7.11.3 IODINE DEFICIENCY DISORDERS

Iodine Deficiency Disorders (IDD) have been recognized as a major public health problem in India. Unlike other micronutrient deficiencies, IDD is due to deficiency of iodine in water, soil and foodstuffs and affects all socioeconomic groups living in defined geographic areas. The WHO/UNICEF/ICCIDD has defined indicators for IDD prevalence and criteria for classifying IDD as a significant public health problem (Table 7.11.3.1).

Table 7.11.3.1: IDD Prevalence indicators and Criteria for classifying IDD as a significant public health problem

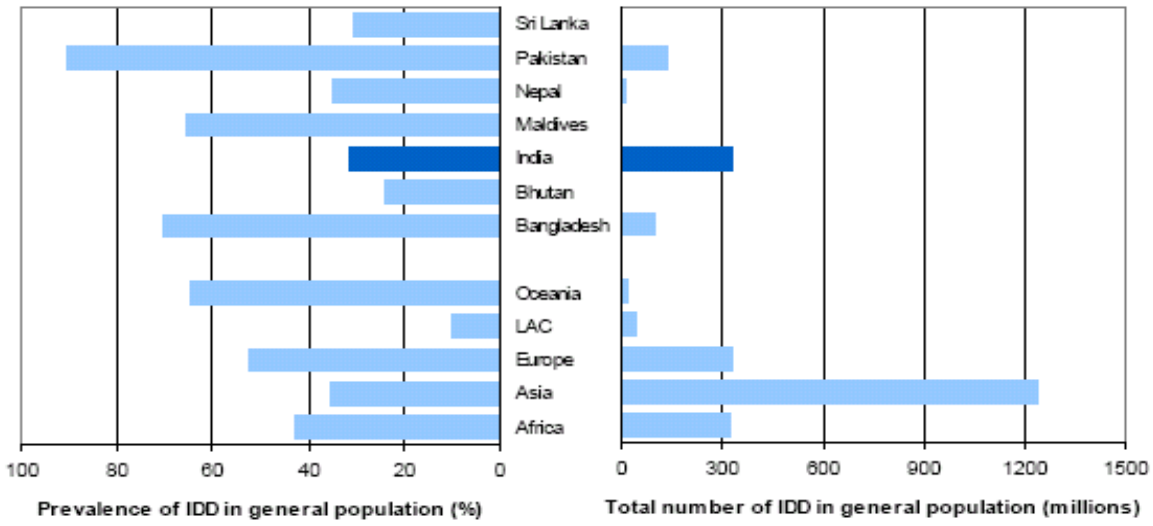
Indicator	Severity of Public Health Problem		
	Mild	Moderate	Severe
Goitre grade > 0	5.0-19.9%	20-29.9%	>=30%
Median UIE (ug/l)	50-99	20-49	<20

Source: Reference 7.11.3.1

Prevalence of iodine deficiency disorders (IDD)

Prevalence of IDD and population at risk of IDD globally and in South East Asia is shown in Figure 7.11.3.1. Although the prevalence of iodine deficiency disorders (IDD) in India is lower than in most South Asian countries, the problem is ubiquitous and affects millions of people. ACC/SCN 2004 estimates that a third of India's population (a sixth of the total global population) is at risk of IDD.

Figure 7.11.3.1: Prevalence and number of IDD in the general population by region and country



Source Reference 7.11.3.2

The estimated prevalence of IDD in children in South Asia is shown in Table 7.11.3.2. Total goitre rates and goitre rates in school children in India is high. The number of children born mentally impaired due to IDD is highest in India. Infact, a third of all children born with IDD-related mental damage live in India.

Table 7.11.3.2: Prevalence of Iodine deficiency in South Asia

	Children born mentally impaired (no.)	Total Goitre Rate (TGR%)	TGR in school children (%)
Afghanistan	535000	48	-
Bangladesh	750000	18	50
Bhutan	-	-	14
India	**6600000**	**26**	**19**
Nepal	200000	24	40
Pakistan	2100000	38	-
South Asia	10185000	-	-
World Total	19000000	-	-

Source: Reference 7.11.3.3

Surveys carried out by Central and State Health Directorates, Indian Council of Medical Research and various Medical Colleges have shown that no State or Union Territory is free from the problem of Iodine Deficiency Disorders (IDD). Out of 586 districts in the country, 281 districts have been surveyed for IDD and 41 districts have been found to be endemic (Annexure7.11.3.2). Universal use of iodized salt is a simple, inexpensive method of preventing IDD.

IDD in newborn and children

A study conducted in 22,000 newborns from different parts of India to determine the incidence of neonatal chemical hypothyroidism (NCH) as diagnosed by cord blood thyroxine level of less than 3 microgram percent and TSH of more than 50 MU/Ml showed that the incidence of NCH was a hundred fold more in iodine deficient endemic districts of Terai regions of UP as compared to non-endemic areas like Delhi and Kerala (Table 7.11.3.3). Subsequent studies in an endemic village of the region to determine the prevalence of known thyroxine deficiency related neurological deficits showed that a significant proportion of the village population had objective evidence of compromised brain development in the form of shift to left in IQ score distribution among school children from iodine deficient areas when compared to non-iodine deficient areas, 20 % prevalence of nerve deafness and 3-5 % prevalence of cretinism.

Table 7.11.3.3: Prevalence of Neonatal Chemical Hypothyroidism

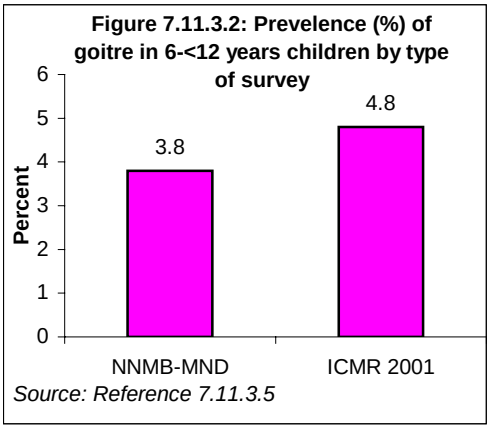
Area	Goitre	Cretinism	Incidence of NCH
	Prev. (%)	Prev. (%)	(per '000 births)
Deoria (UP)	80	3-5	133
Gorakhpur (UP)	70	0-4	85
Gonda (UP)	60	0-4	75
Delhi	29	Nil	6
Kerala (coastal) *	1.3	Nil	1

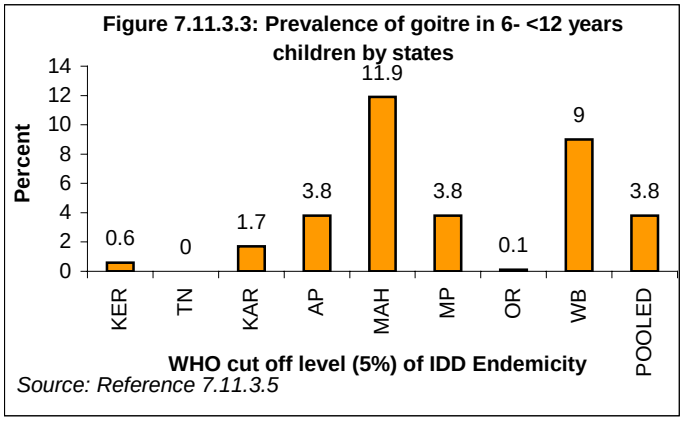
Source Reference 7.11.3.4

** : No prevalence of endemic goitre or iodine deficiency*

Goitre rates in children

Data on prevalence of goitre in 6-12 year old children from NNMB/ICMR surveys is shown in Figure 7.11.3.2. The overall prevalence of goitre both in NNMB and ICMR surveys are below 5%.





The prevalence of goitre in 6-12 years children in the 8 NNMB states in 2003 is given in Figure 7.11.3.3. The relatively high prevalence of goitre in coastal states of Maharashtra and West Bengal is a source of concern.

Interventions to reduce IDD

National Goitre Control Programme

Following the successful trial of iodized salt in the Kangra Valley, Himachal Pradesh, the National Goitre Control Programme (NGCP) was launched by the Government of India in 1962. Initially the programme aimed at providing iodized salt to the population living in the well-recognized sub-Himalayan 'goitre' belt. However availability of salt was erratic. There was no substantial reduction in IDD because of continued use of cheaper non-iodized salt and due to lack of awareness regarding need to use iodized salt.

NFI carried out an evaluation of the ongoing Goitre Control Programme in 1980 to:

- assess reasons for failure of control programmes so far
- identify newly emerging dimensions of this problem and
- set out practical recommendations for future action, based on detailed consideration of causes of earlier failures.

The study showed that the existing salt iodisation facilities were inadequate to meet the country's needs and even they were working far below their installed capacity. Quality control at the production site was inadequate and iodine loss during transport and storage was very high. Awareness about the need to use iodised salt was low even among the population groups with high IDD prevalence.

NFI made the following recommendations for ensuring universal access to iodised salt:

• opening up iodisation of salt to private sector to ensure adequate production to meet national needs
• ensuring quality control at production site
• packing salt in poly packs to reduce iodine loss during transport and storage
• testing iodine content of salt at consumer level
• improving awareness about the need to consume only iodised salt.

Over the next two decades many of these recommendations have been implemented.

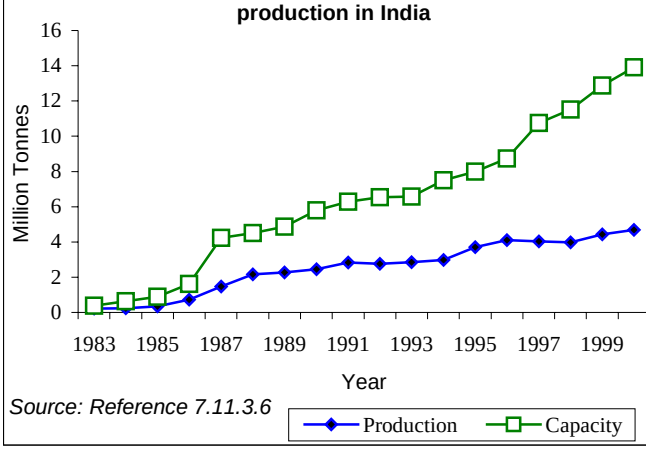
In the eighties the data from DGHS/ICMR surveys indicated that IDD is not a problem confined to the sub-Himalayan regions; there are also pockets of iodine deficiency in all the States. Therefore, a decision was taken for universal iodization of salt for human consumption, which was implemented in a phased manner from 1986. The progress in implementation of this programme was tardy because during eighties, production and availability of iodized salt was a fraction of what was required.

National Iodine Deficiency Disorders Control Programme (NIDDCP)

In 1992, the Central Council of Health, took a policy decision to iodize the entire edible salt in the country by the year 1992. In August 1992, the NGCP was renamed as National Iodine Deficiency Disorders Control Programme (NIDDCP) taking into its ambit control of the wide spectrum of IDD like mental and physical handicap and reproductive wastage. The Goal of the NIDDCP is to reduce the prevalence of IDD below 10% in endemic districts of the country.

During nineties there was a steady increase in the production of iodized salt (Figure 7.11.3.4 and Table 7.11.3.4, Salt Department, 2003-04). The year wise number of iodization units, capacity and supplies of iodized salt is given in Table 4. India has become the second largest producer of iodized salt in the world today after China. In 1988, the Prevention of Food Adulteration Act was amended to fix the minimum iodine content of salt at30 parts per million (ppm) at the manufacturing level and 15 ppm at the consumer level (MOHFW, 1994). Quality control at the production level is being done by the Salt Department. However, there was no quality control testing at retail and household level.

Figure 7.11.3.4: Progress of iodised salt production in India



Source: Reference 7.11.3.6

Table 7.11.3.4: Iodized salt production and supply (Salt Department)							
Year		(in lakh tonnes)					
	No. of Iodisation Units	Capacity	Requirements	Production	Supplies	State/UT banned	
						Full	Partial
1983	13	3.86	9.16	2.13	1.41	7	4
1986	115	16.08	11.27	7.27	5.98	10	6
1989	353	48.71	27.24	22.74	21.34	17	6
1992	529	65.33	29.62	27.13	26.87	22	6
1993	519	65.67	33.31	28.23	27.23	24	5
1994	572	75.04	35.84	29.45	28.01	25	4
1995	657	82.33	42.81	36.96	34.88	27	2
1996	699	87.28	51.70	40.95	40.92	27	2
1997	784	107.50	52.00	40.41	39.07	29	2
1998	809*	115.21*	52.00	39.70	37.42	29	2
2000	926	143.48		46.89			
*As on 31st March, 1998							
Source Reference 7.11.3.7							

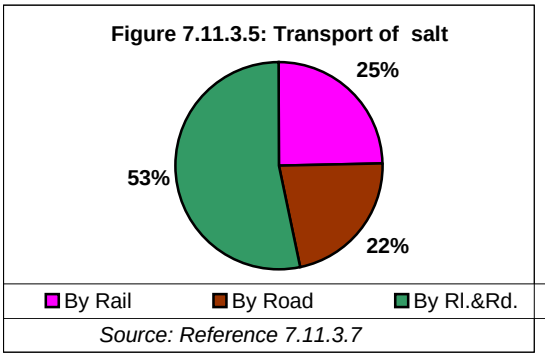
Available data on iodized salt transport showed that most of the manufacturers transported salt both by rail and road; 24.7% of the manufacturers dispatched salt exclusively by rail and 22% exclusively by road (Figure 7.11.3.5). Salt transported by road, especially if it is transported for short distances (<250 kms) was not tested for iodization. This is one of the major factors responsible for the relatively poor household availability of iodized salt in coastal salt producing states.

Wholesalers received iodized salt directly from manufacturers both by road (43%) and rail (50%). They had adequate storage space; majority stored iodized salt in covered godown (Figure 7.11.3.6). Most of the wholesalers (69%) did not repack the iodized salt while distributing it in retail (Figure 7.11.3.7).

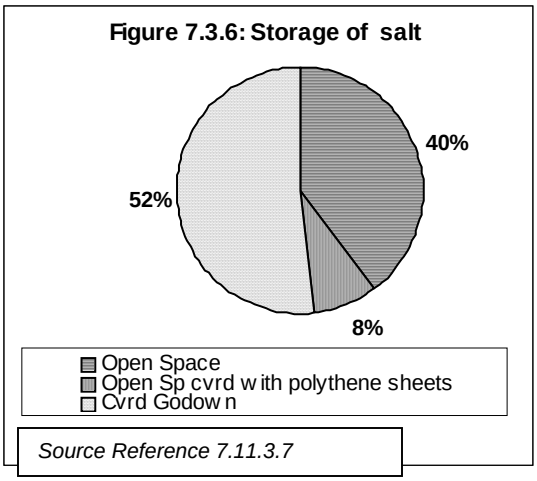
Ban on sale of non-iodized salt for human consumption

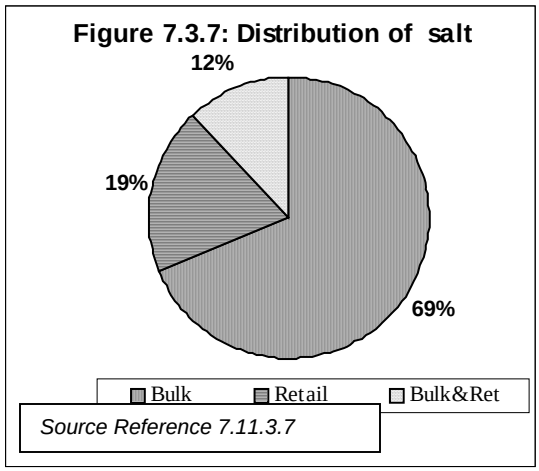
Concerned with the low use of iodized salt at household level, Government of India in 1997 imposed ban on the storage and sale of the non-iodized salt. By 2000 all the UTs and states except Kerala had banned the storage and sale of non-iodized salt; in Andhra Pradesh and Maharashtra, the ban was partial.

Figure 7.11.3.5: Transport of salt



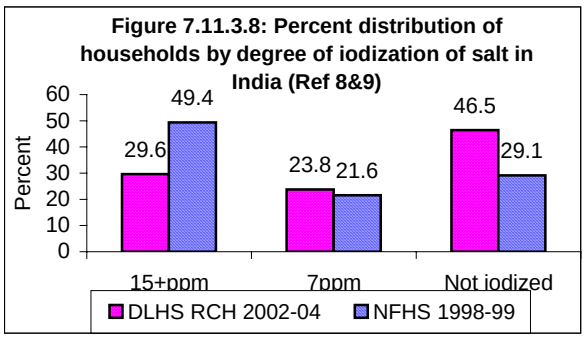
Source: Reference 7.11.3.7





Medical professionals from non-endemic states, especially, from Kerala protested against the ban because they felt that there could be potential adverse effects of use of iodized salt. Between April 1999 and mid 2000 several consultations were held to discuss the scientific and epidemiological evidence on benefits and safety of iodized salt for prevention and control of IDD; the consensus statement from the consultations was that under the existing conditions in India universal iodization of salt for human consumption was safe and was needed to combat IDD. Inspite of unanimous technical advice that the ban on non-iodized salt should not be removed, the central government lifted the ban on sale of non-iodized salt for human consumption in October 2000 because "matters of public health should be left to informed choice and not enforced". However, the state level ban was lifted only by Gujarat and Arunachal Pradesh; Orissa lifted the ban initially but reimposed it later.

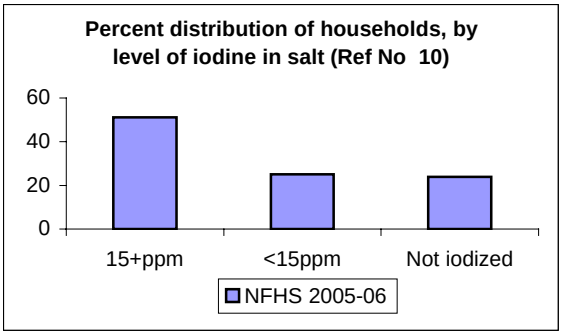
Reports in the first two years of the present decade from several states suggested that though the state level ban remained, it was not effectively implemented. Non-iodized salt was freely available in Gujarat. Increase in rail tariff for transporting salt from 2002 led to increased movement of salt by road especially from Rajasthan; there was no mechanism in place to monitor the quality of iodized salt transported by road. States reported that there was some decline in the consumption of iodized salt after the lifting of the national ban on use of non-iodized salt. With the disappearance of severe forms of goiter many people even in the goiter belt became complacent and did not ensure that they continue to consume only iodized salt. The people in the coastal non-endemic regions were not aware of the adverse effects of IDD and tended to use cheaper non-iodized salt.



Progress in availability and consumption of iodized salt at household level

Data from various surveys indicated that there was substantial

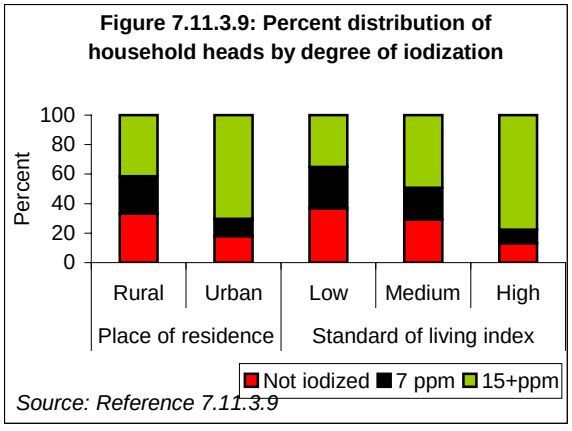
improvement in household availability of salt in the erstwhile “goiter belt” However the National Family Health Survey 2 (NFHS 2) showed that only about half the households use adequately iodized salt; one fourth used salt with inadequate iodine content and one fourth used non-iodized salt (Figure 7.11.3.8).

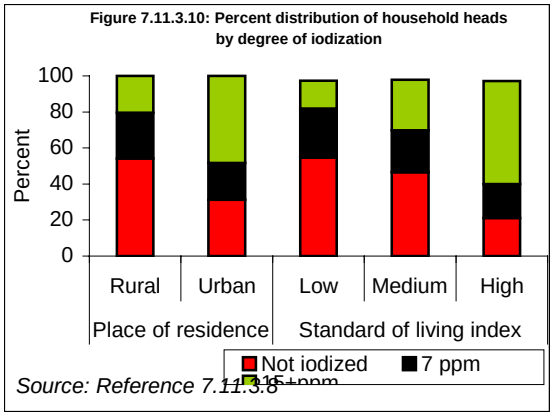


Findings from NFHS 2 also showed that differentials in salt iodization by place of residence were pronounced. Use of non-iodized salt was high in rural areas as compared to urban areas due to better transport facility in urban areas. The widest differentials were observed for standard of living index; use of adequately iodized salt was high in households with high standard of living compared to households with a low standard of living (Figure 7.11.3.9).

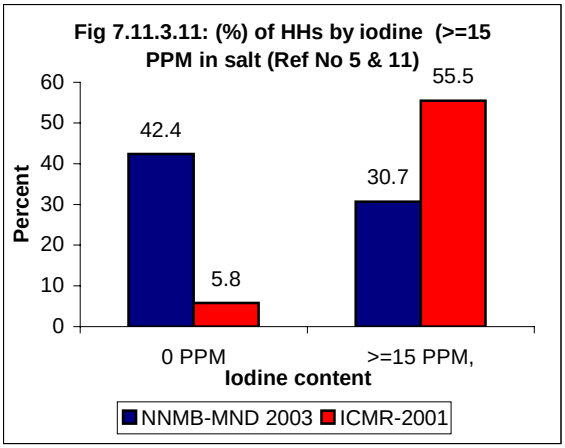
State-wise use of iodized salt from NFHS 1998-99 is indicated in Annexure 7.11.3.3. The data shows that in most of the northern states the household use of iodized salt was more than 90% as people were aware regarding the ill effects of iodine deficiency and the need to use iodized salt. On the other hand in coastal states like Tamil Nadu, Andhra Pradesh, Kerala, households consuming adequate iodized salt was low. In these non-endemic areas people tended to use cheap locally readily available non-iodized salt because they were not convinced of the health benefits of costlier iodized salt.

Data from District Level Household Survey (DLHS-RCH 2002-04) survey confirmed that as compared to NFHS 2 (1998-99) there was some decline in the household availability of iodized salt after the lifting of the national ban; only 30% of households in India used salt that contained a minimum recommended 15 ppm or higher level of iodine content, 46% of households used salts that are not iodized at all and another 24 percent used salt, which is inadequately iodized.





DLHS survey also shows that there was no change in the extent of salt iodization at household level with respect to place of residence and standard of living. Use of non-iodized salt was high in rural areas as compared to urban areas; use of adequately iodized salt was high in households with high standard of living compared to households with a low standard of living (Figure 7.11.3.10).



The state-wise and district-wise use of iodized salt from DLHS-RCH (2002-04) is indicated in Annexure 7.11.3.4 & 7.11.3.5.

Data from NNMB micronutrient survey (2003) also confirmed the relatively low iodized salt use in the southern states as compared to the northern states where ICMR survey was done in 2001 (Figure 7.11.3.11).

Concerned about the relatively sharp decline in the use of iodized salt in the early years of this decade, health professionals sought reimposition of the ban. On June 25, 2005 the Union Minister for Health and Family Welfare announced the decision of the Government of India to reimpose the ban on sale of non-iodized salt for human consumption. He also stated that the Government would shortly bring the legislation for compulsory double (iron and iodine) fortification of salt and that soon the double fortified salt will be used in midday meal and Integrated Child Development Services (ICDS) programmes. Ban on sale of non-iodized salt was reimposed in May 2006. The country has ample capacity to produce adequate quantity of good quality iodized salt. IEC efforts focusing on generation of demand for good quality iodized salt are underway. Some states like Chhatisgarh reduced price differentials between iodized and non-iodized salt and provided ready access to iodized salt through TPDS. Monitoring of the quality of iodized salt at production, distribution and household level can readily be undertaken. It is expected that during the Eleventh plan there will be redoubled efforts by all the stake holders to vigorously implement the programme of universal access to iodized salt so that the time lost since 2000 is made up and the country achieves universal access to adequately iodised salt and reduction in the prevalence of IDD in the country to less than 10 per cent by 2010.

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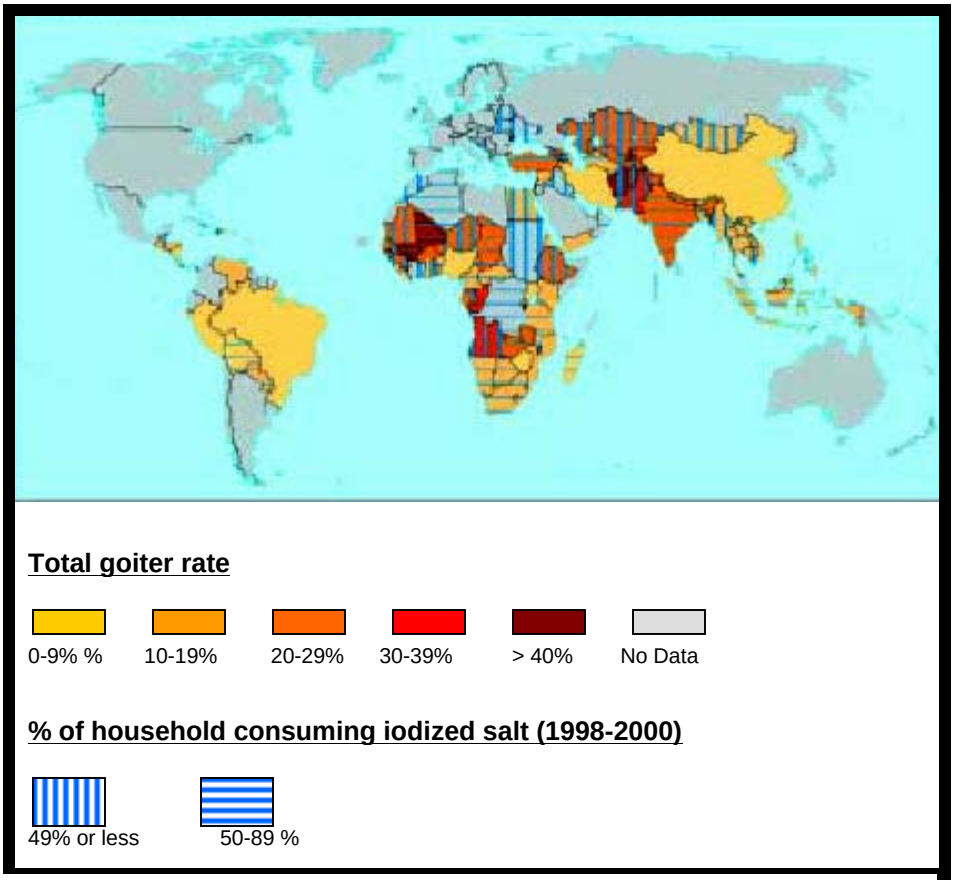
Iodine deficiency disorders and iodised salt consumption rates



Source: Reference 7.11.3.12

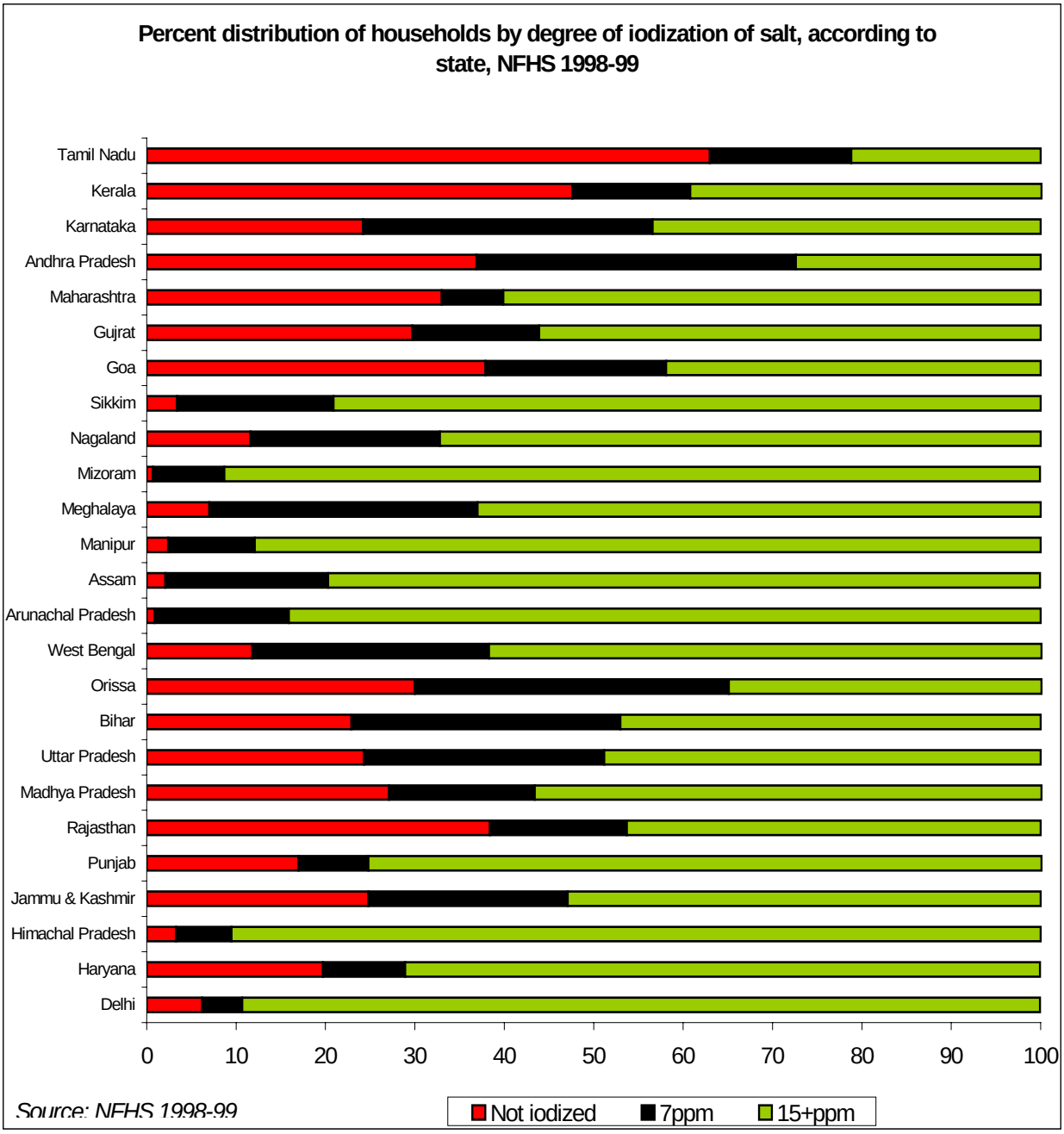
Annexure 7.11.3.2

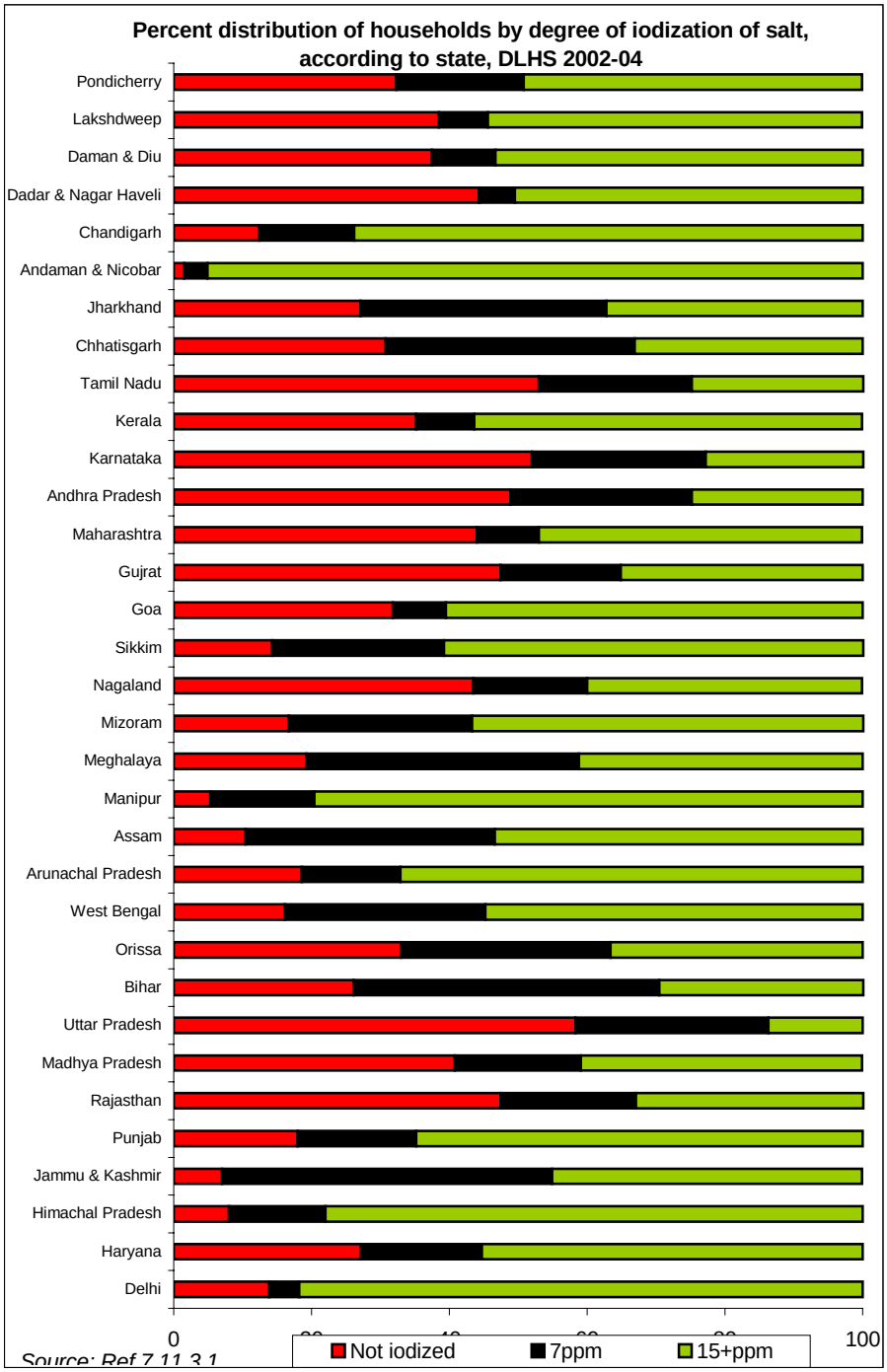
Prevalence of Iodine Deficiency Disorders & Status of National Iodine Deficiency Disorders Programme in different States/UTs of India

Sl.No.	State	Total No. of dist.	No. of dist. Surveyed	No. of dist. endemic	Ban notific-ation issued	IDD Cell
1.	Andhra Pradesh	23	10	9	Partial	
2.	Arunachal Pradesh	10	10	10	Complete	Yes
3.	Assam	23	18	18	Complete	Yes
4.	Bihar	55	22	21	Complete	Yes
5.	Goa	2	2	2	Complete	Yes
6.	Gujarat	25	16	8	Complete	Yes
7.	Haryana	19	9	8	Complete	Yes
8.	Himachal Pradesh	12	10	10	Complete	No
9.	Jammu & Kashmir	15	14	11	Complete	No
10.	Karnataka	27	17	6	Complete	Yes
11.	Kerala	20	14	11	No Ban	Yes
12.	Madhya pradesh	61	16	16	Complete	Yes
13.	Maharashtra	35	29	21	Partial	Yes
14.	Mizoram	8	4	4	Complete	Yes
15.	Manipur	9	8	8	Complete	Yes
16.	Meghalaya	7	2	2	Complete	Yes
17.	Nagaland	8	7	7	Complete	Yes
18.	Orissa	30	4	4	Complete	Yes
19.	Punjab	17	3	3	Complete	Yes
20.	Rajasthan	31	3	3	Complete	Yes
21.	Sikkim	4	4	4	Complete	Yes
22.	Tamil Nadu	29	12	12	Complete	Yes
23.	Tripura	4	3	3	Complete	Yes
24.	Uttar Pradesh	83	34	29	Complete	Yes
25.	West Bengal	18	5	5	Complete	Yes
26.	Andaman & Nicobar Islands	2	2	2	Complete	Yes
27.	Chandigarh	1	1	1	Complete	Yes
28.	D & N Haveli	1	1	1	Complete	Yes
29.	Delhi	1		1	Complete	Yes
30.	Daman & Diu	1	1	1	Complete	Yes
31.	Lakshadweep	1			Complete	No
32.	Pondicherry	4			Complete	No
	Total No. of dist.	586	281	241		

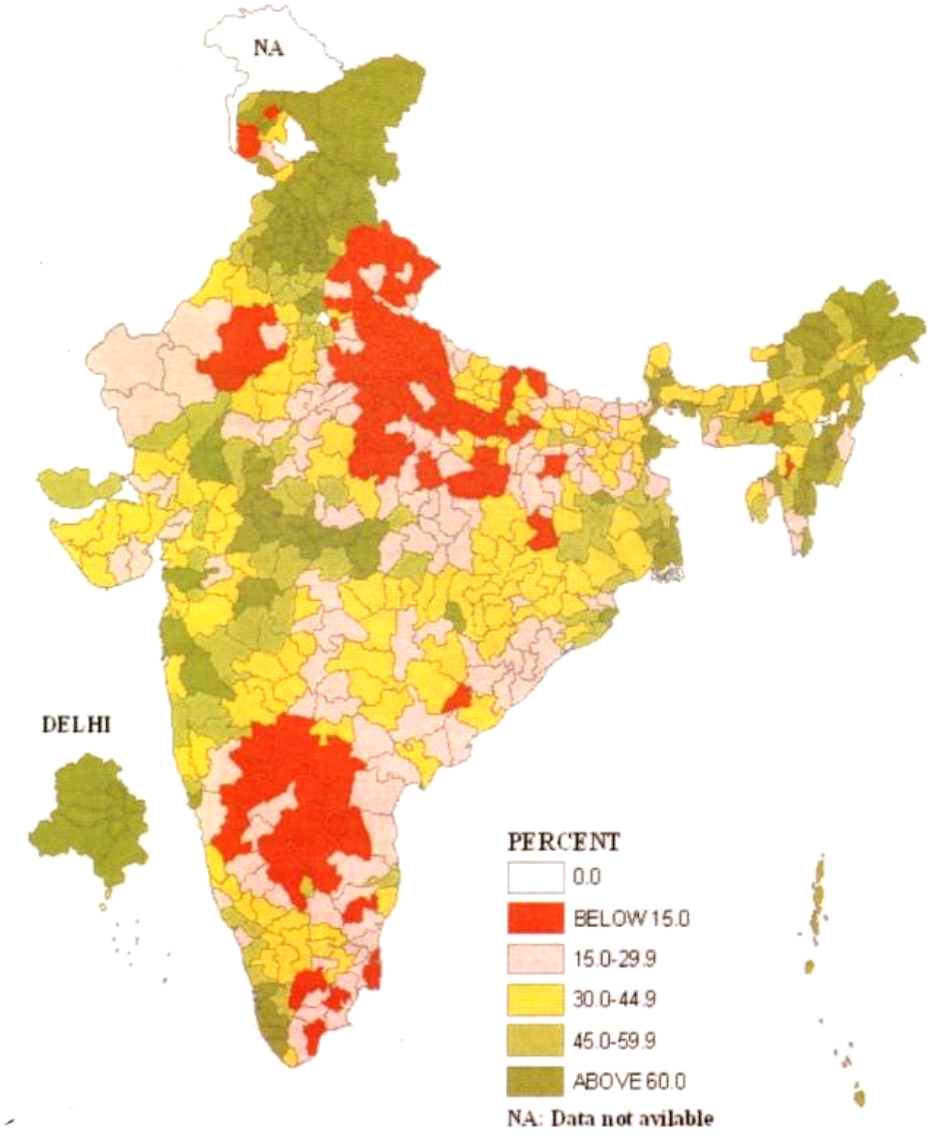
Source: Surveys carried out by Central and State Health Dte.s,ICMR and various Medical Colleges

Annexure 7.11.3.3




Percent distribution of households by degree of iodization of salt, according to state, DLHS 2002-04
Pondicherry
Lakshdweep
Daman & Diu
Dadar & Nagar Haveli
Chandigarh
Andaman & Nicobar
Jharkhand
Chhatisgarh
Tamil Nadu
Kerala
Karnataka
Andhra Pradesh
Maharashtra
Gujrat
Goa
Sikkim
Nagaland
Mizoram
Meghalaya
Manipur
Assam
Arunachal Pradesh
West Bengal
Orissa
Bihar
Uttar Pradesh
Madhya Pradesh
Rajasthan
Punjab
Jammu & Kashmir
Himachal Pradesh
Haryana
Delhi
0
100
Not iodized
7ppm
15+ppm
Source: Ref 7.11.3.1

Percentage of Households using Salt that Contains 15 ppm Level of Iodine



Annexure 7.11.3.6