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Opportunities for Micronutrient Interventions

OMNI

Quality Assurance Workshop for Salt Iodization Programs

October 1996

The United States Agency for International Development

The Micronutrient Initiative

PROGRAM AGAINST MICRONUTRIENT MALNUTRITION

PAMM

TOWARDSTHE ELIMINATION OF HIDDEN HUNGER

UNICEF

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In memory of Tim Stone

In November, 1996, Tim Stone was killed in an airplane crash in Africa. Tim was an important part of this meeting, as he was for many other activities directed toward the elimination of micronutrient malnutrition. Tim was always willing to give of himself, his time, and his expertise. His assistance in the preparation and implementation of this workshop will not be forgotten. His death is a great loss to the community of colleagues working toward the elimination goals.

EXECUTIVE SUMMARY

In spite of the remarkable achievements being made in establishing salt iodization programs and increasing coverage of populations in many countries, there is often too much or too little iodine in salt reaching the consumer. To address this problem, comprehensive quality assurance systems to monitor adherence to national standards and define corrective actions are needed. Such systems focus on ensuring that salt leaving production facilities contains iodine within a certain range. However, other program elements must also be effective, including maintenance of political commitment to the program, making demand for iodized salt habitual, and improving laboratory quality control procedures. Finally, impact assessment through measurement of biologic indicators is critical to decide the overall success of the program.

This workshop drew upon expert opinion from producers, government policy makers, program implementors, and agencies to review the critical components of such quality assurance systems and recommend activities to strengthen them. Issues in production, packaging and labeling, wholesale and retail monitoring, standards and enforcement, laboratory analysis, and policy development were reviewed. General recommendations are included here in tabular form.

All countries will eventually need to address issues of quality in their iodine deficiency elimination programs. Countries will need to establish systems to limit variability in the amount of iodine in salt reaching the consumer, and surveillance mechanisms to confirm that the deficiency is eliminated. Meetings to establish or strengthen quality assurance activities should be conducted at the national level, involving all those who play a role in the process. These meetings will define specific actions to set standards of performance, assign responsibility, define corrective actions, and monitor program efforts.

Background and rationale

Most governments have now recognized that the elimination of iodine deficiency is a development priority, given the positive impact on the mental development of children. Salt iodization is the intervention of choice, and most countries are rapidly developing their capacity to iodize all salt for human consumption.

In several countries rapid progress has been made by generating political commitment, working closely with the private sector, building awareness among consumers, developing multisectoral plans, and establishing conducive regulatory environments. However, reviews of their progress have raised questions about quality at all levels from production to consumption: What are the most critical activities to undertake *now* to ensure uniform levels of iodine in salt? What needs to be done to assure that all critical program elements are sustained? What resources are needed and what policy adjustments are required? The ultimate standards against which to judge the success of iodization programs are the elimination of iodine deficiency as confirmed by biologic assessment, and the continuation of programs to sustain those gains.

Quality assurance ensures that the product and the program meet established national standards and specifications. First, a series of program elements must be put in place and sustained, with both the salt

industry and government program staff practicing quality assurance. Only then will adequately iodized salt be available and consumed by populations now and into the future.

This workshop evolved in response to the need to ensure that iodized salt consistently meets national standards. It was designed to focus on technical improvements to minimize the variability of iodine in salt during production and losses during distribution. However, a number of related policy and programmatic issues emerged. These were reviewed as well to establish a set of recommendations for program improvement. In this broader sense, establishing a quality assurance program includes activities in the following areas: a) production, involving salt producers and industrial inspection; b) government policy, including the regulatory environment, financing and integration with other sectors; c) monitoring and evaluation, inspection, and impact assessment; d) education to create demand and improve school curricula; and e) infrastructure development, including training and capacity building.

During the workshop selected experts shared their experiences in various aspects of salt iodization, such as production, establishment of national standards, program implementation, and agency support for national efforts. Participants reviewed issues in Asia, Africa and Latin America pertaining to both large and small producers, sophisticated programs, and programs that are just beginning. It is hoped that the recommendations of this workshop will be reviewed in each country and applied in a manner suitable to the local situation.

Objectives and expected outcomes

The workshop had the following objectives:

1. To understand current salt iodization practices and identify ways to correct any shortcomings to ensure a product with consistent levels of iodine.
2. To assess the effectiveness of current procedures used by producers, and of confirmatory checking by governments to ensure that salt iodine content meets government standards.
3. To identify broader program actions in policy, advocacy, regulation, and enforcement that affect the establishment of quality assurance systems.

The outcomes expected were:

1. Recommendations would be produced at the workshop and made ready for publication and dissemination.
2. Increased national interest in quality assurance through orientation, training, improved systems, and better communication with private producers.

Working Definitions of Quality Assurance and Quality Control

QUALITY ASSURANCE is a proactive and continuous process of monitoring a system for reproducibility and reliability by: , setting standards of performance and designating responsibility. , defining corrective actions taken when criteria are not met. , performing measurements within a stated level of confidence.	**QUALITY CONTROL** is an indicator system for documenting performance and action that: , provides a record of consistency of performance. , records actions taken when performance fails to meet the standard. , uses a non-blinded system with potential for bias.

Quality assurance is broader, and incorporates quality control. While some countries may only be able to implement some quality control activities, it is ultimately the quality of the iodized salt that is important.

Major issues and recommendations

This executive summary does not attempt to summarize the broad range of recommendations of the workshop. Rather, the following section lays out a summary of the discussion on each topic, highlighting the key issues discussed and the priorities that need to be addressed to strengthen quality assurance. Specific recommendations and several activities emanating from the discussion are summarized in tabular form for each topic. (See pages 7-8, 10-11, 14, 16-17,20, 22-23) These recommendations represent the general consensus of those at the meeting.

Participants attempted to specify the minimum requirements to ensure that salt meets government standards, and to include both technical and programmatic issues. Of course, establishment of quality assurance procedures must be done in the context of each national program one given set of recommendations will not fit all programs. Adapting recommendations to meet national needs may require national or regional comprehensive review by those with extensive local expertise. Governments and agencies could then plan specific national activities and coordinate support efforts. Finally, since the standard against which success will be judged is the elimination of iodine deficiency, impact assessment must be included in the overall quality assurance effort. Although the workshop did not address impact assessment in depth, it was clear that biologic assessment will be required periodically to confirm that the overall program is meeting this ultimate standard.

SALT PRODUCTION, PROCESSING, AND IODIZATION

What needs to be done to be sure that every bag of salt leaving all production facilities is always well mixed, homogeneous, with the right amount of iodine?

Key issues

, Production and quality of raw salt

, Batch processing iodization methods

, Continuous processing iodization methods

, Communication and feedback to producers

, Quality assurance procedures for differing production size and methods

, Procurement and cost of potassium iodate

Discussion summary

While monitoring efforts at other levels is important, getting the process right during production is the most crucial step. Raw salt can present quality problems related to moisture content, purity and crystal size, as these factors affect iodization. Thus, managers need to develop methods to upgrade raw salt production. While there have been many improvements in techniques to improve raw salt quality, these methods are not widely known or used. This information gap must be addressed, particularly for small independent producers. Depending on the level of expertise and investment, upgrading salt quality can be achieved by refining, mechanical washing or simple improvement in field quality control.

Field level quality control for small producers:

, Pond preparation

, Brine density control

, Use of hydrometers

- Pan washing techniques
- Salt storage

Issues related to the technology of salt iodization vary depending on the size of the producer and on the processing methods used. Production quality issues are of less concern for large producers (with both the resources and expertise) than for small producers. Although small producers: contribution to overall national iodized salt needs might be limited, there remains a political and programmatic need to address quality at that level.

Mixing methods are critical to improving iodized salt quality and particularly require further research. Both hand and mechanical mixing methods need adequate time to allow consistent dispersion of iodate, not just on average, but for every batch. This is perhaps the most critical step in minimizing the variation in iodine content from bag to bag and is most difficult for small producers. There is an additional need for equipment and process validation for all producers, to determine the capacity of the machinery to maintain iodine content within a given range during normal operation.

> What steps can be taken that will improve the ability of small producers to produce salt meeting government standards?

Quality assurance is most critical and difficult to implement for small producers. With overall improvement in the salt industry, quality assurance for small producers should become a less significant issue. Market forces may accelerate a global trend toward larger, more efficient production facilities that save time, energy and money. However, due to the large number of small producers in many countries, national standards should be developed in such a way as to minimize the likelihood of putting these small producers in jeopardy. Since the largest production costs are packaging and transport, this may include promotion of small producer associations or establishment of cooperative processing plants.

Communication of technical information to producers is inadequate. Brief technical bulletins are needed on a variety of subjects, and there should be more exchange of experiences. Most countries have no good way to give producers feedback on product quality, either positive or negative. In addition, there is little effective communication among producers, government policy makers and program implementors, and among the various sectors involved. These communication gaps should be addressed by strengthening dialogue among government, agencies and private producers.

> What needs to be done regarding availability of potassium iodate to ensure ready supply at appropriate prices?

There has been a significant rise in the cost of potassium iodate in recent months. An international meeting of iodate producers should be held to address long term supply and cost.

Recommendations for improving production, processing and iodization

For producers	For raw salt production: , Concentrate on field level quality control followed by mechanical washing where feasible. , Develop proper procedures through training. , In collaboration with agencies, develop a manual on improved technologies for salt production by small producers. For batch processing: , For small producers, use mechanized mixing methods as opposed to shovel/hand mixing methods to improve consistency of iodine content. , Ideally use non-corrosive (stainless steel) ribbon blenders for optimal mixing. Alternative methods include roller drum and ›cement mixer‹ type equipment which require greater mixing time. Both should include a manual backup for power outages, to reduce down time. , Use dry mix methods in preference to wet mix methods. For continuous processing: , Use screw/auger mixing device during or after addition of iodate, preferably by spray methods. , Use dosing pumps for uniform addition of iodate solution. , Sample at the appropriate point in the production process.
For government policy makers and program managers	, Hold an annual national meeting of IDD partners (ministries, private salt producers, interested agencies) and distribute reports, giving update on progress, technology, machinery and methods. , Develop methods to enable small producers to meet recommended standards. , Create a national database on small producers. , Establish training programs to improve small producer production techniques. Consider hands-on approach, model salt farm use, and country specific parameters as well as training on validation exercises.
For agencies	, Develop and distribute information on available equipment, including costs, suppliers, production capacities etc., for medium and large producers. , Assist governments and industry to improve information exchange on global, national and local issues through such avenues as newsletters. , Establish a mechanism through which to examine periodically the market situation with regard to the supply and cost of potassium iodate.

Support activities

1) The Indian Model Salt Farm document and UNICEF document on small producers need to be more readily available for use by producers. In addition, a small group should be formed to research and develop a salt production manual for small producers, highlighting brine management, pond preparation, and harvest techniques to achieve optimum purity in the field. This should be part of a broader clearinghouse for information to assist small producers, which could include video, handbooks etc. (UNICEF)

2) A generic training plan and curriculum needs to be developed for small producer production techniques that could be adapted to meet national needs. The training should operationalize the practices outlined in the manual and focus on field layout, pond construction and maintenance, brine management and production practices, and might include a multi-media component. (Selected producer with assistance from MI, ICCIDD among others)

3) Further research and validation is required on both dry batch mixing and on shovel/hand mixing techniques to determine the effectiveness of these methods and establish the Abest practices@ that will ensure consistent batch quality. (Selected small producers with assistance from MI and OMNI)

4) A protocol needs to be developed and tested that allows producers to perform simple validation exercises of their mixing procedures so they can understand the limits of their machinery. A series of validation exercises for machinery and process need to be completed and documented, with the methods and results made available to producers. (Selected producer with assistance from MI)

5) Information needs to be compiled on dosing pumps for continuous processing that would include availability, cost, maintenance requirements, and ordering information. (UNICEF Supply Division)

6) Experiences with the formation of salt associations or cooperatives need to be documented, noting how they can be helpful for improving iodization practices. In addition, there should be a compilation of experiences with shifting salt from small producers to more centralized iodization plants and other mechanisms to ensure that small producers aren=t inadvertently placed out of business as iodization proceeds. This should be made available to countries with many small producers. (Selected national NGOs with assistance from UNICEF)

7) A meeting should be convened with iodate producers, agency representatives, and iodized salt producers to discuss cost and supply issues for the future. (UNICEF, MI)

8) An overall process for strengthening communication should be developed to delineate global, national and local information needs and responsibilities. (MI, OMNI, ICCIDD, UNICEF)

PACKAGING AND LABELING

What policies, procedures and technological improvements can be made in packaging and labeling that will maximize the retention of iodine in salt until it reaches the consumer?

Key issues

, Size of packages

, Materials

, Packaging and sealing methods

, Labeling and logos

Discussion summary

Appropriate packaging is critical to assure quality. This is the single largest cost component for the producer. It is important for producers to understand that investment in better packaging will pay off in terms of lower iodine losses. Packaging should be made of impervious material. There should be exclusive use of lined or laminated bags no larger than 50 kg to minimize the use of hooks during loading and unloading. Better technology should be developed for packaging and sealing to improve efficiency, longevity, and price. Research data, soon to be published, on iodine losses under different controlled packaging and environmental conditions, show that losses are less than expected when packaging is done using impervious materials, but very high when unlined woven material is used, especially at high relative humidity. In fact, improved packaging is more important than a higher degree of raw salt purity. Research also suggests a maximum shelf life of six months even with adequate packaging. This emphasizes the importance of appropriate packaging during production to assure that the salt reaching the consumer maintains adequate iodine. In such cases, monitoring is carried out less for determining iodine loss than to check on counterfeiting and whether alternative sources of non-iodized salt are entering the market.

The are some practical issues with regard to labeling since packaging material is pre-printed, and some consider stamping during production difficult. However, regulations may spell out requirements for labeling, such as the date of manufacture or expiration, and these should be followed, though the exact standards will vary by country. Ideally producers should be able to include a logo or statement on their label about meeting the national standard. There are pragmatic constraints in enforcing compliance, however, and monitoring the

use of such a label represents a significant obstacle. Further dialogue at the national level is needed to address these constraints.

Recommendations for improving packaging and labeling

For producers	For bulk packaging: , Use bulk bags that are no greater than 50 kg. , Use only woven bags that are lined or laminated. , Move toward semi-automated filling and/or sealing procedures for medium and large producers. , Stitch bulk packs by machine, for medium and large producers. , Label bulk packs with Ause no hooks.@ , Follow country standards/legislation for labeling, though the minimum should include: statement that salt is iodized name and address of manufacturer weight For retail packaging: , Reduce production of 50 kg sacks in favor of increased production of 1kg packages. , Use heat sealing by a mechanical device for small packs. , Use impervious, recyclable material using UV resistance if country conditions require it.
For government policy makers and program managers	, Support efforts to accelerate consumer demand for small package size (2 or 1 kg.) as opposed to bulk salt purchase. , Promote policy to include on label that salt conforms to national standards, or through the use of a standards logo, that salt meets a minimum standard.
For agencies	Assist with development of educational materials and methods to help with government efforts to accelerate consumer demand for small package size (2 or 1 kg.) as opposed to bulk salt purchase.

Related activities

1) More information is needed on the availability and possible improvement of semi-automated packaging machines, possibly available in China, Thailand and Turkey, and on higher quality heat sealing machines. (UNICEF Supply Division)
2) Further work is needed to improve information, education and communication efforts used to promote small packages. (National NGOs with assistance from MI, OMNI and producers)
3) Further discussion is needed to gather experiences and review methods to combat counterfeiting. (Producers, national standards agencies)
4) Results from current research on the stability of iodine in salt under varying conditions, need wide distribution to salt producers. (PATH, MI, PAMM, ICCIDD)

WHOLESALE AND RETAIL LEVEL QUALITY ASSURANCE

What improvements can be made in the practices at the wholesale and retail levels to minimize losses, ensure that purchased salt is iodized and meets government standards, and limit the sale of non-iodized salt for human consumption?

Key issues

, Need for monitoring at wholesale and retail levels

, Dealing with counterfeit salt

, Certification

, Targeted and non-formal monitoring

Discussion summary

It is most critical to monitor iodized salt at the production/import level and at the household level, but governments must establish an overall monitoring *system* that may include wholesale and retail levels.

Several factors determine whether to monitor at the wholesale and retail levels at all. During the initial phases of the program it may be necessary to monitor at wholesale and retail levels because quality of salt is not yet consistently assured at production/import. Coverage data may reveal household accessibility problems. As a program matures and progresses, salt should be more consistently iodized in compliance with standards so the need to monitor at the wholesale and retail level may diminish.

Counterfeit salt (salt packaged to look like a quality iodized brand, but of poor quality often without iodine) and the diversion of industrial or other non-iodized salt to be used by households may necessitate monitoring in the marketplace. The government of China uses Asalt police@ to monitor and inspect at the retail level because of the high percentage of non-iodized salt being sold as iodized salt.

In countries where enforcement is weak, it may do more harm than good to inspect at these levels since this may convey a message that noncompliance will be tolerated. However, monitoring at the retail level may

cause retailers to demand only properly iodized salt from their suppliers. In Tanzania, monitoring at this level has been a very useful incentive for producers to comply with standards.

Informal monitoring mechanisms can be effective, such as using private standards certification organizations and voluntary organizations using simple test kits. In Tanzania, trained boy scouts demonstrate the use of rapid test kits in the schools. This is an effective way to use schools as proxies for households for monitoring purposes, while at the same time stimulating awareness of IDD and creating demand for iodized salt among school children and their families.

Targeted monitoring is another option in certain situations. Instead of monitoring all wholesale and retail facilities, in Honduras only those in severely IDD-affected areas, or those where problems with salt iodization have been identified, are monitored.

Recommendations for improving wholesale and retail monitoring

For producers	, Support government efforts to monitor iodized salt quality during wholesale and retail sales, and at the point of consumption.
For government policy makers and program managers	, Establish a monitoring system that concentrates on production/import and households. , Determine whether to monitor at wholesale and retail levels by considering the phase and needs of the program and the specific problems (e.g., existence of counterfeit salt, diversion of industrial salt) taking into account the resources available for monitoring at these levels. , Consider using informal monitoring such as salt testing in schools, in addition to formal monitoring. , Consider using targeted monitoring, such as monitoring focused on areas with expected low iodized salt coverage.
For agencies	, Support initiatives to increase use of schools and community-based monitoring systems.

Related activities

1) For each country, monitoring activities should be correlated with program phases. (National government policy makers)

2) Case studies of the use of informal monitoring should be collected and distributed as examples. (National government program managers, with assistance from UNICEF, ICCIDD)

STANDARDS AND ENFORCEMENT

What improvements can be made in both the regulatory environment and the procedures for confirming that salt produced and in the marketplace contains adequate iodine within an acceptable range?

Key issues

- Elaboration of standards
- Encouraging compliance with standards
- Maximizing resources devoted to inspection and enforcement

Discussion summary

International standards for salt quality assurance and sample testing, such as those promulgated by the WHO/FAO Codex Alimentarius, already exist and can be used at the national level. Product standards, on the other hand, tend to vary by country. Because salt characteristics, climatic conditions, and populations: salt consumption patterns vary by country, national governments are in the best position to set standards that meet their needs.

Enforcement in most countries is weak and must be strengthened if the salt iodization program is to succeed and be sustained. Where resources are limited, the administrative burden of governments to inspect salt producers and traders and to enforce regulatory requirements must be reduced. Solutions include periodic self-reporting by producers/importers, followed-up by unannounced inspections of some producers/importers; voluntary self-policing by salt associations; and use of private, voluntary certification or accreditation, or logos, to supplement governmental inspections. If logos are used, use must be carefully planned and specified in regulations, with attention to issues such as who owns and may grant the logo.

Incentive plans and public recognition for meeting standards are important for producers of iodized salt. In the case of non-compliance, the government should explore a wide range of options. Bad publicity, such as publishing a list of companies that fail to comply with standards, is likely to be an effective sanction in many countries, but should be used only after a thorough examination of the implications of implementing such sanctions. A positive approach may be better, however. By publishing inspection results, consumers know who is producing and selling quality iodized salt and who is not. Since small producers are likely to have some

difficulty in conducting quality assurance and meeting standards, they should be given special attention by the government.

Inspection and enforcement systems may vary according to the phase of the program. In the initial stages, it may be necessary to establish an inspection and enforcement system that is separate from the existing food control system in order to ensure that appropriate attention is given to checking salt compliance. Once industry establishes a standard of quality, the need for external inspection may decrease, and it can be included in the normal food inspection system.

Recommendations for standards and enforcement

For producers	, Establish a dialogue with government officials to review regulations and enforcement procedures. , Encourage self-policing through producer associations for compliance with government standards.
For government policy makers and program managers	, Modify standards to specify acceptable ranges (expressed in ppm iodine) rather than as absolute figures. Ranges should be specified for production and consumption levels. , Develop a strict inspection and monitoring system for imported salt at border checkpoints and ports of entry. , Apply government standards to each batch or lot of salt produced or imported and not by averaging the iodine content of all bags. , Encourage self-reporting by producers/importers, followed up by targeted, unannounced inspections. , Encourage industry Aself-policing.@ , Develop an adaptable inspection system that correlates with the phase of the program. , Establish governmental and extra-governmental certification or accreditation, including use of logos. , Provide incentives for compliance. , Consistently impose a broad range of sanctions for noncompliance. , Assist small producers to help them meet standards. , Assist with sharing experiences on successful incentive programs and enforcement methods, with help from UNICEF.
For agencies	

Related activities

1) A study should be completed on the various inspection and enforcement mechanisms being used in a number of countries, with a critical review of successful systems. (PAMM, MI)
2) A one-page generic reporting form is needed that can be modified by producers and importers to meet their reporting needs. (PAMM, MI)
3) Accreditation/certification plans need to be drawn up to describe use and control of logos. (National government program managers, with assistance from PAMM, ICCIDD, UNICEF, MI)
4) Mechanisms should be developed in countries to enable publication of inspection results to support producers complying with national standards (National government policy makers, producers)
5) Empower customs or law enforcing officials through training for compliance with government standards for imported salt. (National government policy makers)

LABORATORY ANALYSES AND SALT TEST KITS

What improvements can be made in quantitative analysis of iodine in salt that will assist in quality assurance of salt at all levels?

Key issues

- Use of standard titration methods
- Use of rapid test kits and their reliability

Discussion summary

The accepted standard titration laboratory for iodine estimation in salt is more difficult to establish and probably less widely used than previously thought. Except for very large producers, establishing such a laboratory and providing trained staff to perform the tests is difficult; many medium and small producers revert to the rapid salt test kit. There is ample concern about the use of the currently available test kits for other than qualitative assessment. They are perhaps best used for such activities as salt testing in schools. There are no standards available for these test kits and they are now produced in many countries with varied quality and reliability. There is a specific need for a simple, more practical quantitative method of analysis for medium and small producers. Establishment of a titration laboratory remains the accepted gold standard for quantitative assessment.

Recommendations for improving laboratory analyses & salt test kits

For producers	Continue use of current kits and methods, recognizing limitations of salt test kits. Modernize and simplify methods for monitoring iodine levels at production sites. Make every effort to establish a titration laboratory for quantitative analysis.
For government policy makers and program managers	Modernize and simplify methods for monitoring iodine levels for purposes of inspection. Incorporate quality assurance and quality control procedures in all government laboratories.

For agencies	, Work with the manufacturers to include a statement explaining the color code used for the kit and describing the basis for its development.

Related activities

1) A small group should be organized to develop quality assurance standards for salt test kits. (PATH, PAMM, MI)
2) A meeting should be called for test kit producers from several countries to review quality assurance of these kits and harmonize interpretation protocols. (Kit producers, UNICEF, MI)
3) Research is needed to develop an intermediate test kit with better quantitative assessment capability than currently available kits. Further research and development is needed to simplify titration procedures and equipment, to facilitate its broader use in medium and large producers. (ICCIDD, PATH, MI)
4) Performance standards are needed for all test kits. (Kit producers, with assistance from UNICEF)

POLICY AND PROGRAM ISSUES

What other elements of the program or policy development support the improvement of quality assurance measures at all levels from production to consumption?

Key issues

, Sustaining political commitment

, Sustaining awareness and demand through improved communications

, Ensuring fiscal sustainability

, Improving the regulatory environment

Discussion summary

A program assessment tool, developed at PAMM with support from OMNI, may prove useful to assist with a review of all salt iodization program elements. The tool can be used by program managers or by an external group and is meant to provide a comprehensive compilation of the issues for each program area (such as monitoring, management, laboratory management, marketing, legislation and regulation, and information management). When seen as a reference to facilitate such an assessment, the tool will be helpful in reviewing various program elements, including those required for adequate quality assurance.

It is not realistic to separate the technical requirements for quality assurance from the policy and programmatic elements. For example, the incentive for performing adequate quality assurance depends on the producer=s perception of the demand for a quality product, and this may require government assistance to increase that demand. Policy discussions should deal with quality assurance of the salt iodization program itself, concentrating on sustainability issues including:

, whether there are effective, ongoing activities to stimulate political and industry leaders and maintain consumer awareness of IDD and demand for iodized salt

, whether the micronutrient budget is a routine line item in the national budget

, whether lines of communication with the salt industry and other interested sectors are open and will stay open

, what the international community can do to keep pressure on governments to meet their World Summit commitments and provide them assistance toward that end

, what governments can do to escape dependence on international agencies.

Recommendations for policy and program issues

For producers:	, Support and participate in public-private dialogue through producer associations to have a say in the development of public policy. , Develop, in conjunction with government representatives, an inventory of quality assurance needs over the next five years, including needs for training, laboratory establishment, capital improvements, etc.
For government policy makers and program managers:	, Develop plans to ensure continuing political commitment to IDD elimination. , Establish the ability to assess biologic impact of interventions and use impact data to show positive results. , Incorporate IDD elimination into the educational system and other appropriate structures and systems. , Sponsor public-private sector partnerships. , Establish a separate micronutrient budget as a routine component of the national development budget. , Establish Universal Salt Iodization laws and regulations; salt for animal consumption should not be exempted. , Strengthen enforcement systems and apply sanctions consistently.
For agencies	

Related activities

1) Agencies need to continue to assist with advocacy efforts for IDD elimination and consideration should be given to including the concept of the rights of children in these efforts. (UNICEF, ICCIDD)
2) Support materials need to be developed to help build iodine deficiency knowledge into school curricula. (UNICEF, PAMM)
3) Experiences in the use of salt test kits in schools, both for building awareness and for monitoring, should be compiled and circulated. Broader use of testing in schools should be encouraged. (National government program managers, with assistance from MI, PAMM)
4) To strengthen inclusion of micronutrient activities in budgets, cost analysis with projections for the future should be done as a guideline for budget planning in countries. (National government policy makers, UNICEF)
5) Quality assurance activities need to be reviewed in selected countries as a means to identify strengths and weaknesses, and establish a system for ongoing activities. (National government program managers, producers with assistance form MI, ICCIDD, PAMM)

ANNEX A: PARTICIPANT LIST

Twenty-seven participants representing a full range of expertise required for a successful salt iodization program were selected. They came from Bangladesh, Canada, Denmark, Eritrea, Ghana, Guatemala, India, the Netherlands, Pakistan, the Philippines, South Africa, Tanzania, Thailand, and the United States. The PAMM organizers, who also attended, sought to obtain a balanced representation from private industry, government, agencies and NGOs, and expert consultants. Recognizing that producers ultimately bear responsibility for a quality assured product, the workshop included those involved in production, standards, management, policy making, program implementation, food technology, procurement and logistics.

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ANNEX B: WORKSHOP STRUCTURE AND METHODS

Pre-meeting questionnaire

Prior to the workshop, each participant was asked to complete a questionnaire about the issues, barriers, and experiences they have had with regard to each of several topic areas. The questionnaire responses, summarized below, served as background information for the discussions during the workshop.

This questionnaire included questions on the activities currently being done related to both product and process quality assurance. Participants were asked to provide information from their experience, not just in their own country, but from their professional perspective as individuals involved in some aspect of salt iodization. Thus, the responses reflect the perspectives of producers, program managers, developers of standards, and agencies. The purpose of the questionnaire was to generate the key issues, including successes and obstacles, as seen from these different perspectives, for use in the discussions during the workshop. Results were summarized and reported back to participants during the workshop.

When describing current quality assurance activities, most respondents described establishment of or improvements in the technology of salt processing and iodization, and efforts in monitoring at various levels. Few mentioned training as an ongoing activity. Establishment of laws and regulations and improvement in local technology were seen as successes. The major obstacles facing producers included poor raw salt quality, limited financial and trained human resources, lack of appropriate laboratory facilities, and limited enforcement of standards. Governments faced difficulties with monitoring, establishing financial incentives, and in enforcing existing regulations. Logistic problems included supply of reagents, potassium iodate and test kits. Several noted lack of trained personnel for various quality assurance activities.

There was limited data on variation in iodine content at production sites. Out of 8 specific numeric ranges given, the overall range was from 0-600ppm. The average low and high values were 24-148 ppm, although in some cases this may reflect the desired range rather than the actual range. Most respondents noted technologic improvements as the means to limit this variation.

With regard to the equipment currently used, most felt that equipment still is relatively new, and maintenance costs were not yet significant. Local production and the importance of locally available or manufactured parts were stressed, with UNICEF playing a key role in assisting with establishing iodization capacity. Laboratories were seen as important, but weak, with titration not frequently used, and most using the more qualitative test kits. Several respondents mentioned the critical importance of an independent quality assured government inspection laboratory.

On the issue of government inspections and monitoring of quality, most felt that even at the level of production, this external quality assurance was weak performed only periodically, with little enforcement. Respondents had no consistent answer as to how to improve these activities, mentioning only use of a quality mark or logo, stricter enforcement and more regular dialogues with industry partners.

With regard to policy and program issues, most again felt that the regulatory environment needed improvement, with greater ability to enforce standards. Several mentioned the need to continually reinforce government commitment to elimination goals, and the need to improve demand for a higher quality product.

Questionnaire

Workshop on Quality Assurance
of Salt Iodization Programs
8-10 October 1996
Atlanta, Georgia
USA

Background questionnaire for all participants

We are very pleased that you have agreed to participate in this expert discussion on quality assurance for salt iodization programs. In the interest of making this workshop most productive, we have developed a short series of questions for each participant to complete prior to their arrival in Atlanta.

We have a mandate during the workshop, to generate a series of recommendations on the necessary elements for salt iodization programs to ensure that iodized salt reaches consumers with adequate iodine. We will need to look in detail at all the factors, both technical and programmatic, that affect the variability of iodine content during production and distribution, so that salt reaches the consumer without excessive iodine, while at the same time, ensuring that there is adequate iodine to protect the consumer against iodine deficiency. The more information we bring to the meeting the more successful we will be in understanding how to improve programs, and making the best recommendations for program sustainability.

Please complete the following questionnaire. Please be specific, providing real data where possible, bearing in mind the objectives and expected outcome of the meeting. The information will be summarized, and will be used to stimulate the discussion on each topic area.

WORKSHOP ON QUALITY ASSURANCE OF SALT IODIZATION PROGRAMS

PARTICIPANT QUESTIONNAIRE

1) Describe the activities the major producers currently undertake to ensure that the salt they iodize consistently contains the amount of iodine described by government standards and that the iodization process is fully integrated with salt production and refining systems..

What have been the most successful activities for ensuring quality? What are the 3 most significant obstacles that *producers* face in meeting government standards? What are the 3 most significant obstacles that *governments* face in seeing their standards met?

2) At production sites, how much variation is there in ppm iodine in salt produced, before distribution? (Please provide any available data)

Have there been any technologic improvements in the production process that have minimized this variability in salt iodine content?

3) What is the status of the iodization equipment currently used by the major producers, in terms of age, reliability, cost of repairs and upkeep, availability of parts?

What 3 initiatives have helped modernize equipment, or ensure maximum equipment functioning?

4) Describe the laboratory facilities used by the major producers for quality assurance.

What 3 attributes of laboratories in your country have been the most critical in helping reach elimination goals?

5) Describe any logistic issues that impair iodized salt quality, such as cost, availability or quality of supplies or reagents; availability of staff; level of knowledge of staff; inconsistency of raw salt quality, etc.

6) Describe the system by which the government checks that producers are complying with government regulations?

What have been the most important steps taken that have improved this system? What policies have supported this regulatory system, with regard to limiting bribery, supporting inspection staff, etc?

7) What additional activities or events have occurred that have improved iodized salt quality, including regulatory issues, coordination between ministries, financing, marketing and demand issues?

What are the 3 most important barriers to implementing policies that would improve iodized salt quality?

8) Is there any evidence suggesting that iodine is being lost from production through the distribution chain to households? If so, describe the steps being taken at the wholesale and retail levels to minimize these losses.

What 3 things have worked best in determining iodine losses during distribution and taking corrective action?

9) In your current position (whether public or private, or as a consultant):

< What information do you need to do your job? (not information that would be helpful or interesting, but that which you NEED)

< How often do you need this information? (daily, weekly, monthly, annually, periodically)

< In what form do you need it? (as written report, as verbal report, computerized, memo etc)

< In what way do you use this information; what do you actually do with the information?

< How do you pass this information on to others who need it? (How do you get rid of the information, feed it back into the system to improve the situation)

The structure

Each topic at the workshop was introduced by selected participants, followed by a full discussion of the *issues* for that topic. The whole group participated in the discussions related to the topics of production, packaging and labeling, and monitoring at wholesale and retail levels. The remaining topics were divided and discussed in two separate groups which, during subsequent plenary sessions, outlined the issues for the entire group. Once all issues related to each of the topics were aired, the participants again divided into two groups to discuss and outline specific *recommendations* to address the issues for each topic. The recommendations of each group were presented again in plenary session, where they were discussed and agreed upon by the entire group. A short questionnaire was used to evaluate the workshop, and a second questionnaire, to be completed 4-6 months later was designed to determine whether the workshop was helpful in stimulating further quality assurance activities in represented countries.

Workshop on Quality Assurance
of Salt Iodization Programs
8-10 October 1996
Atlanta, Georgia
USA

Venue: The Turner Center
Clifton Road
Atlanta, Georgia

Monday, October 7 Participants arrive, receive welcome packets

6:00 Meeting with **facilitators and rapporteurs**: Emory Inn lounge
6:30 Meeting with those presenting **overviews**: Emory Inn lounge

Tuesday, October 8 Rapporteur: Pandav/Fulgencio

8:45 Coffee and tea available in conference room

9:00 Welcome and opening remarks
Facilitator: Houston

Dr. David Alnwick UNICEF
Dr. Harry Hannon Centers for Disease Control
Mr. Venkatesh Mannar Micronutrient Initiative

Introductions
Objectives

10:15 Coffee break

The next sessions are designed to bring out the key issues for each topic. In later sessions, participants will review the issues in view of policy and program implications, and make recommendations.

10:45 **Topic 1:** The Production of quality iodized salt
Facilitator: Sunderasan
5 minute overview: Naber
Discussion of key issues

12:30 LUNCH (provided)

1:30 **Topic 2:** Packaging and labeling
Facilitator: Woldentensae
5 minute overview: Stanley
Discussion of key issues

2:45 Coffee break

3:15 **Topic 3:** Monitoring quality during wholesale, retail and distribution
Facilitator: Joven
5 minute overview: Jahangir
Discussion of key issues

4:30 Summary of key issues: Topics 1-3 by rapporteur

6:00-7:30 Reception: Rollins School of Public Health, 8th Floor

Wednesday, October 9 Rapporteurs: Naber (Group I)/Belbase (Group II)

Based on the emergence of several other topics that need to be addressed, we will divide into two groups for the morning session. One will follow the agenda outlined below for topics 4 and 5, and the other will address topics 7 and 8. In the afternoon we will reconvene as a single group to discuss topic 6, policy, at the time indicated.

8:45 Coffee and tea available in conference room

9:00 Reconvene in conference room, review revised agenda

GROUP I **Topic 4:** Standards and enforcement mechanisms:
1) government inspections for enforcement purposes;
2) the role of the laboratory
Facilitator: Alam
5 minute overview: Tedla

Topic 5: Potassium iodate: procurement and cost issues
Facilitator: Claassen

GROUP II **Topic 7:** Salt test kits
Facilitator: Stone

Topic 8: Quality assurance methods for different situations:
1) batch vs. spray for different size producers;
2) Specific issues in quality assurance facing small producers: the role for cooperatives
Facilitator: Rossi/Anzueto

(Coffee break at your leisure)

12:00 LUNCH (on your own)

The following session is designed to review policy and program issues, including such issues as continuous training, commitment of human and financial resources, ongoing public education, communication network.

1:30 Quality assurance in a highly industrialized setting: Weinstein

1:50 An historic perspective: program implications for sustained elimination: Haxton

2:00 **Topic 6:** Program and policy issues for sustaining salt iodization
Facilitator: Wanaratna
Discussion of key issues

2:45 Coffee break

3:15 Continue with **Topic 6:** Program and policy issues for sustaining salt iodization
Facilitator: Wanaratna

4:30 Summary of key issues: topics 4-6 by rapporteur

7:00 On your own**C**optional group dinner, transportation provided

Thursday, October 10 Rapporteur: MacArthur/Armah

8:45 Coffee and tea available in conference room

9:00 Broadening the view of quality assurance: ISPAT: Nathan

The following session is designed to synthesize the work of the group thus far, and to develop the expert recommendations for each topic area.

9:30 Development of recommendations regarding physical resources, human resources and financial resources required for adequate quality assurance:
Facilitator: vanderHaar

Group I: From the perspective of production: covering primarily topics 1-3
Facilitator: Claassen

Group II: From the perspective of government program management: covering primarily topics 4-6

Facilitator: Mora

10:15 Coffee break
10:45 Continuation of working groups

12:00 LUNCH (provided)

1:30 Summary presentation of recommendations (group selects presenter)
Group I
Group II
Final discussion on recommendations
Facilitator: Maberly

2:30 Coffee break

3:00 Implications for policy makers and agencies: Alnwick
Discussion

4:30 Concluding remarks: Mannar

Rapporteurs:

Pandav/Fulgencio
Naber/Belbase
MacArthur/Armah

Facilitators:

Topic 1: The Production of quality iodized salt
Facilitator: Sunderasan

Topic 2: Packaging and labeling
Facilitator: Woldentensae

Topic 3: Monitoring quality during wholesale, retail and distribution
Facilitator: Joven

Topic 4: Standards and enforcement mechanisms: External Quality Assurance
Facilitator: Alam

Topic 5: The role of the laboratory: public and private sector
Facilitator: Anzueto

Topic 6: Program and policy issues for sustaining salt iodization
Facilitator: Wanaratna

Brief Overviews:

Topic 1:	Production	Naber
Topic 2:	Packaging	Stanley
Topic 3:	Wholesale	Jahangir
Topic 4:	External QA	Tedla
Topic 5:	Lab issues	Armah

The report

PAMM organizers prepared this report following comments from participants. As the product of the workshop, this report is for use by those in a position to review and act on the recommendations. This will involve adaptation of the recommendations to fit the national situation. National meetings of those integrally involved with iodized salt quality assurance are needed. The workshop will be seen as successful if these recommendations are useful in guiding the development and implementation of quality assurance plans to improve salt quality and sustained programing in countries with iodine deficiency.