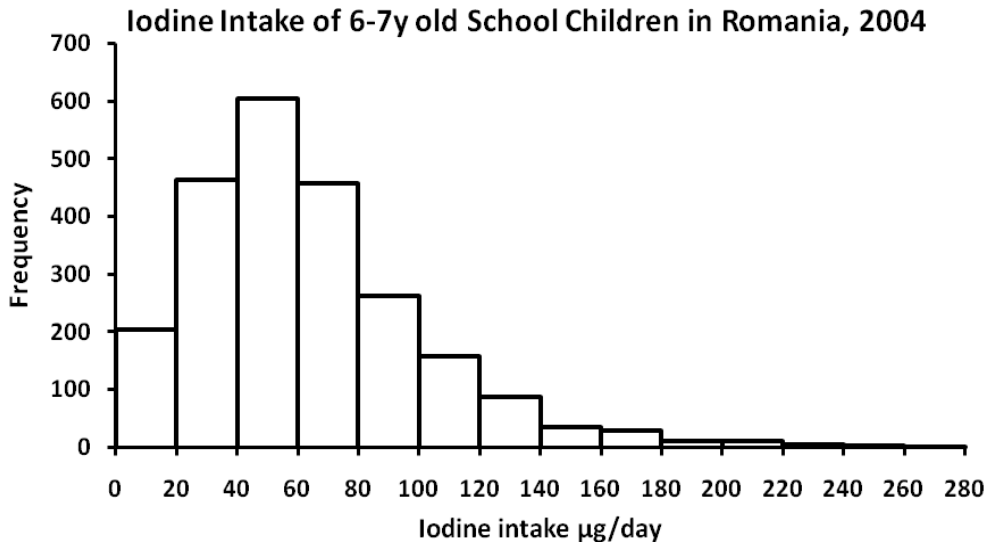

Figure 3: Histogram of estimated iodine intakes in school children in Romania

An analysis of the findings of iodine status and intake by urban and rural residence (Table 1) illustrates that the children in rural households were at a significant disadvantage compared to their urban peers. Not only had rural children significantly lower iodine status ($p<0.01$), their estimated consumption was also significantly ($p<0.001$) lower. These findings translated in a significantly ($p<0.001$) higher share of children in the rural households with iodine consumption below the recommendations.

		UI concentration		Estimated dietary iodine intake			
Location	n	median	95% CI	median	95% CI	Below RDA	Below EAR
Urban	1,417	105	100 - 108	59	57 - 61	78%	56%
Rural	909	100	95 - 102	51	49 - 54	86%	64%
P-value		0.0013		<0.001		<0.001	<0.001

Table 1: Iodine status findings in 6-7y old Schoolchildren Romania, 2004

Finally, the iodine intakes of the children were analyzed by the iodine content in their household's salt (Table 2), which indicated consistently lower dietary iodine intakes in rural households at each level of iodine content in table salt. Compared to children in the households that used salt with iodine content ≥20mg/kg, children in the households with table salt iodized <20mg/kg were consuming about 10% less iodine in urban (61 *versus* 56µg/d) as well as rural areas (56 *versus* 49µg/d).

	Urban households			Rural households		
Salt iodine content	n	median	95% CI	n	median	95% CI
0 - 19.9mg/kg	408	56	53 - 60	399	49	46 - 53
20mg/kg and above	869	61	58 - 65	374	56	51 - 56
P-value		0.002			0.09	

Table 2: Iodine intakes of 6-7y old schoolchildren by iodine content in table salt, Romania 2004

Thus, although overall the UI findings of the school children in Romania suggested a just sufficient iodine status, in-depth analysis of their estimated dietary iodine intakes revealed that the majority of the children did not obtain sufficient iodine from the common diet to meet their biological requirements, and this affected especially the children in rural areas. The analysis by iodine content in the table salt in the households showed that the mandatory salt iodization policy did address the iodine deficiency problem in Romania, but dietary iodine deficiency was still persisting, particularly in rural households that used table salt with low levels of iodine.

At the time that the iodine survey was conducted in 2004, table salt iodization had been obligatory for more than 1 year and the mandatory use of iodized salt in commercial food manufacturing had not yet started. In the time following the survey, however, resistance against USI was increasing in the food industries. Especially the food conservation enterprises (vegetable preservation, pickling and canning, etc) voiced significant objections from the belief that their end product would be affected by the substitution of non-iodized by iodized salt in the recipe. In response, MOH amended the Decree on 1st April 2004 to the effect that only the bread bakeries were obligated to use iodized salt.

In an effort to improve the confidence in the use of iodized salt by the food industry, UNICEF sponsored a study tour of a professional group to Bulgaria to learn first-hand of the experience in the Bulgarian food industries (dairy, vegetable conservation, bread baking), where the use of iodized salt in food manufacturing processes is universal. In addition, UNICEF supported a detailed study in the Department of Food Research, Food Technology Institute of the effects of using various iodized salt types produced by SALROM on the product characteristics in vegetable conserves (11).

A presentation by the MOH of Romania in 2005 (12) reported that a National Committee on USI and IDD Elimination had been established in 2004, followed by the creation of a coordinating Centre in the Institute of Public Health (IPH), Bucharest to assist in data consolidation, analysis and policy advice. The salt iodine levels at production and in the markets were monitored at quarterly intervals by the local public health workers, who report to IPH but lack the authority to follow-up on salt sales that are not conforming to the mandatory iodine content. SALROM reported that it supplied 54,500MT iodized salt in 2004, compared to an estimated national consumption need of 70-80,000MT. The remainder of the salt needs was believed to be covered by the illegal diversion of “technical” salt imported from outside Romania and by the use in poor households of non-iodized salt intended for animal husbandry. The lack of functional and transparent enforcement of the national legislation was mentioned as a key obstacle in the progress toward USI. On basis of this analysis, MOH from 2005 onward started promoting a revision of the iodization levels to 25-40mg iodine/kg. Along with the high-level political decision to

prepare for EU membership, the MOH in Romania was obliged to undergo a health sector reform, however, which relegated many health matters, including the USI strategy, to a lower status.

In Istanbul, Turkey, in May 2006, UNICEF and ICCIDD collaborated in a regional workshop for national program managers and their counterparts in national iodine laboratories to assist in strengthening of USI/IDD monitoring systems (13). Participants from Romania included the MOH program manager and a laboratory manager from each of the Institutes of Endocrinology and the Institute of Mother and Child Care (IOMC). Part of the workshop was dedicated to the free-of-charge service provided by the US CDC through the EQUIP UI sample exchange program, which assists in maintaining proper proficiency in urinary iodine laboratories (14). A comparative analysis of the salt monitoring systems in the region concluded that the regular salt titration monitoring system by the local health staff in Romania is an excellent example for the various systems in use in the region (15). It was also recognized, however, that the laboratory capacity in Romania was in need of technology and equipment improvement, and needed also to sign up with an independent outside QA service. Both Institutes applied to the EQUIP service in 2006, but the Institute of Endocrinology did not continue participating after the first rounds in 2007. The iodine laboratory of IOMC has continued participating successfully in EQUIP from 2007 until to date.

To conclude, the current USI strategy in Romania is based on mandatory table salt iodization, combined with mandatory use of iodized salt in bread bakeries, both at 20±5mg iodine/kg while permitting KIO_3 as well as KI as fortificant. The national salt industry, SALROM, is fully capable of supplying good quality iodized salt at the national requirements but the market remains uncertain due to illegal imports of non-iodized salt mainly from Ukraine. In addition, salt intended for animal feeding and/or industrial purposes is diverted for household use especially in rural areas where a tradition of food preservation is strong and widely believed to be affected by using iodized salt. There is a well-functioning system for salt QA and inspection at production, as well as quality testing at retail for table salt in Romania, although the public health officials have little authority to enforce the national standard. An iodine survey among young school-age children demonstrated significant improvement of the iodine status in the population in 2004, although the dietary iodine intake was not sufficient to meet the RDA and pregnant women still had deficient status. This survey was completed prior to the introduction of iodized salt use in the bread bakeries, however, but no large-scale iodine assessment has been reported since then.

Participation of national officers in UNICEF-supported regional meetings:

- Conference on Elimination of Iodine Deficiency Disorders (IDD) in Central Eastern Europe, the Commonwealth of Independent States, and Baltic States, 3-6 September 1997, Munich, Germany
- Regional Salt Producers' Meeting, 29 September – 1 October, 1999 Kiev, Ukraine
- Workshop on Strengthening Strategies for the Elimination of Micronutrient Malnutrition. Ankara, Turkey, 13-17 September 2004

- Workshop on Strengthening of Laboratory Capacity and Iodine Status Assessments for Monitoring of Sustained IDD Elimination through USI in the CEE/CIS Region. Istanbul, Turkey, 18-19 May 2006

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