Consultation meeting on the current situation and next step for iodized-fluoridated salt in Lao PDR

23-24 October 2014

Meeting Held at the National Institute of Public Health (NIOPH)

Organised and supported by:

The Lao Dentist Association (ADL), the Ministry of Health of Lao PDR – Department of Hygiene and Health Promotion, Aide Odontologique Internationale (AOI)

This publication is compiling the presentations that were presented by Lao and international partners in Vientiane on 23-24th of October 2014 during the 'Consultation meeting on the current situation and next step for iodized-fluoridated salt in Lao PDR'.

The objectives of the Consultation meeting were the following:

1. Share experiences and discuss achievements of iodization-fluoridation of salt programs in Laos and the region with all partners involved.
2. Update developments of the Lao program in terms of legal framework, production, quality control, communication and evaluation.
3. Reinforce partnerships and synergies at national and international levels on salt fluoridation.
4. Review the benefits of fluoride on health and the fluoridation of salt program in Laos.

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EXECUTIVE SUMMARY

Salt fluoridation started in Switzerland in the 50's and was developed in more than 30 countries all over the world since then, particularly in Europe and South America. Globally oral diseases affect 3.9 billion people - more than half the world's population. Untreated caries (tooth decay) in permanent teeth is the most prevalent disease worldwide, and oral diseases share many of the same common risk factors as non-communicable diseases e.g. poor diet leads to obesity, cancers, heart disease and tooth decay. However, both tooth decay and periodontal (gum) diseases are largely preventable and any public health approach must focus on prevention rather than on their treatment.

Prevention through appropriate exposure to fluoride is a realistic way of reducing the burden of tooth decay in populations. In 1997, World Health Organization (WHO) adopted a resolution on oral health, which urged the establishment of national plans for the use of fluoride based appropriate programs for automatic administration through drinking water, salt or milk and/or topical use such as affordable toothpaste.

In Laos, Iodine Deficiency Diseases (IDD) were identified as a main public health problem since 1993. Consequently, the Universal Salt iodization (USI) program was launched in 1995 and implemented by the Ministry of Health, supported by the UNICEF. Since iodized salt has been successfully accepted in Laos, the MoH thought in 2005 that it would be practical to combine the fluoridated and iodized salt together for the benefit of both oral and general health of the population. In Laos, caries prevalence is high especially in primary teeth which cause not only oral health but public health problem as well (96% in 5 years old children, 2010).

The salt fluoridation program was launched after a programming workshop held in 2005 in Vientiane. The program started after preparatory work, e.g. a national survey, a survey on the fluoridated toothpastes, a fluoride mapping, training sessions of lab technicians, preparation of a legal framework (decrees), and development of an appropriate mixing process and adapted protocols.

In 2009, a pilot project of salt fluoridation was launched in Khok Saath factory and has been replicated in Veunkham factory recently (2014). Both projects are strongly supported by the Ministry of Health (Hygiene and Prevention Department), the National Dental Faculty, the French NGO AOI and the Lao Dentist Association.

Khok Saath factory has been producing between 100 and 350 tons of iodized-fluoridated salt every year since 2010 and Veunkham factory is planning to produce 500 tons in 2015. Both factories have been fully equipped (plough mixer, centrifuge machine…), and have benefitted from regular visits and trainings by international experts. They are using the same protocols for production and quality control of the IF salt. Both have an in-house lab with trained technicians and are implementing a double control of each analyzed sample, thanks to the partnership established with the Food and Drugs Quality Control Center (FDQCC). For each batch of IF salt produced (250 kg), 3 to 4 samples are analysed to ensure that the recommended amount of fluoride in the salt (250 ppm) is followed. Also, an evaluation program on the long-term has been launched in order to assess the levels of fluoride in consumers of IF salt (children mainly) and in the toothpaste sold on local markets.

The sales policy adopted by the producers is another element of the utmost importance and has to be accompanied by a strong marketing and communications campaign. Without a good communication on the benefits of the fluoridated salt (on oral health especially), Lao people cannot understand its added value and it could be difficult to develop the product's sales. Communications in the press, on the radio and TV, production of posters and leaflets, as well as other marketing tools is crucial. Widely disseminated, these promotional products and actions are reaching the Lao public in numerous provinces, in rural and urban areas.

I - ASSESSMENT AND PERSPECTIVES OF THE IODIZED SALT PROGRAM IN LAO PDR

By: Dr Bounthom Phaengdy, Director,
National Centre of Nutrition

IDD has been identified as a main public health problem since 1993. Consequently, in 1995, the Universal Salt iodization (USI) program was announced and implemented under the Prime Minister's decree. Five years after the USI was implemented, results showed only 27% had urine iodine excretion <100mcg/l, percentages drop of 68% from 1993. In 2005, the eradication of IDD from Laos was discussed as a possibility; however, communities in multiple provinces are still suffering from IDD.

In 2008, the majority of salt used in the communities was being produced in Laos, with some communities also receiving salt from Vietnam and other imported sources. Regionally, Laos is one of the forerunners in the Sustainable Elimination of Iodine Deficiency, with only Vietnam and China in front.

However, Laos is facing some challenges. In the 2013-2014 school survey, results showed that compared to the results of the 2006 NNS, the median UIC nationwide had decreased by almost 2 times, from optimal to borderline. The underlying causes for the failing salt iodization strategy in Lao PDR were the temporary shortage of essential supplies (potassium iodate and/or WYD solutions) and the weakened official enforcement which failed to ensure the salt factory continually adhered to the national USI mandate.

Next steps should include: securing the potassium iodate supply; consolidating all the required supplies for USI though a newly established Lao USI Secretariat/PIRF; ensuring QA measurements and reporting are executed in all salt factories; creating a central QA data analysis and information capacity.

Recommendations include:

- controlling measurements and enforcements to monitor factory salt production and imported salt; fortifying salt for human and animal consumption with iodine;
- implementing a control check point at the border for imported salt,
- allowing entry only to salt with adequate iodine levels.

The salt factory needs to control the quality of salt production, ensuring adequate iodine content. It also needs to regularly improve internal and external production systems.

Lastly, the community needs to be educated to understand the importance of IDD and the use of salt iodisation for IDD prevention as well as the conditions required to store and use iodine salt properly.

II - SALT FLUORIDATION IN LAOS: SITUATION AND DEVELOPMENT

By: Dr Khamhoung Phommavongsa President - LDA
Dr François Courtel, Regional Manager - AOI

The first part of the presentation was on the salt fluoridation projects all over the world. Salt fluoridation started in Switzerland in the 50's and has now been developed in more than 30 countries all over the world, particularly in Europe and South America.

Numerous publications have shown the efficiency of iodized-fluoridated salt programs, and WHO published a reference book on the subject based on the experience accumulated in South America. Jamaica showed particularly successful results (*see bar chart*).

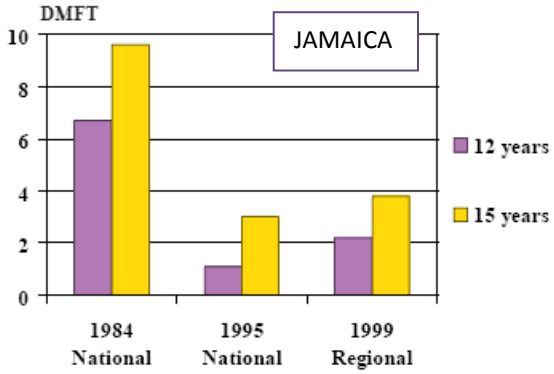


Figure 1. Mean dental caries experience (DMFT) of 12- and 15-year-olds in Jamaica after introduction of salt fluoridation in 1987[19]

In Laos, the salt fluoridation program was launched after a programming workshop held in 2005 in Vientiane. At this occasion, a national and international support group was established in order to help the Lao stakeholders to develop the project.

Several actions were implemented to prepare the project: a national survey, a survey on the fluoridated toothpastes, a fluoride mapping, training sessions of lab technicians, preparation of a legal framework (decrees), and development of the mixing process.

Results from the national survey 2010, compared to 1992 figures

	1992	2010
DMFT - 6 years old	4.4	6.3
DMFT - 12 years old	-	1

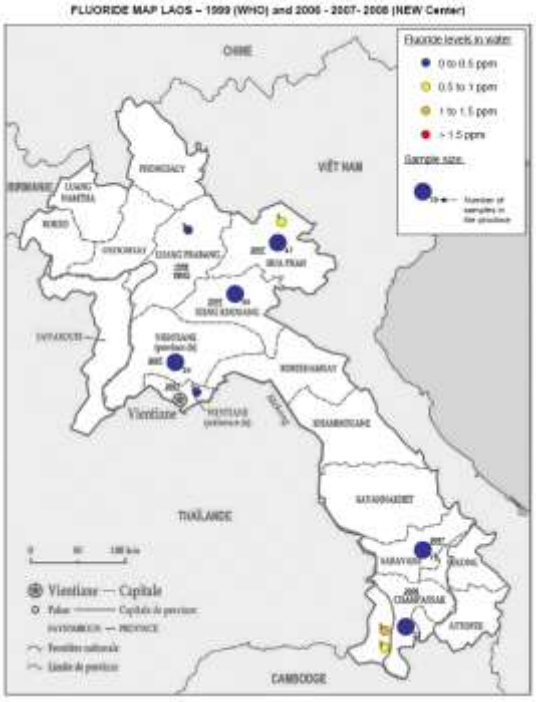
Reminder on the legislation for salt fluoridation in Laos:

- Marketing authorized by food and drug in 2010
- Decree N° 1604/MS - October 2011: Standards for fluoridated salt on Lao market
- New decree planned for end 2014

A pilot project of salt fluoridation was then launched in Khok Saath factory in 2009 and in Venkham factory in 2014. The tests of mixing iodized salt and fluoride (KF) have proved good results and the final product has a good homogeneity.

Today, the project's perspectives for the future are:

- Extension to 35% of the population.
- Implementation of sustainable funding .
- Improvement of quality control.
- Development of the communication and marketing campaign.



- Planing of the evaluation of the project with the faculty.

Key "take home" points from this presentation:

- Globally oral diseases affect 3.9 billion people - more than half the world's population.
- Untreated caries (tooth decay) in permanent teeth is the most prevalent disease worldwide.
- Oral diseases share many of the same common risk factors as non-communicable diseases e.g. poor diet leads to obesity, cancers, heart disease and tooth decay.
- Periodontal (gum) disease affects diabetes mellitus, cardiovascular disease, adverse pregnancy outcomes and respiratory diseases.
- Tooth decay causes considerable pain and suffering, lost sleep, school absenteeism and days off work.
- Tooth decay affects nutrition, growth, weight gain and psychological well-being
- In low-income and middle-income countries most tooth decay remains untreated
- Tooth decay is one of the most expensive diseases to treat.
- Both tooth decay and periodontal (gum) diseases are largely preventable and any public health approach for their management MUST be the focused on prevention rather than on their treatment.
- Prevention through appropriate exposure to fluoride is the only realistic way of reducing the burden of tooth decay in populations.
- On a public health level a number of different vehicles can be used to deliver fluoride including water, salt, milk, and toothpaste.
- The choice of fluoride vehicle depends upon many factors specific to the country and therefore some methods for the delivery of fluoride are not feasible in some countries.
- Fluoridated salt is usually the cheapest method of delivering fluoride.
- The effectiveness of fluoridated salt in inhibiting caries can be substantial, of the same order as that for fluoridated water.
- Fortification of salt with iodine for the prevention of iodine deficiency disorders (IDD) is compatible with fortification with fluoride for the prevention of tooth decay.
- Policies for salt iodization/fluoridation and reduction of salt intake to less than 5g/day are both necessary and compatible.
- Health is a concern for everyone and oral health is an essential component of general health.

IV - WHY IODIZED-FLUORIDATED SALT IN LAOS?

By: Pr Prathip Phanthumvanit,
Consultant Thammassat University, Bangkok

Caries prevalence in Laos was reported high especially in primary teeth which cause not only oral health but public health problem as well (96% in 5 years old children, 2010).

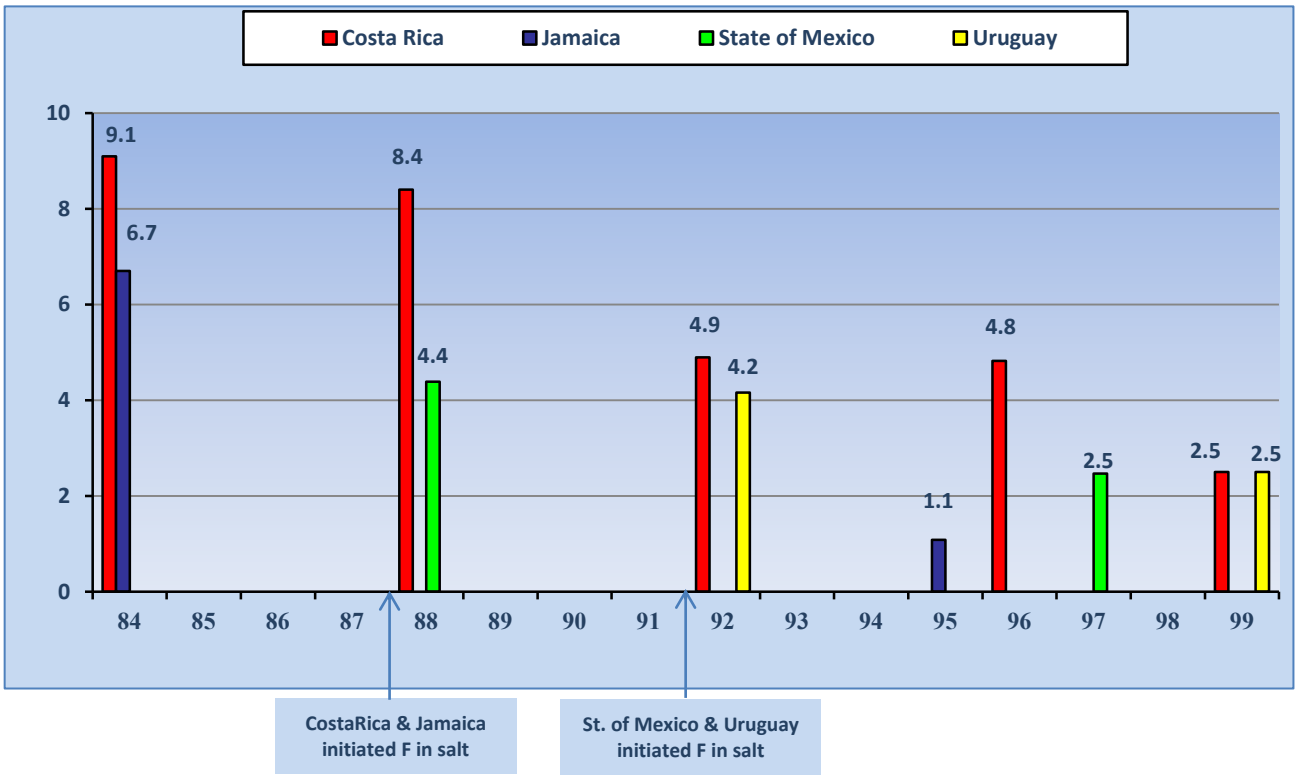
In 1997, World Health Organization (WHO) adopted a resolution on oral health, which urged the establishment of national plans for the use of Fluoride based on appropriate programs for automatic administration through drinking water, salt or milk and/or topical use such as affordable toothpaste.

Salt fluoridation has been developed and implemented in Switzerland since 1969 and has expanded to other countries in Latin America with good success. A few countries in Europe also successfully use salt fluoridation such as France and Germany. Cariostatic Effectiveness of Fluoridated Salt:

- France: National mean DMFT12 decreased from 4.2 to 2.07 from 1987-1993
- Montpellier DMFT12 1.42 in 1999 and 1.29 in 2002
- Heidelberg DMFT12 1.56 in 1999 and 1.15 in 2002

Tramini P., Schweiz Monatsschr 115:656-658 (2005)

Change in the mean number of permanent teeth decayed, missing, or filled in 12 year old children:



Salt fluoridation cannot be overused which also cost much less than other community fluoride use. It is: inexpensive, effective, eminently safe, equitable – entire population benefits, requires no cooperative effort or direct action, benefits continue for a life time if consumption continues, reduces cost for dental treatment and does not depend on professional services

Community Fluoride Approach in Asia:

- Water fluoridation: China SAR Hong Kong, Malaysia, Singapore, Korea, South Vietnam, Brunei
- Milk fluoridation: Thailand
- Salt fluoridation: Lao PDR, North Vietnam, Taiwan

Since iodized salt has been successfully accepted in Laos for many years, so that the MoH thought that it would be practical to combine the fluoridated and iodized salt together for the benefit of both oral and general health of the population, especially in the new generation.

Reasons for choosing to develop a salt fluoridation program in 2005:

- iodized salt in goiter and mental retardation prevention / fluoridated salt in caries prevention
- High level of decay in Laos
- Water fluoridation is not practical
- Low fluoride levels in natural water
- Iodine and fluoride are compatible
- Toothpaste is not accessible for all
- Fluoridation benefits from iodine experience
- Communication and quality control are complimentary
- KIO 3 and KF are compatible in the mixture
- Using a mixer for fluoridation process provides a mixture of greater homogeneity for the KIO3
- Cost is low: less than US$ 0.06/person/year

Method	Estimated cost/person/year
Water	US $ 0.52
Salt	US $ < 0.06
Milk	US $ 3.49

V - THE SALT FLUORIDATION PROGRAM IN VIETNAM : DEVELOPMENT AND PERSPECTIVES

By: Ms. Nguyen Tac Lu, Ms. Pham Hung, Ms. Nguyen Ngoc Bich

Since 1986 Vietnam started salt iodization which has been successfully accepted in Vietnam for many years now.
In 2009 a salt fluoridation program was launched in Vietnam because it's a safe, cheap and well accepted solution to bring more fluoride into the usual diet of the population.

With help from WHO, consultants: Pr. Prathip Phantumvanit and Eng. Michel Martuchou, a mixed fluoride was tested with screw machine - used for mixing salt iodization - but the result was not satisfactory.

Today a good quality fluoridated salt is produced (F: 250 ±10 ppm; I: 50±5 ppm) because:

- WHO helped to have a Machine LDH0.3B-00 Plough Mixer-101006 of S&L - a kind of batch mixer
- Use of low humidity of salt (4-5%)
- Special use air pressure machine to make KF + KIO3 solution spray to make good result
- We make 2 lifts to seal with batch mixer for help salt workers to work easier
- List control always at first from chemical, additives, salt, time…

All the products need to obtain certificate of food safety standards for fluoridated and iodized salt before being delivered for local community by local volunteers or local MOH system each month.

VI - SALT AND FOOD HABITS IN LAO PDR

By: Dr Sengchanh Kounnavong,
Head of Health Research Department - Ministry of Health

Laos is experiencing an increasing burden of non-communicable diseases (NCD). According to hospital based data, non-communicable diseases have shown a tendency to increase in the last two decades. Economic growth, the ageing population and lifestyle changes are the leading causes of the increasing burden of non-communicable disease.

WHO Member States have agreed to reduce the global population's intake of salt by a relative 30% by 2025.

Reducing salt intake has been identified as one of the most cost-effective measures countries can take to improve population health outcomes. Key salt reduction measures will generate an extra year of healthy life for a cost that falls below the average annual income or gross domestic product per person

To date there have been no studies to try and accurately estimate salt intake or sources of salt in the diet for people in Lao PDR.

In order to address this issue, a study on salt and food habits in Laos was implemented in two sub-samples of the population of Vientiane in the year 2012, aiming at assessing salt intake, food habits of people about salt consumption for a better prevention and control of non-communicable disease.

We used face to face interview and physical examination including blood lipid profile and urine test for sodium among 247 subjects.

Body indexes were measured using

1) OMRON Automatic blood pressure monitoring;
2) SECA Weighing scale;
3) Stadiometer for body height measurement; and
4) Unstretched tape for waist circumference.

Padek stall in a market (fermented fish+salt mixture)

We found that more than half of study subjects had higher salt intake than the World Health Organization recommended level and some of them had twice and or 4 times higher than recommended level.

The main dietary sources of sodium are salt, soy sauce, fish sauce, fermented fish, MSG or Knor as well as processed food such as instant noodles, salty egg, salty fish and salty meat.

The main recommendations of the study were:

- Sodium reduction intervention is needed to reduce high salt intake among population for the control and prevention of hypertension and cardio-vascular diseases (For adults: WHO recommends that adults consume less than 5 g -just under a teaspoon- of salt per day)
- Need to do a study in different region and included rural areas to have clearer picture of current sodium intake in Laos.
- Spot urine specimen can be used to estimate and monitor the changes in sodium intake among population groups with high salt intake.

VII - COMMUNICATION AND MARKETING OF IODIZED -FLUORIDATED SALT

By: Ms. Stéphanie Cohen, Representative - AOI Laos

An important marketing and communication campaign was designed and implemented in 1995 to launch the sales of the iodized salt, produced and promoted through the Universal Salt Iodization Program in Laos (UNICEF/MOH).

Communications and marketing are two crucial activities that have to be used to promote the production, consumption and sales of a new product on a local market.

Three years ago, with the launch of the iodized -fluoridated salt project and production in one factory (Khok Saath), a communication campaign was designed and implemented, supported by the MoH, the Lao Dentist Association and AOI. At this time, a radio campaign was done as well as the printing of a poster and brochures.

Today, the production is starting in a second factory and a new campaign is launched. Without a good communication on the benefits of the fluoridated salt (on oral health especially), Lao people will not understand its added value and it will be difficult to develop the product's sales.
The Ministry of Health and the salt producers in particular, as well as the INGOs, NPAs and IOs are the main stakeholders who should communicate on the fluoridated salt.

The ongoing campaign includes the broadcast on 3 national radios of an audio spot in Lao but also in Khmu and Hmong languages. A TV spot will also be broadcast and other interventions and reports are planned during specific TV programs on health issues. A brochure and 2 leaflets have also been designed and printed and will be distributed widely to the consumers. The materials will be distributed to health professionals during trainings and meetings (By LDA, MoH…) aiming at increasing the number of health structures distributing these materials.

The promotion of iodized-fluoridated salt done by the salt wholesalers is also crucial. The wholesalers are trained to deliver an adapted message, and will distribute posters, brochures/leaflets, t-shirts, calendars, banners …

VIII - AOI PARTNERSHIP - TECHNICAL AND FINANCIAL SUPPORT FOR THE PROGRAM: IMPLEMENTATION, DEVELOPMENT AND PERSPECTIVES

By: Ms. Gwenaelle Empis, Consultant

AOI support to the salt fluoridation program started in 2005 in Laos. The objectives of this partnership were to support the development and implementation of a prevention program adapted to the Lao context and to ensure the program's sustainability at national level, by enhancing the capacity of Lao partners and targeting financial independence. The partnership was also aiming at empowering the Lao health managers and stakeholders to be fully committed in developing the iodized-fluoridated salt program.

Between 2005 and 2008, AOI accompanied the Lao Ministry of Health with expertise and studies, and provided technical and financial support to private and public Lao partners to be able to start the pilot production. AOI also developed a regional and international network of experts to serve the program. Between 2009 and 2012 the pilot project was implemented, developing and improving the production process, supplying equipment and fluoride (KF), defining and implementing protocols for production of a salt of quality. Other objectives were to:

1/ Build a strong local partnership with Lao authorities, institutes & international organizations
2/ Work together: Communication & information, press releases.
3/ Follow up and implement training (factories, quality control center, ministry, faculty),
4/ Develop information, lobbying, and new partnerships.
6/ Develop the civil society, e.g. LDA.
7/ Fund raise to develop the project in the future.

Today, the phase II of the project has started and the salt production, communication, as well as the support to the Ministry, dental faculty and salt producers will be developed until mid-2016.

Several activities are going to be strengthened such as the evaluation and research program, with the faculty, the establishment of a KF revolving fund, with collaboration of the ministry of Industry, the development of a laboratory specialized in fluoride analysis (equipment, training), the development of marketing and communication with the producers, the strengthening the Lao dental association on project management issues.

Raising awareness of local health workers and stakeholders about the fluoridated salt will also be given much attention as well as maintaining a solid network of regional cooperation.

The perspectives for 2015-16 will allow AOI and its Lao partners to continue the development of local partners' capacity building with a timely support provided by the experts' network.
The objective is the integration and ownership of the program by the ministry of health and the strengthening of regional partnerships in particular with others countries of SEA.

IX - PRESENTATION OF THE LAO SALT PRODUCERS GROUP (LSPG)

By: Mrs Bounthavy Chounlamany, General Manager Veunkham factory

The Lao Salt Producers Group (LSPG) was established in 2003 with the support of Lao National Chamber of Commerce and Industry. There are eight members of the LSPG in six different provinces with a total of 552 staff. The group produces boiled salt and sun dried salt following the 1995 Prime Minister's Decree that all edible salt must be iodized.

Edible salt is packaged in 500 gram and 1000 gram bags, while industrial salt is packed in 50 kilogram quantities. In 2014, LSPG's total salt production was 30 300 tons and the prediction for 2015 is set to be 32 700 tons, an increase of just under 10% and 10 000 more tons than the year 2008.
The factories of Khok Saath (Vientiane) and Natheuil (Savannakhet) are the most important in terms of production volumes (more than 6,000 tons per year). Veunkham factory comes is the third in terms of production. Both Veunkham and khok Saath are producing iodized-fluoridated salt.

The Lao Salt Producers Group

		Production 2013					
		Boiled Salt (Ton)		Solar Salt (Ton)		Boiled salt + solar salt (Ton)	
No	Name	Total	Iodine salt	Total	Iodine salt	Total	Iodine salt
1	Boten, Luang Namtha province	1,039.33	88.31			1,039.33	88.31
2	Oudomxay	3,368.28	97.80			3,368.28	97.80
3	Veunkham, VTE	4,296.00	2,594.00	399.20	-	4,695.20	2,594.00
4	Khok Saath, VTE	2,001.00	1,251.00	4,487.00	732.00	6,488.00	1,983.00
5	Ban Bo, VTE province	1,452.41	1,419.66	1,381.00		2,833.41	1,419.66
6	Songkhon, BKS province	439.60	307.62			439.60	307.62
7	Nateuil, SVK province	2,852.00	1,332.00	2,061.00		4,913.00	1,332.00
8	Kengkok, SVK province	2,489.00	2,489.00	389.00		2,878.00	2,489.00
Total production 2013		**17,937.62**	**9,579.39**	**8,717.20**	**732.00**	**26,654.82**	**10,311.39**

X - PRODUCTION, PROSPECTS, DISTRIBUTION, MARKETING AND COMMUNICATION OF IODIZED-FLUORIDATED SALT: VEUNKHAM FACTORY CASE

By: Ms Bounthavy Chounlamany, General Manager Veunkham factory

Veunkham Salt Company, established in 1996, is responsible for the production and distribution of iodised boiled salt (table salt) and solar evaporated salt (sun-dried salt). The company currently has 94 employees. Traditional methods used to make boiled salt include using sawdust and processed coal. Iodised table salt is sold in the minimarts as well as exported to Taiwan.

AOI supported program has provided the factory with a salt iodisation and fluoridation mixer and a salt centrifuge, which reduces the salt's moisture.

The process continues to the testing stage in which iodine and fluoride content is analyzed and an analysis results certificate from the FDQCC is then issued.

In 2015 Veunkham factory will start to produce iodized-fluoridated salt. In this regard, bags, banners, calendars, T-Shirts and leaflets are all branded and unified and the iodised salt is packaged in the factory's established packing line.

XI - PRODUCTION, PROSPECTS, DISTRIBUTION, MARKETING AND COMMUNICATION OF IODIZED-FLUORIDATED SALT: KHOK SAAT FACTORY CASE.

By: Ms Souphattha , General Manager - Khok Saath factory

In 2010 AOI agreed to collaborate with Khoksaath factory, providing assistance and support from the Ministry of Health and University of Health and Services, to produce iodized-fluoridated salt.

The first stage is production which, to produce one ton of iodized-fluoridated salt, requires the combination of two solutions - 760g Fluoride/ 1500 ml water and 80g iodized/ 1500ml water and the product is then packaged in two weights - 500 grams or 1 kilogram.

Once the process is complete, the salt is ready to sell to customers, who either collect the salt in person or have it delivered by the store.

The annual sales figures of salt from Khoksaath factory are as follows:

2010 - 37 tons,
2011 - 355 tons,
2012 - 304 tons,
2013 - 222 tons
2014 - 108 tons.

The factory sells iodized-fluoridated salt across eight provinces: Vientiane, Saythani, Saychetha, Hatsayfong, Parksun, Phonhong, Chanthabury and Pakse.

In order to market the salt to a wide audience, Khoksaath's marketing strategy includes radio, posters, apparel, leaflets and banners.

XII - ISSUES OF QUALITY CONTROL OF THE IODIZED-FLUORIDATED SALT IN LAO PDR

By: Mr Sysomsak KeobouaNgeun, Lab technician, Food and Drug Quality Control Center

The FDQCC is a technical body of the Ministry of Health working in collaboration with the Food and Drug Department (FDD) to monitor the quality control of food, drugs and cosmetics with centres in multiple provinces of Laos.

The FDQCC works to control the quality of iodized and fluoridated salt in accordance with Lao national standards to ensure the health and safety of consumers.

As of March 2013, FDQCC has been working with AOI to further supervise the quality control of iodized-fluoridated salt with the Khok Saath factory being appointed as the pilot factory. AOI has provided both materials and equipment for the analysis of fluoridated salt and equipment training for four lab staff at FDQCC and Khok Saath factory.

The success of the collaboration with AOI has enabled FDQCC technical staff to analyze batches of iodized-fluoridated salt once to twice every month; to supervise and train factory staff; to provide facilities for testing and analysis of salt samples; and to compare fluoride test results from factory laboratories with the FDQCC laboratory.

Since March 2013, 528 samples have been analyzed and all results have been passed in accordance with the guidelines. FDQCC takes 15 samples per factory and monitors producers twice per year as well as household distribution once a year.

The challenges faced are: limitations in the knowledge of lab technicians; often irregular supervision of quality in the factory; and not enough equipment.

Recommendations for improvement are:

- To upgrade and develop laboratory equipment;
- provide more staff training;
- for FDQCC to continue monitoring, training and reporting consistently and effectively before and after production;
- for AOI to continue partnership till end of 2015;
- for the Ministry of Health to supply equipment and budget from 2016;
- to ensure the terms of reference for expansion to new factory at Veunkham are clearly set out.

XIII - THE EVALUATION OF THE FLUORIDATED SALT PROGRAM IN LAO PDR

By: Dr Amphayvanh Homsavath, lecturer, Lao National Dental Faculty

The PAHO/WHO recommendations for an efficient monitoring of a salt fluoridation program say that it should be done through 3 phases: a first phase of feasibility assessment and program implementation, a second phase of first Evaluation after 5-7 years, and a third phase of long-term evaluation after 10 to 14 years of implementation.

The salt Fluoridation previous activities implemented in Laos can be summarized as follows:

year	Working plan	partnership
2006-2009	Training about salt fluoridation	Robert Yee, AOI, Thammasat University
June, 2006	Visit salt factory, fluoride production in Vietnam	Salt factory in Hanoi
2006-2009	Technical feasibility of salt fluoridation Identification of mixing method(wet method selected) and finalization of the process and equipment required for mixing	Group Salins, AOI, Thammasat University
2006/2008/2009	Analysis of fluoride in the water	Thammasat University, WHO, NEW center, AOI
2006/2007/2008	Fluoride Mapping	WHO, NEW center, AOI
Jan,2009	Fluoride ingestion examination, finger nail, Urine examination	Tokyo University, Seoul University, AOI
2008-2009	Protocol for the pilot project at Khok Saath: production, commercialization and quality control	AOI, Thammasath University, Group Salins
2009	Mixing test at Khoksaat between KF and KIO_3	Khok Saath factory ,AOI, Grou Salins, Thammasat University
2010	Start salt production mixing fluoride and iodine, distribution in 3 districts	
2011	Salt distribution , evaluation of the pilot project, workshop and discussions about extension of the program	Khok Saath , Ministry of Health, AOI, UNICEF, WHO

Note: the fluoride mapping has showed that there are only very low levels of fluoride naturally found in the water in Laos.

*Results of the **2nd Lao National Oral Health Survey** (2010):*

- 84% of tooth decay in children of 6 years old, 42% in 12 years old, and more than 50% in the 15-19 years old population.
- Between 50 and 85% of the population have dental caries on permanent teeth.
- In Pakse 12 among 50 showed fluorosis
  - TF score 1= 8
  - TF score 2= 3
  - TF score 4= 1
- In Vientiane, children 6-9 year olds showed TF score 1=2 (50).

Plan for the future:

Year	Working plan	Partnership
2010	National Oral Health Survey	Faculty of Dentistry, Ministry of Health
2014	Scaling up of salt fluoridation program - objective 35% coverage of the Lao population(year 2020)	Salt producers
2015 - 2020	- Every year in sentinel sites analysis of urine for iodine and fluoride - Quality control of iodised/fluoridated salt - Yearly sales of iodised/fluoridated salt	Faculty of Dentistry, Ministry of Health, Dept. of Public health FDQCC Salt producers
2020	Epidemiological survey in sentinel sites - Fluorosis - Dental caries	Faculty of Dentistry, Ministry of Health,
2020-2021	Reevaluation of the salt fluoridation program and modification where necessary	All partners

XIV - THE EVALUATION OF THE FLUORIDATED SALT PROGRAM IN VIETNAM

By: Ms. Nguyen Ngoc Bich - Viet Nam Odonto- Stomatology Association (VOSA)

From 2006 to 2009 the salt fluoridation program has been surveying the prevalence of dental cavities and analyzing the concentration of fluoride in urine and water in the mountainous Lao Cai province in northwest Vietnam. Lao Cai is made up of 8 districts and one city, with a population of 635 000 (2012) of which 64 percent is ethnic.

Initial data showed there was a lack of fluoride in drinking water, with high numbers of dental cavities in primary teeth. However, there was no sign on fluorosis in these children. Trial phases of fluoridated salt (FS) in different provinces failed due to the humidity of the salt.

However, from 2010 to 2011 the salt factory VISALCO were successful and fluoridated salt was then proposed to the Ministry of Health who in turn requested that the project be piloted before national implementation. The fluoridated salt project was officially inaugurated in 2011.

Since 2012 the FS program has been implemented in two communities in the Lao Cai province, reaching 500 households of around 2000 people, of which 135 are young children (under 3 years old).

The salt is free of charge for the recipient communities and the project is overseen by the Hanoi National Hospital of Odonto-Stomatology (NHOS) with the financial support of WHO. Clinical dental evaluation monitors results of those using fluoridated salt after 6, 12, 14, and 48 months.

The project also teaches households how to use and preserve FS and how to avoid fluoride poisoning. It follows up with household visits to assess FS usage and collect feedback.

NHOS has also organized a training program for regional dentists to educate on oral health, particularly the requirements of FS. Between 2012 and 2013, village health workers collected urine samples for fluoride analysis at NHOS resulting in positive feedback from local people in 2014.

Local authorities and medical officers have also shown great support for the FS project, in some cases requesting its expansion. Therefore, in 2015, evaluation of the pilot phase will continue, looking to expand the program in 2016.

Official inauguration of fluoridated salt project jointly declared by the Vice-Minister of Health, Vietnam, and Prof. P.E. Petersen from WHO Geneva in 2011

XV – BLEUSEL CONSULTING PARTNERSHIP: THE STAKES OF A QUALITY PRODUCTION

By: Michel Martuchou, Consultant

The first operational salt fluoridation project by Bleusel started in 2008 with a feasibility mission in Mexico. The main lesson learnt from this mission was that the use of some specific equipment (mixer machine) was essential to the production of a good quality and iodized-fluoridated salt (homogeneous mixture).

The pilot project was started in 2009 in Laos with the use of a ploughshare mixer in order to be able to do sequential mixing (per batch) which obtained good results. At that time, several other countries were interested by salt fluoridation, e.g. Lebanon, Vietnam, Haiti, Cambodia and Madagascar. Today, Vietnam has a factory producing iodized-fluoridated salt while Laos has two.

The latest mixing tests have validated that the salt obtained by solar evaporation and boiled salt can both be fluoridated. Bleusel also confirmed the compatibility of iodization and fluoridation of salt.

- The iodine is added to the salt (40 to 60 ppm) under the form of Iodate Potassium (liquid).
- Fluoride is added to the salt (250 ppm) under the form of potassium fluoride (liquid).

The results analysis undertaken by several quality control organizations did confirm the good homogeneity and quality of the salt/iodine/fluoride mixture.

Organizations like the UNICEF, WHO or AOI can provide guidance and support to the governments who would like to start such projects in the future.

XVI - FLUORIDE REVOLVING FUND: PRESENTATION, OPERATION, LEGAL FRAMEWORK.

Mr Manohak Rasachack, Director General - Ministry of Industry & Handicrafts

Since 1995, several decrees from the Prime Minister's office were promulgated in order to manage the iodized salt project and production in order to improve the Lao population's health.

The establishment of the Lao Producers Group (LPG) and the establishment of a Committee for the evaluation of iodine deficiency were the first steps of the salt iodization project in Laos. The Ministry of Industry and Handicrafts (MIH) has then been working on the norms of the IS, the establishment of a Committee to manage the iodine revolving fund and the appointment of a new Committee of the revolving fund (ministerial decree No 1041/IC.OP- 5/6/2013)

The LPG has eight production units in Laos today and the countries exporting fluoride (with quality certificate) are India and China.

The revolving fund's objective is to eradicate the iodine deficiency diseases in the Lao PDR and to make a quality iodized salt is available for the whole population according to the guidelines of the MoH. The revolving fund is also allowing the salt producers to have an available budget in order to get supply of iodine whenever needed and to avoid the iodine stock shortages.

The revolving fund Committee is composed of the Director of Industry and Handicrafts, The Deputy Director of hygiene promotion department (MoH), the Chief of LPG and a Secretariat. The role of the committee is to manage and control the activities, to manage banking, to plan and authorize the fluoride purchase, to collaborate with local authorities and to hold evaluation meetings.

The role of the Secretariat is to establish, improve and implement the rules of the revolving fund regarding the quality of iodised salt and to supervise the production of the 8 factories in regards to the quantity, the quality, the distribution and fluoride purchase and payment. The secretariat also has to report to the Committee.

Each year, producers have to submit a 'needs and production plan' to the Committee before the 30th September.

The plan today is to establish a fluoride revolving fund that will be similar to the iodine fund for financial management and stock. A first meeting on the fluoride revolving fund will be held in 2015, and the Committee will be established according to the decision taken during the meeting held on 08-15-2014 at the MIH.

Begining of 2016, the Fluoride Revolving Fund (FRF) will be operational and manage / supply the salt producers of 2 factories (Veunkham and Khok Saath) with up to 2000 kg per year supplied by AOI. In the future, more factories might need fluoride too. At first the KF will be provided by AOI in order to start create the fund.

Every year, each one of the producers will have to establish a Fluoride needs plan and send it to the Revolving Funds Committee (before 30 Sept of each year).

<u>Provisionnal plan for the FRF functionning</u> :

Year 1 :

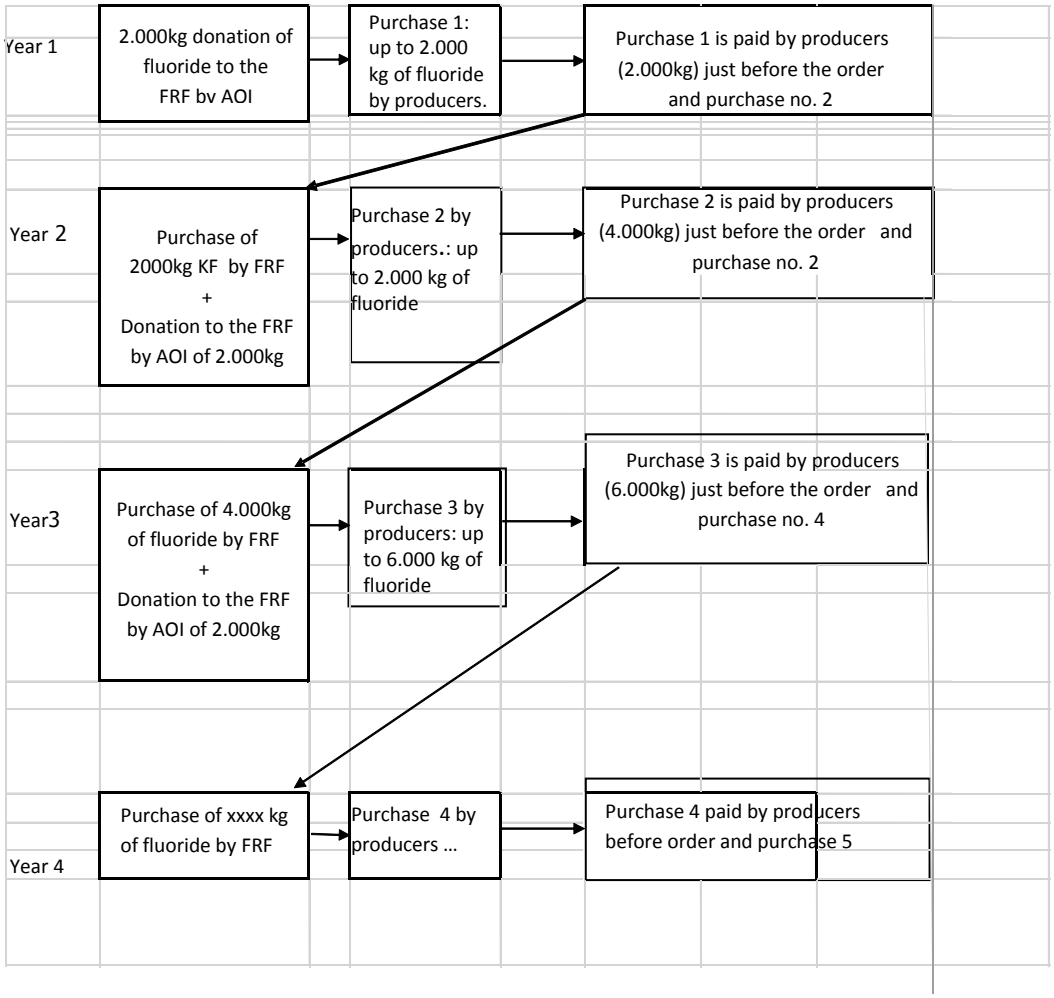
- AOI provides max. 2.000kg of fluoride to the FRF (according to production forecasts of salt producers).
- Purchase 1: up to 2.000 kg of fluoride by producers.
- Purchase 1 is paid by producers just before the order and purchase no. 2

Year 2 :

- FRF purchases 2000 kg de KF of fluoride with the payment of the producers;
- AOI provides max. 2.000kg of fluoride to the FRF (according to production forecasts of salt producers).
- Purchase 2: up to 4.000 kg of fluoride by producers.
- Purchase 2 is paid by producers just before the order and purchase no. 3

Year 3

- FRF purchases 4.000 kg of fluoride with the payment of the producers;
- AOI provides max. 2.000kg of fluoride to the FRF (according to production forecasts of salt producers).
- Purchase 3: up to 6.000 kg of fluoride by producers.
- Purchase 3 is paid by producers just before the order and purchase no. 4, etc …..



XVII - THE ROLE OF FACULTY OF DENTISTRY IN THE DEVELOPMENT AND IMPLEMENTATION OF IODIZED-FLUORIDATED SALT PROGRAM IN LAOS

Dr Aloungyadeth, Vice University Chief, Lao Faculty of Dentistry

Laos has a unique Faculty of Dentistry (FOD) in Vientiane and counts a total of 640 dentists in the country which shows a population to dentist ratio of 1 for 10.600 people (latest population projections: 6.8 million pop. in Laos).

Oral health services are offered in the provincial and some district hospitals and there are few projects of oral health education at community level. Globally, the oral health action in Laos is limited to:

- School preventive oral health program (implemented by FOD and Mahosot Hospital)
- Health education (FOD)
- Brushing with fluoride toothpaste project
- Fluoride mouth-rinsing project
- Sealant obturation project
- ART restoration project.

The main actors and partners implementing the oral health project are the Ministry of Health, with the FOD (UHS) and Mahosot Hospital, and international partners like AOI (France), Group Salins (France), Thammasat Univ (Thailand), Seoul National University (Korea), and the Tokyo Dental College (Japan).

The role of the Faculty in the implementation of iodized-fluoridated salt program in Laos is to develop a strategy and policy to prevent dental caries and to manage epidemiology surveys, e.g.DMFT, Fluorosis….al.

Steps of Implementation:

- 2006-09: Studied the feasibility for salt fluoridation program in Laos and trial with different mixes and methods for salt fluoridation along with salt iodization.
- In 2010 Feb: - request for permission to distribute the fluoridated salt in the 3 pilot districts
- In the end of 2010:- the permission to distribute was received and then the fluoridated salt rapidly spread to the district
- Unfortunately, dental caries prevalence has not yet dropped thanks to the salt fluoridation project, it is necessary to wait for at least 5 years before having a large evaluation survey.

Future plans are:

- To develop communication and marketing to sale the salt
- To ensure the sustainability of a quality control system
- To continue surveillance.
- After five years: follow up of children to long term assessment