Ending Hidden Hunger: The Montreal Micronutrient Conference

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This meeting from October 10-12, 1991, was sponsored by UNICEF, WHO, the World Bank, Canadian International Development Agency (CIDA), USAID, FAO, and UNDP. ICCIDD was prominently represented both in development of the program and in presentations.

The conference's purpose was to pursue goals of the World's Summit for Children, held one year before. The Summit (ICCIDD Newsletter 6:(4), November 1990) pledged the virtual elimination of IDD by the year 2000. This conference reviewed programs and examples, and discussed ways to accelerate progress towards that goal. ICCIDD presentations included the keynote address by Dr. Ramalingaswami, ICCIDD Vice-Chairman, and addresses by board members Dr. Suniti Acharya (on supplementation), Mr. M. Venkatesh Mannar (on fortification), Dr. Festo Kavishe (Tanzania program), Dr. Mauro Rivadeneira (on Ecuador program), and Dr. Basil Hetzel (summary global perspective on iodine). In addition to plenary addresses, many other members of ICCIDD attended, demonstrated techniques and strategy and participated in discussions of global issues and country programs.

This report will summarize key discussions from the conference. The full document is available from the Task Force for Child Survival and Development, 1 Copenhill, Atlanta, GA 30307, USA.

The conference opened with welcoming addresses from **Dr. Hiroshi Nakajima**, Director General of the World Health Organization, and **Mr. James P. Grant**, Executive Director of UNICEF. Dr. Nakajima reminded the conference of the pledge made by the 1990 World's Summit for Children, and stated that of the three micronutrients, success is most likely for the iodine deficiency disorders, which are recognized as the world's leading cause of preventable mental retardation. He gave special recognition to ICCIDD by stating that "with the every growing development of national control programs, supported by regional working groups and the remarkable global collaborative network of the ICCIDD, the essential infrastructure for global elimination is already in place. Now required are the resources to reinforce the national programs which will drive this global support system. If these resources are forthcoming, I am certain we shall see the virtual elimination of iodine deficiency disorder by the year 2000."

Mr. Grant entitled his address "The End of Hidden Hunger is in Sight." He emphasized the "extraordinary mandate for concerted action that all of us receive from the World's Summit for Children." He noted the success of worldwide efforts for universal child immunization, and set this as an example of what should be done with micronutrient deficiency. He called for aggressive action by governments, the food industry, education facilities, and the donor community. He particularly stressed the importance of action now.

In his keynote address, **Dr. Ramalingaswami** first gave a **broad overview of the three micronutrients under consideration, iodine, iron, and vitamin A**. He emphasized the close relationship between technology and the delivery system, and the importance of leadership at the ministerial levels to obtain political commitment and raise resources necessary for effective delivery. Research is also recognized as an important component for guiding policy and action. In turning to future strategies, long-term approaches to prevention and control are the most fundamental, but short-term measures for immediate impact are also necessary. Nutrient deficiencies must be considered in the context of overall health and development programs. "Close association with measures for infection control such as immunization and measures for improvements of maternal and child health and family planning is imperative. The use of common targets, common entry points, and common

agents of service delivery enhances efficiency, reinforces primary care, and reduces cost. Building institutional capacity for management of micronutrient program is of strategic importance."

After discussing dietary diversification, food fortification, and supplementation, he turned to operational targets. He suggested that by 1995 all countries should have established a national coordinating mechanism, a monitoring and control unit, a dietary diversification program, a salt iodization program where appropriate, and systematic monitoring of indicators related to attainment of goal for each micronutrient. By the year 2000 fully operational programs for long and short term solution should be present for all countries with significant deficiency.

Dr. Suniti Acharya described **supplementation of iodine and vitamin A in Nepal**. The IDD situation in Nepal has been described in previous issues of the IDD Newsletter. Iodized oil injections by targeted districts has been a program for over 15 years, in addition to a strategy for salt iodization. The early problems with salt iodization included dependence on plants in India, complex distribution networks, inadequate packing of iodized salt, lengthy exposure during transit, and high price to the consumer.

The iodized oil program was based on the EPI program, whose mobile teams had already been giving injections, even in remote areas. Monitoring was carried out by process indicators such as coverage versus targets. The last impact assessment, in 1986, showed marked decrease in goiter and cretinism. There was no evidence that any cretins were born after the program began. Two of the earliest pilot districts have received three rounds of injections, 26 have been covered with two rounds and 12 districts with one round. So far 7 million injections have been given. She estimated that approximately 250,000 cases of cretinism have been prevented so far, using the approach made for estimating EPI disease prevented by immunization.

Dr. Acharya listed several factors important to the success of the program so far. Some of these included: the realization that an effective salt program would depend upon development of roads and other infrastructures, a long-term process, and that a short-term program such as iodized oil would also be necessary while awaiting that development; both programs were part of a comprehensive five-year development plan and were included in the set of objectives and targets to define strategies and resource allocations of the health plan; management level health workers with considerable expertise in difficult remote areas were available; all available means of communication, particularly local level methods, were utilized for delivering the IDD message; and despite absent laboratory facilities, process indicators of management were employed to assess program impact.

Dr. Acharya then described the vitamin A program, and compared it, iodine supplementation, and the EPI program. She noted that the EPI program has developed strategies to reach about 80% of target infants, and that strategy can be applicable to both a larger target group and to other health interventions. The DPT contacts should be utilized for delivery of iodine to infants and the tetanus toxoid for pregnant women.

She closed with recommendations emphasizing education, particularly about the effects of iodine deficiency on the fetus for health professionals, politicians, and maternal child health related professionals. Politicians must be made aware of the effects of iodine deficiency on brain function. Finally, "coordinated strategies based on principles of EPI micro-planning exercise should be developed to target all women of childbearing age, pregnant women, and children, and make special efforts to reach them by increasing their access to health care." She called on international donor agencies to work together with national programs to concentrate their effort on reaching the women and children through effective strategies.

Mr. M. G. Venkatesh Mannar reviewed **fortification of foods to combat micronutrient deficiencies**. Fortification is defined as the addition of nutrients to commonly eaten foods to maintain or improve nutritional quality of individual foods or the diet of a community. It does not require changes in the customary diet of a population nor does it demand individual compliance. Therefore, fortification can be implemented and yield results within a short time. Examples of some recent initiatives include salt iodization in India, where 500 million people are now receiving iodized salt, whereas six years ago it reached very few. A regional program for salt iodization in sub-saharan Africa is being developed.

Technical considerations for a program include: (a) the fortified food should be consumed by a sizable portion of the population; (b) it should be inexpensive; (c) it should be processed centrally in large enough units to permit control fortification; (d) it should be distributed through a widespread network to reach all regions of the country; (e) it should not change the taste appearance or color of food; (f) the nutrient should not be lost on further processing such as cooking; (g) it should be consumed in fairly constant amounts so that fortification levels can be calculated accurately; and (h) the supply of the fortificant should be relevant to both the household and the individual, so that large amounts are not consumed such as might occur with soft drinks and snack foods. Salt fills most of these requirements admirably.

Mr. Mannar then reviewed various efforts on fortification of food with iodine, iron, and vitamin A. He has described technical issues in salt iodization recently in the IDD Newsletter. He also reviewed efforts towards fortification of salt with iron, including combined fortification with ferrous fumarate and potassium iodide, and in another approach, potassium iodide and ferrous sulfate with a polyphospate chelating agent as stabilizer; the latter was reported to be stable even in impure grades of salt. In trials in India, iron has been introduced at the level of 1000 ppm and iodine at 40-50 ppm. For a per capita consumption of 15 grams, an iron absorption of 5% and an iodine availability of 30% at consumption, this fortified salt would provide 0.75 mg of iron and 200 mg of iodine per person per day. He reviewed a number of other fortificants that have been tried with iron, including sugar in Guatemala, fish sauce in Thailand and in the Philippines, and cookies in Chile.

For vitamin A several countries in Central America have laws stipulating that all sugar for home consumption should be fortified with vitamin A. However, these laws have not been implemented. India has a law that a cooking fat known as Vanaspati must be fortified with vitamin A. Monosodium glutamate has been fortified with vitamin A in trials in Indonesia.

Some estimates for cost of fortification programs, in US cents/per capita/per year, were: salt with potassium iodate, 3-5 cents; salt with ferrous sulfate, 10-15 cents; salt with potassium iodide and ferrous fumarate, 12-15 cents; cooking fat with vitamin A, 30-40 cents; and cookies with hemoglobin, 108 cents. These costs are only for actual processing and chemical cost at source. In making recommendations, Mr. Mannar stressed the importance of motivation of policy planners, national committees to develop a coordinated policy, adequate financing, technical feasibility studies, coordination of multiple fortification programs, enlistment of food industry and trade involvement, social communication, training for nationals, effective monitoring, subsidization of iodine purchases internationally, and intersectoral and international cooperation in coordination for distribution and marketing of fortified foods. For example, a regional initiative to iodize salt at the source of production in sub-Saharan Africa would benefit all the recipient countries.

Dr. Suttilak Smitasiri, from the Division of Communication at the Institute of Nutrition, Mahidol University in Thailand, discussed **"encouraging production and consumption of micronutrient-rich foods."** He used as an example the social marketing of vitamin A-rich foods in northeast Thailand. While this program did not involve iodine, it has relevance as an example for encouraging changes in food practice associated with improving micronutrient nutrition. The program covered about 100,000 people in 134 villages. He listed the program components under the headings of communication, collaboration, and concentration. For communication, the focus was "to build a solid

nutrition education program by creating a local need and demand for change." The work plan for the project included research to understand local health nutritional, behavioral, and environmental contacts, defining the program's target group, identification of best project activities to lead to increased production and availability of food sources, design of a communication program that was socially and culturally appropriate for community members, and implementation phase, monitoring, and final evaluation.

Following this outline, the program began with a health problem analysis, including baseline surveys for vitamin A and its deficiency, and identifying dietary habits. Reasons for these conditions were obtained from interviews and focus groups to show the role of economics, traditional beliefs, lack of nutritional awareness, and personal preferences. It became apparent that the mothers were unconvinced when told that their children could become blind because they did not consume enough vitamin A-rich foods. However, they did recognize their children were often sick from diarrheal diseases, respiratory infections, and others disorders associated with vitamin A deficiency. With this information the project shifted its focus to promote child nutrition and health rather than focus on blindness. The project recognized three different audiences for nutrition communications: the first was the child care takers themselves; the second was authority figures and opinion formers; and a third was external individuals who could provide information and support.

In discussing collaboration, he noted that the most successful programs are planned, implemented, managed, and monitored by the people themselves. Another important finding was that "what community members can do by themselves does have limits." He cited five major objectives for program success: (1) decentralize project decision making, for planning, managing, implementing and monitoring activities; (2) promote a two-way communication process; (3) create positive relationships between project collaborators based on a common understanding and complementary roles and responsibilities; (4) build a functioning team based on mutual awareness of each other's needs and resources; and (5) transfer project ownership to the people as early as possible.

Messages were communicated in a variety of ways. These included radio messages, posters, T shirts, billboards, cassette tapes, school publications, manuals for health workers, mother's counseling sessions, cooking demonstrations, and mobile drama groups. Dr. Suttilak emphasized that "the main factor that ensures the sustainability of dietary intervention programs is that they become important for the community for other reasons besides nutrition. Hence home gardening and vitamin A promotion needed to become part of wider community developments."

Professor Soekirman, with Dr. Fasli Jalal, of the National Development Planning Agency discussed the **Indonesian experience in developing priorities in dealing with micronutrient problems**. Indonesia has 180 million people living on a total of 13,677 islands stretching 3200 miles across the equator. Since 1969 the government has had a succession of five year plans aimed at broad based economic growth, equity, and national stability. Its progress in economic development in the last 20 years has been impressive. As part of that program, its food and nutrition policy has stated objectives of achieving food self-sufficiency and equitable distribution, diversification of production and consumption of staple food, improved nutritional status by reduction of deficiencies through direct or indirect interventions and community participation, and family planning.

IDD in Indonesia has been discussed in previous issues of the Newsletter. From a survey in 1982, it was estimated that about 30 million people lived in iodine deficient areas, 10 million had goiter, 3.5 million had other manifestations, and 750,000 were cretins. Salt iodization has been mandated throughout the country, and the sale of non-iodized salt is prohibited. However, the program has had limited effect, because of dispersion of small-scale salt producers, poor quality of iodized salt, increased price, false labeling, and inadequate monitoring and enforcement. Iodized oil was given by injection to 5 million people in 25 provinces from 1983 to 1988, and 10 million doses are planned during the current five year program, at an average of 2 million doses per year. Problems in this

program include the high cost of imported iodized oil, shortage of professional staff and difficulties reaching remote areas. Oral iodized oil programs are currently being studied as well as a pilot project for water iodization.

The program has achieved some success, in that the national prevalence of IDD is down from 37.2% in 1982 to 23.2% in 1990. Reduction has been particularly evident in Java and parts of Sumatra, but many other areas show little improvement or even some worsening. It is recommended that the program needs intensification of education on IDD, consolidation of data through epidemiologic studies, stronger local government commitment for law enforcement on false labeling, improvement in management, pilot trials of water iodization and of oral iodized oil, and more prevention in area-specific strategies or intervention with more participation by local governments.

For vitamin A, the government began a capsule distribution program in 1974, and this has remained the major control measure. The integrated health service posts distribute capsules twice a year to children under five, and obtain a coverage of about 50%. Nutrition education has emphasized vitamin A-rich foods. By 1990 xerophthalmia appears to have been almost eradicated, although marginal vitamin A deficiency still exists.

In a section called "lessons learned" Dr. Soekirman stated that iodine deficiency initially could be the problem most easily controlled. However, the greatest nutritional improvement for Indonesia has been in protein energy malnutrition and vitamin A deficiency. He attributed much of the improvement to the general advance in the national economic program. Accelerated efforts are needed for control of IDD and iron deficiency.

Dr. Festo P. Kavishe, Managing Director of the Tanzania Food and Nutrition Center and ICCIDD Subregional Coordinator for Eastern and Southern Africa, reviewed the **control of micronutrient malnutrition in Tanzania**.

The country's estimated population is about 25 million, of which 85% is rural. Infant mortality is 105 per 1,000 live births, the under five mortality rate is 176. Twenty-five percent are estimated to have iodine deficiency disorders, including 3% of the total population as severe and 22% as moderate. For particular groups, 13% of children under five and 52% of pregnant and lactating women show manifestations of iodine deficiency. Goiter prevalence surveys between 1980 and 1990, expressed as percent goiter prevalence (IB plus visible) for the following regions were: Arusha, 35.8%; coast, 4.4%; Dodoma, 33.9%; Iringa, 47.7%; Cagera, 47.1%; Kigoma, 61.1%; Kilimanjaro, 33.0%; Mebeya, 80.7%; Morogoro, 53.5%; Mwanza, 19.6%; Rukwa, 76.7%; Ruvuma, 55.7%; Sinyanga, 5.2%; Tabora, 25.3%; Tanga, 0.5%; and Singida, 11.8%, This gave a Tanzania average of 37.0%. About 40% of the Tanzanian population, or 10 million people live in iodine-deficient areas. About 5 million have endemic goiter, 160,000 are cretins, and perhaps 450,000 are subclinical cretins. Also, it has been estimated that about 30% of the perinatal mortality may have been attributable to iodine deficiency. *(Central Africa Journal of Medicine 34 (3), 1988, van der Haar et al)*

Xerophthalmia has also clearly been a problem, causing an estimated 2,000 to 4,000 new cases of blindness every year, and affecting 1.4 million or 6% of Tanzania's population, 98% of those affected being children under six years. Nutritional anemia is also a major problem, affecting an estimated 7.2 million people or 32% of the population, including 45% of children under five and 80% of pregnant and lactating women.

The Tanzania Food and Nutrition Center (TFNC), a parastatal organization under the Ministry of Health, has responsibility for managing of all the national nutritional programs.

The National IDD Program consists of targeted distribution of iodized oil capsules as a short-term measure and iodization of salt for the long-term. The Swedish International Development Agency has supported the iodized oil capsule distribution while the Netherlands government has funded salt iodization. For iodized oil the target group is everyone aged 1 to 45 in districts severely affected by IDD. The dose is 380 mg of iodine once every two years. Initially the choice of targeted districts was based on visible goiter rate of 10% or greater, but this was later lowered to include Grade IB and visible goiter combined. Using this criterion, 30 districts have severe IDD, covering a population of about 5 million. Iodized oil capsules are distributed through the primary health care system or by campaigns in the primary schools. Five million people are expected to be covered by the end of 1991. The percent coverage has been about 70%. As an example of the effect, in surveys of schoolchildren aged 7-18 in Mahenge, Morogoro region, the total goiter rate was 74.9% before capsules in 1988 and 51.9% three years later; similar figures for visible goiter rate are 26.9% and 7.6%. The program estimated that if all costs (including capsule distribution, training, operation, research, monitoring, evaluation, advocacy, and personnel) are considered, the program costs about US $0.40 per person prevented or treated for severe IDD. The direst costs of the capsule plus delivery and the other overhead costs is about US $0.30.

Recently, three salt iodization machines were imported from India, of which two were located at Bagamoyo in the coast region and one at Uvinja in Kigoma region. Production is expected to start in late 1991. The capacity of these instruments is about 37,000 metric tons of iodized salt per year, about 40% of the country's requirement. There are many small salt works along the coast, and achieving universal salt iodization may take some time. Legislation for salt iodization is actively sought.

The programs for vitamin A has given more than 25 million capsules since February 1987. There are also efforts to create public awareness to stimulate production and consumption of vitamin A-rich foods. The program for prevention and control of nutritional anemia is targeted mainly at pregnant women and children under five. The dietary approach promotes production and consumption of iron and folic acid-rich foods, particularly green leafy vegetables, fruits, animal and dairy products. Iron folate tablets have been distributed to pregnant women through the essential drug program and the maternal and child health system. Control measures against malaria, and intestinal parasites are also important.

The TFNC manages these programs through national multisectoral coordinating committees responsible for policy, steering, and implementation. These are structured as national units of the corresponding international bodies. For example, the National Council for the Control of Iodine Deficiency Disorders is a national unit of ICCIDD. These coordinating bodies form technical committees for more detail. The TFNC acts as secretariat for all the national coordinating committees and sees that they are part of a wider micronutrient deficiency program. At the subnational level, programs are managed by the primary health care committees at regional, district, and village levels.

Constraints for the program include restricted resources, from the poor national economic situation, and shortage of well-trained staff. Communication is also limited, for example, television is not available. While management is adequate at the national level, it is still insufficient at the subnational level.

The experience so far in Tanzania provides lessons for the future, and perhaps also for other countries. First, good management is essential. The TFNC found it useful to have a conceptional approach that explicitly analyzes the causes of mortality and malnutrition, in turn facilitating dialogue and approaches that are multisectoral, and integrated. Thus, program managers must have a good assessment and analysis of the problem, and be able to mobilize human, organizational, and financial support for action. It is important for managers to build capacity so that the program has a permanent structure with a technical and managerial base rather than depending only on a few individuals. Thus human resource development is particularly important. In addition to human resources, a technical

institutional base like TFNC has proven very useful. It has the legal and executive function with regard to food and nutrition, promoting coordination and integration with other nutritional problems. The TFNC provides a national coordinating mechanism for several different nutritional problems, and also serves as a base for negotiating support for both the government and donors. In this program it was also found that the first target for advocacy should be the medical profession because if not convinced, it can delay implementation of programs.

Several practical points emerged from the development of these programs. One is that programs must be developed in an orderly way rather than prematurely. It requires some time to build up confidence in a national perspective and ownership of programs. Dr. Kavishe noted that there is always a trade-off between wanting to be completely prepared and getting things done. His conclusion was that program should be technically sound, and that its start may have a very large advocacy effect. Regarding targeting, he noted that it may be more cost effective, but perhaps at the price of community acceptance.

Monitoring should be included from the beginning of the program, and the chosen indicators identified. Finally, in the communications efforts, it is essential to identify the target group. It is all too common to concentrate advocacy efforts on those already convinced.

Tanzania has the goal of eliminating IDD by the year 2000. With iodized oil capsules, it expects to virtually eliminate severe IDD by 1993. The iodized oil program can be slowly phased out as iodized salt takes over, and the target date for that is 1995. However, it is recognized that the successful implementation of iodized salt may take somewhat longer, and monitoring will be essential to determine when iodized oil is no longer necessary.

In summarizing, the success so far of the Tanzania program is attributed in large part to the following factors: conceptionalization of the problem in which the micronutrient deficiencies are seen as outcomes of processes in society with immediate underlying and basic causes; the emphasis on program development, in which assessment analysis and action were carried out at both national and community levels; the presence of technically competent and interested nationals; the presence of a technical and managerial institutional base, the TFNC, which made multisectoral coordination possible; the emphasis on communication to achieve widespread public understanding of the problems; frequent internal and external process evaluations; establishment of national and international contacts and linkages with individuals and organizations with technical managerial and mobilizational expertise; and a favorable political commitment strongly advocating social action.

IDD control program in Ecuador was described by **Dr. Mauro Rivadeneira**, ICCIDD Board Member and Director of the Ecuadorean Belgian Cooperative Program Against IDD.

Although a 1968 law made the use of iodized salt compulsory, there was little progress in its implementation. A survey in the 1980's showed that half of the total population, about 5 million people living in the highlands, was at risk for iodine deficiency. The bilateral agreement between the government of Belgium and the Ecuador Ministry of Public Health began an aggressive program in the mid-1980's. It developed a quick and efficient operational methodology with the objectives of guaranteeing that salt for human consumption has an adequate concentration of iodine and increasing its use among the rural population, the group at highest risk.

It was first necessary to analyze the current state of salt and its iodization. In Ecuador, iodized salt is produced by private industry. At the program's beginning, 11 different brands of iodized salt were found, but most of them actually had no iodine because the producers knew there was no control system. It was necessary to establish contact with the producers to explain the program objectives, to provide the technical information about salt iodization, to demonstrate the legal instruments that allow

the program to take corrective measures, to offer technical assistance, and particularly, to motivate them about the importance of adding iodine to the salt as the easiest way to eliminate IDD. The prevention of brain damage in children and the possibility of increasing productivity in adults were the main messages. Some producers responded immediately to these appeals, but others needed further supervision, and some even required legal enforcement of their compliance. Seven years after the initiation of the program, there are five producers in the market. The most important of these supplies about 85% of the total and produces an acceptable iodized salt. Almost 90% of salt samples obtained last year had an appropriate concentration of iodine. The control system obtains salt samples every week at the plants and once a month at the consumer level nationwide. Samples are measured in central laboratories and the results introduced in electronic databases for further analysis. Thus, the program has a continuous record for each producer, and can immediately recognize abnormal trends. Cumulative results are analyzed every three months and distributed among health personnel and producers through a Newsletter. The production plants are visited periodically, and motivation meetings with the producers take place yearly.

For assessment of iodine deficiency, initially a medical team visited villages to assess thyroid size in children and obtain urine samples for iodine measurements. These surveys showed considerable variation both among communities closely related geographically and among children from the same school. Further analysis showed that these variations depended on whether the families of children used iodized salt. From this beginning the program shifted its focus to establishing how much iodized salt was used in each small village, as determined by health inspectors of the Ministry of Public Health who are distributed all over the country.

In Ecuador iodized salt is refined and sold in small plastic packages, while non-iodized salt, supposedly for animal consumption, is coarse and yellow and not packaged. Thus, the health inspectors could visit households and determine the type of salt used for the family. Later it was found that this information could be obtained more simply by having the school teachers ask the children what type of salt was being used. Statistical analysis of this information also showed that in larger villages, where the school had at least 120 children, the probability of the families using iodized salt was over 80%. Thus, many rural villages and urban villages could be excluded from the salt consumption survey and attention focussed instead on the small villages.

The information from the teachers was computerized and communities were categorized as follows:

1. If more than half of the families in a community already used iodized salt the community was considered as low risk.
2. If in a given community, 50% of families used non-iodized salt, a medical team assessed the thyroid size and obtained urine samples from at least 30 children. If the mean urinary iodine concentration was greater than 3 mg/dl, the community was considered as medium risk.
3. If the mean urinary iodine was lower than 3 mg/dl, the community was considered as high risk and iodized oil was injected in the entire population under 45 years old.

This approach using indirect indicators accelerated identification of high risk areas and diminished operational costs. It also helped to focus education activities on the most deficient areas.

Education began with brochures containing basic information about IDD, which were distributed to health personnel at the peripheral level. Slide and video shows were also produced for communities, although the time and costs in this activity need to be considered. Most rural families listen to the radio early in the morning and late in the afternoon. Several short messages were produced working with the villagers, explaining to them the basic concepts and letting them generate their own messages with their perception of the problem. Messages were recorded with people from the villages instead of professionals. The basic concepts were:

1. That goiter, cretinism, mental retardation, and poor school performance are diseases.
2. That they are caused by iodine deficiency.
3. They can be prevented by utilizing iodized salt every day.

Preferred broadcasting stations were identified and engaged to transmit the messages 10 times a day. Some important broadcasting stations contributed free air time. Thus messages were broadcast nationwide for three years, produced in Spanish and Quechua. This strategy was considered sufficient for the low risk areas. In medium risk areas, local leaders were trained to act as multipliers and received simplified education messages for use with smaller groups. In high risk communities medical teams in addition used slide shows and video presentations and other techniques of intensive education.

The use of different education strategies for different risk levels has helped reduce operational costs. The impact is shown by the fact that in 1984 20% of the people used non-iodized salt and now that has been reduced to 1% in 1990.

The program set up a surveillance system based on the type of salt used in the communities, and an additional 100 communities were selected as sentinel units for more careful follow-up using thyroid size and urinary iodine measurements. Of 100 studied in 1990, all urinary iodines were in an acceptable range.

The success of this program can be attributed to the following factors: the permanent motivation of the people involved; the use of modern technology, mainly the use of computers and appropriate software; the support from the political level; the financial and technical assistance provided by the government of Belgium; the general management of the program; and the use of results for making adjustments. So far the program has been managed within the general structure of the Ministry of Public Health. It is important that surveillance be continued to maintain the progress achieved so far.

A **global perspective of iodine deficiency** was presented by **Dr. Basil Hetzel**, Executive Director of ICCIDD. Much of the background material has already been presented in the IDD Newsletter. He first described the need for iodine and the impact of iodine deficiency. The latter can be presented graphically as an iceberg effect (Figure 1). The obvious cretin represents only the tip of the iceberg and indicates varying degrees of mental retardation and suboptimal mental function in a much larger fraction of the population. This model underscores the fact that iodine deficiency is a community disease and affects virtually all its members to some degree.

Dr. Hetzel described national IDD control programs, and the importance of assessment, communication, planning, political decisions, implementation, and monitoring as key components. In addition to the health gains, economic benefits for human populations include the value of higher work output in household and labor market, reduced costs of medical and custodial care, and reduced education costs from reduced absenteeism and grade repetition. For livestock populations, correction of iodine deficiency improves live births, weight, muscle mass, meat production, wool coat in sheep, and work output.

He then described ICCIDD and how it works with countries, regions, and international organizations toward the goal of elimination of iodine deficiency. Regional working groups now exist in Africa, Southeast Asia, the Middle East, Latin America, Indonesia, and China. These working group includes representatives from WHO, UNICEF, and ICCIDD, interested bilateral agencies and representatives of national governments.

The progress towards the target of elimination was reviewed by continent. Most of this information has been recently presented in various issues of the Newsletter and will not be repeated. He concluded

with the message that much progress is being made towards the correction of IDD, but much remains to be done.

A **summary presentation** was made by **Dr. Lincoln Chen**, of the Harvard University Center for Population and Development Studies. He noted four key components to link policy action to human need:

1. People - The most important are the target groups, but also policy actors. In addition to government representatives, these should include industry, nongovernmental agencies, scientific and professional groups and field workers.
2. Tools - Diet fortification and supplementation are the major ones. Also, noted were the urgent need for low cost, simplified, diagnostic, and monitoring field instruments techniques, such as the iodine detection kits used in India and elsewhere.
3. Delivery systems - Important features are integration, multisectoral coordination, and sustainability.
4. Policy - Policy action against micronutrient deficiencies is part of the overall socioeconomic development goals of social equity and justice, especially the attack against mass poverty. Mobilization of public support, by communication and marketing concepts such as "super nutrients" or "smart foods," are crucial to success.

To achieve progress, the three A's - assessment, analysis, and action - need to be applied. Action must be taken by different groups to achieve the objectives of the conference. Policy makers need to launch accelerated national activities. National programs of action must be developed and can be strengthened through regional cooperation. The scientific community needs to extend beyond simply identifying the problems to addressing the more important issues of how they can be solved. International agencies need to support national and scientific initiatives. Donor activities need to be coordinated and responsive to the different needs of countries. Access to international information and technology and training is essential.