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## Control Of Iodine Deficiency The National Programme — Current Status

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Goitre is the most common and visible ill-effect of iodine deficiency. A less obvious but more serious condition affecting millions of iodine deficient children includes impaired mental function, poor intellectual performance, lowered IQ, muscular disorders and impaired coordination and sluggishness. In pregnancy, iodine deficiency causes spontaneous abortions, still births and infant deaths.

Iodine deficiency disorders (IDD) constitute a major public health problem in India. Accumulating evidence suggests that no state in India may be completely free from iodine deficiency. Goitre surveys conducted in 239 districts of 25 states and four Union Territories (UTs) have identified 197 districts as endemic for IDD (Table)<sup>1</sup>. This is based on the estimates of population at risk of IDD with a cut-off point — 10 per cent — for total goitre rate (TGR). The prevalence of goitre is, in fact, higher if the current proposed criteria for cut-off for population at risk is taken as 5 per cent TGR<sup>2</sup>, and not 10 per cent TGR. It is estimated that nearly 167 million persons are exposed to the risk of IDD, of which 54 million have goitre, 2.2 million are cretins and 6.6 million have mild neurological disorders. With continuous depletion of iodine from natural resources, the situation could worsen in the coming years unless measures are taken to control the situation.

Prevention, control and eventual elimination of IDD requires the establishment of an iodised salt

programme in which all salt for human and animal consumption is fortified with iodine. The technology is low cost and well established. Daily iodine supplementation, through iodine fortified salt, has been successfully applied in several developed countries, resulting in total eradication of goitre from those countries several decades ago. Salt is the most commonly accepted vehicle for iodine for a number of reasons. It is universally consumed in fairly uniform quantities almost daily by all populations and the production of salt is limited to a few regions/centres making it feasible to undertake centralised processing. Moreover, iodisation does not impart any colour, taste or odour to the salt.

The strategy being adopted by the Government of India for prevention of IDD is the fortification of common salt with iodine. A prospective study<sup>3</sup> was undertaken in a population of 100,000 in the Kangra Valley of Himachal Pradesh in 1954, which helped to substantiate the role of iodine deficiency as a causative factor of endemic goitre in the Himalayan belt and the effectiveness of iodine prophylaxis. After six years of supplying three zones in the study area respectively with common salt, salt fortified with potassium iodide, and with potassium iodate, it was established that the goitre prevalence rate in zones supplied with fortified salt had been reduced appreciably, while the zone supplied with common salt registered an increase in the prevalence of goitre. The study also revealed that potas-

sium iodate was a more effective agent than potassium iodide. Following the landmark Kangra Valley studies, the Government of India launched the National Goitre Control Programme (NGCP) in 1962 and began supplying iodised salt to the goitre endemic areas in the sub-Himalayan belt.

The Nutrition Foundation of India (NFI) was commissioned in 1982-83 by the Government of India to undertake a rapid evaluation of the existing status of the NGCP. The emphasis was on reviewing past experience and proposing a plan for intensification of the NGCP. The study revealed that the major factors responsible for the failure of the NGCP were public ignorance, apathy of health agencies of many of the endemic states, non-involvement of the state administration, lack of coordinating machinery of sufficient authority for implementation, and lack of monitoring and enforcement of the programme both at the central and state levels. NFI recommendations also emphasised the involvement of private agencies in production of iodised salt<sup>4</sup>.

Following the above NFI report

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and increasing evidence of widespread prevalence of iodine deficiency in the country, the Central Council of Health decided to allow private sector participation in the production and distribution of iodised salt and adopted the policy of universal iodisation of salt under the NGCP in 1984.

The objectives of the National Goitre Control Programme were:

- identify IDD endemic areas;

- supply iodised salt in place of common salt to the entire country with active private sector participation;

- resurvey to assess the impact of supply of iodised salt.

The review also resulted in modification in organisation and management of the NGCP. Goitre cells (IDD cells) were recommended to be set up with Central Government funds in each state.

## THE PRESENT STATUS

To date, 25 IDD cells (Table) have been established. The Government of India has been repeatedly advising all state governments to establish IDD cells in their territories and issue ban notifications as early as possible. By September 1993, about 65 per cent of the total population in the country had been covered under the ban (Table).

Of the major salt producing states, only Rajasthan has notified a total ban. Gujarat, another major salt producing state, producing about 68 per cent of the total salt in the country, has yet to issue a ban notification. Tamil Nadu, the second largest salt producing state, has issued only a partial ban notification. However, the state has recently taken significant steps towards the goal of universalisation of iodised salt and a total ban on sale of non-iodised salt in the state is proposed to be implemented by 1995 under the Chief Minister's 15-Point Programme for Child Welfare.

In addition to these, the following significant steps were adopted:

- introduction of subsidy on the iodising chemical (potassium iodate) until 1992;

- higher priority rail quota for salt movement (which now ranks second to defence movement in priority);

- in 1986, the Salt Commissioner's Office was identified as the nodal agency for monitoring production and distribution as well as for monitoring the quality of iodised salt at the production sources. Payment of subsidy to iodised salt manufacturers was another responsibility assigned to the Salt Department;

- in 1986, inclusion of the Goitre Control Programme in the 20-Point Programme of the Prime Minister;

- in 1986, customs duty on the import of iodine was reduced from 140 to 25 per cent;

- in 1988, the Prevention of Food Adulteration Act (PFA) was amended to specify that iodised salt should contain not less than 30 ppm iodine at the manufacturing level and 15 ppm iodine at the retail level;

- issue of a ban notification on sale of non-iodised salt;

- setting up of Goitre State Cells and quality control laboratories;

**TABLE**  
**IDD Prevalence**

State	Status of Ban	Total No of Dists	No of Dists Surveyed	No of Dists Endemic
*Andhra Pradesh	Partial	23	7	6
Assam	Full	18	18	18
Bihar	Full	38	21	20
*Gujarat	No Ban	19	11	9
Haryana	Full	14	3	2
Himachal Pradesh <sup>+</sup>	Full	12	10	10
Jammu & Kashmir <sup>+</sup>	Full	15	14	14
*Karnataka	Partial	20	17	5
Kerala	No Ban	14	5	4
Madhya Pradesh	Full	45	16	16
*Maharashtra	Partial	31	28	10
Manipur	Full	8	6	6
Meghalaya	Full	5	2	2
Nagaland	Full	7	7	7
*Orissa	Partial	13	2	2
Punjab <sup>+</sup>	Full	12	3	3
*Rajasthan	Full	27	3	3
Sikkim	Full	4	4	4
*Tamil Nadu <sup>+</sup>	Partial	21	2	1
Tripura	Full	3	3	3
Uttar Pradesh	Full	62	34	29
*West Bengal	Full	18	5	5
Andaman & Nicobar Islands	Full	2	Survey not done	
Arunachal Pradesh	Full	12	10	10
Chandigarh	Full	1	1	1
Dadar & Nager Haveli	Full	1	1	1
Delhi	Full	1	1	1
*Goa <sup>+</sup>	No Ban	1	1	1
Daman & Diu	Full	1	1	1
Lakshwadeep <sup>+</sup>	Full	1	Survey not done	
Pondicherry <sup>+</sup>	No Ban	4	Survey not done	
Mizoram	Full	4	3	3
<b>Total no of districts</b>		<b>457</b>	<b>239</b>	<b>197</b>

\* Salt producing states. <sup>+</sup> States with no IDD cells

● in 1989, the Ministry of Health approved the "Smiling Sun" logo for easy identification of iodised salt by members of the public.

The Government of India's effort to universalise iodisation of salt acquired a new dimension in the 1990s. Following the World Summit for Children in 1990, the Government of India reiterated its commitment to universalise iodisation of salt by 1995 at the second SAARC conference on children in South Asia, held in Colombo, Sri Lanka, in September 1992. Following the SAARC conference, the Government of India introduced an amendment in the National Plan of Action for Children to include 'Universal access to iodised salt by 1995' as a specific goal. The nomenclature of the NGCP was changed to National IDD Control Programme (NIDDCP) to emphasise the wider implications of iodine deficiency.

## PRODUCTION

The overall annual production of common salt in India is approximately 13.5 million tonnes. Human and animal consumption accounts for 5.2 million tonnes with the balance used for requirements of heavy chemical industries and export. At present, there are 10,000 producers (licensed and unlicensed) of common salt in India. Of these only about 641 private manufacturers have been licensed by the Salt Commissioner, out of which about 550 are registered producers of iodised salt. The total amount of iodised salt produced is estimated to be about 3.0 million tonnes, that is over 50 per cent of the total requirement of 5.2 million tonnes (Figure 1)<sup>5</sup>. The annual requirement of each state is worked out

on the basis of the consumption pattern of 6 kg per annum per individual (which includes the animal requirement as well).

The chemical potassium iodate is made available to these iodised salt producers by only 20 registered importers of crude iodine (imported from Japan, Chile, Indonesia and the Netherlands) who are also responsible for the production and distribution of potassium iodate. One kg of potassium iodate is required for iodising 20 tonnes of salt at the 50 ppm level iodine. The cost of iodisation is only 2 per cent of the total cost (Figure 2)<sup>5</sup>. As per the monitoring guideline for the production centres, salt is to be tested by manufacturers prior to packing and loading. Development of a low cost iodine testing kit (Rs 11/kit) has resulted in empowering manufacturers, traders, retailers as well as front-line workers and consumers to test the iodine content of salt. The iodometric method, however, remains the method of choice for legal purposes.

## CURRENT DEFICIENCIES

An analysis of the gap in total production of iodised salt and total capacity of manufacturing iodised salt reveals that in India, the problem is not of inadequate quantity of common salt or low capacity of iodisation plants (total capacity is estimated to be 6.6 million tonnes) or lack of technology.

Major factors responsible for not achieving the goal by 1992 are mainly poor understanding of the implications of iodine deficiency by consumers as well as the ban notification not being implemented completely in the entire country, resulting in a low de-

mand for iodised salt by wholesaler, traders and retailers.

In addition, the low priority given to the salt iodation programme, inefficient management, poor information system and lacunae in the policy with reference to rail and road transport, legislation, licensing of iodisation and repacker units have affected the goal achievement.

## TOWARDS ACHIEVING THE GOAL

Efforts are being directed to sensitise policy-makers, planners as well as public health specialists to the fact that no state in India is free from IDD. Legal measures are essential to safeguard against entry of non-iodised salt to any of the states and UTs. A universal notification and enforcement of the ban on sale of non-iodised salt will significantly increase the market demand for iodised salt by traders located within the state. Presently, a complete ban on sale and distribution of non-iodised edible salt has been enforced in 23 states/UTs while five states have issued only a partial ban notification in selected districts (Table). No ban has been issued in the other four states. For enforcement of the ban, the lacunae in the legal system is proposed to be reviewed with reference to the following specific issues:

- ban notification period to remain a permanent feature and not to be imposed only for a limited period;
- redefining the ban notification policy to ensure its extension to include sale of iodised salt for human as well as animal consumption.

Enforcement of the ban is es-

Figure 1: Production Of Iodised Salt

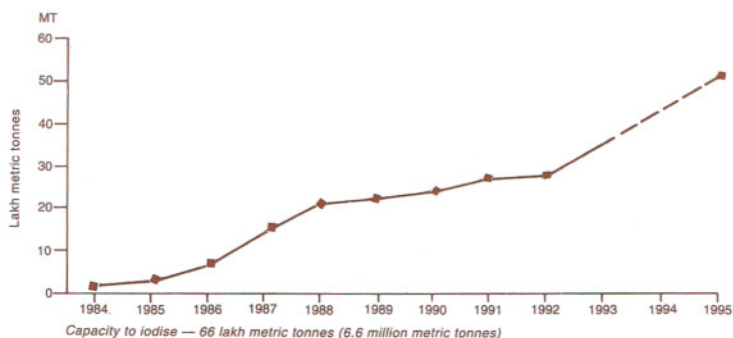
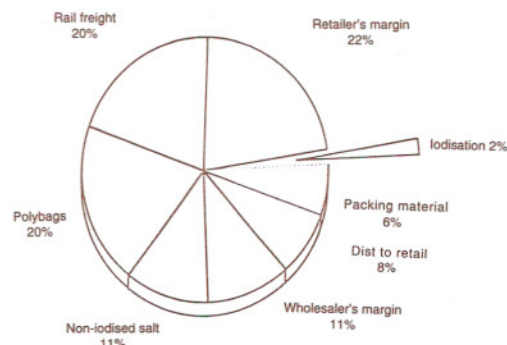


Figure 2: Cost Of Iodised Salt: Percentage Distribution Of Various Components



sential for ensuring access to iodised salt by each and every consumer. It is now recognised that enforcement of the ban is weak. Non-iodised salt is freely available in the markets of even the 'banned' states since there is infiltration of common salt for feeding animals or for industrial usage. In fact, available data from the states where the ban has been notified for a minimum of five years indicate that in 1991-92 less than 50 per cent of the available salt was iodised<sup>6</sup>.

### MULTI-SECTORAL APPROACH

A major effort in this direction is the multi-sectoral IDD project launched by the Government of India. This includes:

- intensification of the IDD programme in 106 moderate and severe IDD districts of 13 states;
- creating demand for iodised salt;
- establishing a monitoring information system;
- ensuring supply of iodised salt to selected states;
- sensitisation meetings with potassium iodate manufacturers, salt manufacturers, wholesalers and traders for creating awareness on their role in controlling the problem;
- providing support to accelerated production of iodised salt by strengthening activities for the establishment of iodised salt plants;
- development and supply of low capacity-low cost iodisation plants for small salt manufacturers;
- establishment of crusher plants and packaging units is also a major part of the plan of action.

The problems related to *baragara* (big crystal salt) is also being addressed. Effort is being made to promote the culture of small ( $\frac{1}{2}$  kg — 1 kg) packages of powered iodised salt.

From the existing data it is evident that currently, in India, a dual market still exists in which non-iodised salt, which is cheaper than iodised salt, can be purchased. But the immeasurably greater benefits of consuming iodised salt, even though it is more expensive than non-iodised salt, are not known. Awareness of the health priority aspect of iodised salt, which far outweighs the cost factor, among

the producers of iodised salt as well as the public is essential for the creation of a significant consumer demand for iodised salt. The success of the programme, therefore, depends on creating a demand for iodised salt and in establishing an effective monitoring information system at the consumer level using the existing Primary Health Care and Food and Civil Supplies infrastructure.

In addition, programming efforts are being directed at improving monitoring at the production level. The absence of an appropriate system to monitor production and distribution of iodised salt by rail and road has been recognised by the Salt Department. A comprehensive database is being planned to be set up. It may be noted that only 20 agencies are licensed to import iodine and convert this into potassium iodate today. Potassium iodate is supplied by these agencies to manufacturers, traders and repackers who iodise salt. Fortunately, potassium iodate can only be used for iodisation of salt and therefore using this linkage, a system for monitoring production of iodised salt is being developed by the Salt Department. In addition, in coordination with Civil Supplies Department, an appropriate system for monitoring supply is planned to be developed.

Distribution of iodised salt by rail under a special zonal scheme is well known. Lack of appropriate facilities for timely piecemeal rail wagon quota as well as storage and loading problems are often reported by the salt manufacturers. Presently, very little is known regarding salt movement by road transport. Only about 1.6 million tonnes of iodised salt is moved by the railways. Movement of iodised salt within the salt producing states as well as in the neighbouring states is undertaken solely by road transport (Gujarat, Tamil Nadu, Rajasthan, Maharashtra, Andhra Pradesh, Madhya Pradesh, Kerala and most of Orissa). The current status of salt movement by road is therefore planned to be reviewed systematically by the Salt Department to facilitate increased production and improved distribution of salt<sup>5</sup>.

In addition to the above issues, the capacity to iodise salt by small manufacturers is also being addressed. The Salt Department, the authorising agency for iodisation of salt, has, to

date, approved three processes of iodisation of salt — spray mixing, submersion and the batch process. Processes for iodising salt in small batches is also being developed. Designing and production of hand-operated iodisation plants with a capacity to iodise about 100 kg salt/hour at low cost (Rs 15,000/plant) is being developed by an Indian firm. The Salt Department is also encouraging small manufacturers to form cooperatives and establish iodisation plants with financial support from the Government.

Salt iodisation is a multi-disciplinary programme that calls for the cooperation of various sectors: the health department, the salt industry and trade, rail and road transport, food and civil supplies as well as health and agriculture professionals. With the intensification of efforts at every level, there is no doubt that the difficulties in the current national programme discussed above will be overcome expeditiously and the goal of universal access to iodised salt by mid-decade will be achieved. The challenge lies in effective coordination amongst various nodal ministries, departments, agencies, groups and salt manufacturers and traders involved in the endeavour to reach the mid-decade goal of universal access to iodised salt.

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