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Crouching Tiger Hidden Goiter Belt: A Critique of Health Care and Universal Salt Iodization in the Tsum Valley

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ABSTRACT

The Tsum Valley, opened to visitors in 2008, has only recently begun the process of modernization. The health of the population is still not stable with regards to nutrition, and the health care system is still inadequate due to geographic conditions of remoteness and difficulty of access. The health condition is further exacerbated by political interactions affecting iodine consumption. This paper presents original information collected via interviewing processes throughout the valley and in Kathmandu over the course of a four-week period. The results include the inadequacy of health care facilities in treating endemic health issues and of the failure of Universal Salt Iodization (USI) programs in reaching the area. The main conclusions are the need to establish an adequate primary health care center in the valley in order to administer iodine oil injections regularly due to the unreliability of salt iodization in containing iodine deficiency disorders in the coming years.

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Julian Goetz, Vanessa Soetanto, and Mingmar Lama at the Shen Phen Clinic, Domche

ACRONYMS

DDC	District Development Office
DHO	District Health Office
FPMT	Foundation for the Preservation of the Mahayana Tradition
GLK	Geshe Lama Konchok
HSS	Health Sector Strategy
ICCDD	International Council for Control of Iodine Deficiency Disorder
IDD	Iodine Deficiency Disorder
MCA	Manaslu Conservation Area
MDG	Millennium Development Goal
NGO	Non-governmental Organization
NHSP-IP	Nepal Health Sector Program- Implementation Plan
NMSS	Nepal Micronutrient Statues Survey
PHASE	Practical Help Achieving Self-Empowerment
PRA	Participatory Rural Appraisal
PRC	People's Republic of China
SEEDS	Social Educational Environmental Development Services
STD	Subscriber Telephone Dialing
TAR	Tibet Autonomous Region
TTM	Traditional Tibetan Medicine
TWC	Tsum Welfare Committee
UN	United Nations
UNICEF	United Nations Children's Fund
USI	Universal Salt Iodization
VCD	Village Development Committee
WFP	World Food Program
WHO	World Health Organization
WWF	World Wildlife Foundation

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1. Introduction

The Tsum Valley, located in the northern part of Nepal's Gorkha district, occupies the Khymolung Beyul (**Appendix IV)**, one of the seven major sacred valleys of the Himalayas. These *beyuls*, or hidden valleys, were prophesied in the eighth century by the great Buddhist master, Guru Padmasambhava, to provide a haven for people in the degenerate age of Buddhist cosmology. The recent legal opening of Tsum to outsiders in 2008 is part of a series of efforts by the Nepali government to expand the benefits of modernization into the more remote regions of the country.

This paper focuses on the developing health situation in the valley. It emphasizes the role of private and governmental health posts as the only form of primary healthcare in the valley, the larger trends affected by Nepalese and Chinese political legislation, and the work done by various international health agencies regarding iodine deficiency.

Until the mid 1900's, iodine deficiency disorders (IDDs) were so common in the Himalaya that it was sometimes referred to as "The Himalayan Goiter Belt" due to the high prevalence of iodine deficiency-related outgrowths on people's necks. Universal Salt Iodization (USI) was chosen by the Nepal Ministry of Health as the primary method for removing iodine deficiency, also known as "The Hidden Hunger", from the country.[1] Among the progress made in Nepal over the past twenty years, recent evidence suggests that control of IDDs is now on the wane in areas like Tsum. The commencement of a seven-year rations program by the Chinese government, including salt rations, marks a decisive moment for the continued progress of removing iodine deficiency disorders from Nepal.

The expression, "crouching tiger, hidden dragon," a Chinese proverb, means a strength that is hidden from others. In this case, the title refers to the spiritual power of the Khymolung Beyul, the strength of iodine deficiency in holding back the population, and the hidden strength of impact of the Chinese rations program.

[1] Nayana Siva, "A Sprinkle of Salt Needed for Nepal's Hidden Hunger", 2010. *The Lancet*, Volume 376, Issue 9742, Pages 673 - 674, 28 August 2010

Nepal is located between China and India along the Himalayan mountain range (**Map 1.1**). Tsum itself lies on the southern side of the mountains, directly adjacent to Tibet (**Map 1.2**).

Map 1.1: Tsum's Location in Nepal, From: Google Maps, Dec. 7, 2010.

Map 1.2: The Tsum Valley

From: Shangri-La Maps, 2009.

2. Methodology

We approached the assessment of health conditions and the analysis of health care facilities from several angles. First, a literature review was conducted focusing on past health surveys of the Tsum Valley from reports prepared by Frances Howland and the Tsum Welfare Committee (TWC). Other preparations were done including informal interviews with Frances Howland, Lama Sherab Rinpoche, and Ghana S. Gurung, those who have been to the Tsum Valley, to familiarize ourselves with the layout of the valley (i.e. number of villages, location of villages, trekking routes, environment) as well as to understand locations of current health posts. During this preparation process before we began our trek into the valley, we did further literature review to familiarize ourselves with the Nepali system of health care and with the most pressing health issues in the Tsum Valley as found from previous studies.

There are two options available for accessing the Tsum Valley from Kathmandu: by helicopter and by trekking starting from Arughat where motor vehicle roads end. For economic reasons, we chose the second option. It was also important to walk instead of to take a helicopter in order to obtain data on how far away villages are from eachother, thereby allowing us to measure how far away people are from available health care facilities (See **Appendix I** for Trekking Log). It took about five days of walking from Arughat to reach the first village of Tsum known as Lokpa in Shangri-la Maps 2009 and as Logpag by locals. We spent a total of twenty days for fieldwork, including the trek in and out of Tsum Valley, and visited almost all the villages. The decision to visit more villages rather than spend more time in fewer villages was made in order to collect a more

Figure 2: Planning our Trek Over Map

thorough examination and avoid incorrect generalizations about the status of health care in the whole Tsum Valley.

We noted village names in their local terms in order to obtain accurate data as many available maps have adapted local names into Nepali, thereby changing the meanings of these names. This is a necessary step in our use of the Participatory Rural Appraisal (PRA) method that aims to incorporate the knowledge and opinions of locals in planning future development of health. Throughout the paper, we will refer to village names in Tsum by what it is known locally as transliterated using the Wylie System. (See pp. 12 for complete list of village names).

In the field, we relied most on guided interviews as our main means of gathering information. We were able to communicate with locals with the assistance of our translators Mingmar Lama, resident of Nyinloe in Upper Tsum, and Rinzin Norbu Lama who was born in Gog Village. Our target participants include head of villages, government workers/officials, health care providers and assistants from both traditional Tibetan and allopathic healing systems, representatives from non-governmental organizations (NGOs), a representative from Nepal's salt distributing company, trekkers, and locals. (See **Appendix II** for complete list of interviewees). Individual information such as name (in their own local language), age, sex, village and occupation of each interviewee were recorded.

GUIDING QUESTIONS FOR INTERVIEWS

A. Health

- How close to your home is the closest place where healthcare is offered?
- Why do you/might you seek medical care and how often?
- Is it important to you to have a medical station?
- What do you think is lacking in the current healthcare in Tsum?
- Which type of medical care do you prefer: Traditional Tibetan Medicine or allopathic?
- How do you think it could be improved?
- In what way(s) are you willing to contribute to better health systems/coverage? Conditions?
- Where does sickness come from?

C. Life Patterns

- Why don't you have a smokeless stove?
- Where do the good stoves come from?
- Do you go to Kathmandu every year? When?

- Would you be willing to bring (village heads? Turn-based?) iodized salt/iodine tablets/iron tablets up to Tsum when you return?

D. Nutrition

- What did you eat in the last week?
- What is the most common dish that you eat?
- How many times a day, a week do you drink alcohol?
- Where do you get your salt?
- Which type of salt do you prefer? Why?
- Why do you prefer that type of salt because of economic or flavor reasons?

E. Development

- What do you think of the foreign tourists that come here?
- What do you think of having a road built here?
- Would you prefer to have a road for quicker commute, or a more advanced hospital?

F. Sanitation

- Where do you get your water?
- Do you think that water can be the cause of sicknesses?
- How do you prepare your meals?
- How often do you shower? Was your hands?

Analysis of findings from interviews and previous studies draws on economic and health-related theories but an understanding of economic theory is not required for understanding the basic conditions of healthcare in Tsum. Subsequent topics of discussion in this study include the basic health conditions and system in the valley that is relevant to achieving the World Health Organization's (WHO) definition of health, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity,"[2] such as nutritional issues, health care sustainability, and sanitation.

[2] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

	Village Names According to Shangri-la Maps 2009	Local Tsumge Village Names[3]	Tibetan[b]
UPPER TSUM	Mu Gompa	Mu Goenpa	དམུ་དགོན་པ་
	Chho Syong	Ts'ho Shong	མཆོ་ཤོང་
	Nile	Nyinloe	ཉིན་བསྡོད་
	Chhule	Chhule	ཆུ་ལེ
	Pangdun	Pangdun	སྤང་འདུན་
	Phurbe	Phurpe	ཕུར་པེ་
	Lar	Lar	ལར་
	Lamagaun	Ngak	རྔག
	Rachen Gompa	Rachhen Goenpa	ར་ཆེན་དགོན་པ་
	Ngakyu	Ngakyu	རྔག་སྐྱུ
	Leru	Leru	ལྷེ་རུ
	Chhokangparo	Chhogang	མཆོ་གང
	Bhajyo	Bajo	བ་འཇོ་
	Ngula Dhojyang	Ngoenlha Grochen	རྔོན་ལྷ་དགྲ་ཆེན་
LOWER TSUM	Chhogu	Dsong	རྫོང་
	Lapche	Latse	ལ་རྩེ
	Kowa	Gogpa	འགོག་པ་
	Dumje	Domche	སྡོམ་བཅད་
	Ripchet	Hribche	རྟིག་བཅས་
	Yaju	Yarchog	ཡར་ཕྱོགས་
	Chumling	Ts'humning	ཙུམ་རྣིང་
	Rainjam	Relzam	རེལ་ཟམ་
	Gho Village	Gog Grongkyer	འགོག་གྲོང་འཁྱེར་
	Gumba Lungdang	Goenpa Lungphrang	དགོན་པ་ལུང་སྤྲང་
	Gumba	Goenpa	དགོན་པ་
	Tharung	Tharong	ཐ་རོང་
	Tanjo	Tajug	རྟ་འཇུག
	Tumje	Tsumche	ཙུམ་བཅད་
	Lokpa	Logpag	ལོག་པག

[a] Transliteration according to the Extended Wylie System (EWST) and the Wylie System:
Turrell Wylie, "A Standard System of Tibetan Transcription," *Harvard Journal of Asiatic Studies,* Vol. 22 (Dec., 1959), pp.261-267

[b] Tibetan spelling obtained with the help of Lama Karma Kunzang and Mingmar Lama

3. Nepal's Health Care system:

Although the government of Nepal has been in conflict for the last ten years, the 2006 Nepal Demographic and Health Survey has shown improved conditions in certain aspects of health that brings the country closer to achieving United Nations' Millennium Development Goals (MDGs). Improvements in MDG Indicators including an increase in child immunization rates, decrease in child and infant mortality, decrease in fertility rates, increase in skilled attendance at birth, and a decrease in maternal mortality show significant achievements by Nepal's health care system led by two essential programs: the Nepal Health Sector Program- Implementation Plan (NHSP-IP: 2004-2009) and the Health Sector Strategy: An Agenda for Change/Reform (HSS).

3.1 Nepal's Institutional Health Framework

Nepal's institutional set-up of health system provides seven types of health posts to meet regional needs. In 2007, Nepal had specialized hospitals at the central level, four regional hospitals and nine zonal hospitals at the tertiary level, and sixty-eight district hospitals at the district level. The three remaining health institutions are responsible for overseeing the most basic health care needs of the population such as reproductive healthcare, child health care, nutrition services, and disease control. There are 205 primary health care centers (PHCs) at the electoral constituencies, 786 health posts at the sub-district level, and 3,129 Sub-Health Posts at the Village Development Committee (VDC) level. But even with these facilities, still 50.7 percent of health care funds come from external sources such as non-governmental (NGO) and non-profit organizations. Only 6.2 percent of the national budget is allocated towards health.[4]

3.2 Urban-Rural Chasm

Surveys of Nepal's population health progression over the years depict a hopeful future for the country. However, whole-country surveys prove to be inadequate in describing the real health situation faced by Nepalis living in rural, mountainous areas such as the Tsum Valley. In these poorer regions, the picture is quite different: the presence of physicians, nurses, and midwives is

[4] World Health Organization (WHO), "Nepal National Health System Profile" 2006

scarce, vaccine coverage is low, most infant deliveries are not attended by skilled health personnel, and in mountainous regions, children under-5 years old are twice as likely to die than children in other economic zones. Inequities in health service and its utilization are glaringly apparent when comparing between urban areas and remote rural areas in Nepal. Health care in the northern Himalayan regions in Nepal reflects these disparities.

4. The Slippery Slopes of Himalayan Health

4.1 Isolation

The topography of Nepal is highly irregular, such that in a very small area, land rises from just a few meters above sea level to the high regions of the Himalayas. This geography has many implications regarding health. The mountainous terrain that surrounds the scattered valleys in northern Nepal makes access via roads tremendously difficult. As a result, these areas become isolated and are then bypassed by modern development. The World Health Organization reports, "Due to the thinly scattered population profile in the hilly and mountainous regions, the accessibility to health facilities is still a problem in this Himalayan country."[5] Further, perhaps also because of the remote nature of the region, there is a lack of medical facilities compared to the rest of Nepal as can be seen in **Table 4.1**.When roads for motor vehicles are scarce and the only other means of commuting between cities and villages is by helicopter, the process of monitoring of and sustaining clinics become difficult as well as costly.

Table 4.1. Topography-wise the Distribution of the Health Care Facilities.[6]

Type of institution	Total	Mountain	Hill	Terai
Hospital	85	16	45	24
PHCC/HC	193	20	94	79
Health Post	701	152	379	170
Sub-Health Post	3,129	387	1,606	1,136
Ayurvedic Hospital	2	-	1	1
Dist. Ayurvedic HC	50	8	27	15
Ayurvedic Dispensary	211	28	125	58
Zonal Ayurvedic Dispensary	14	1	8	5
Homeopathic Dispensary	1	-	1	-
Unani Dispensary	1	-	1	-

Source: DHS Annual Report 2001-2002

[5] *Ibid.,* 12
[6] *Ibid*

4.2 Consequences of Erosion

The steep topography of the Himalayas also has nutritional consequences. In these high altitude regions, topsoil erosion has taken place over many years into the low lands below, thereby depleting the earth of its iodine content. Iodine deficiency among people of the mountains, including in the Andes and the European Alps, has thus become endemic as a result of insufficient concentration of environmental iodine.[7] The effects of this deficiency influence individual as well as communal aspects of life. The most direct physical effect is of cretinism, brain damage, and the formation of goiters as a result of the enlargement of the thyroid gland. Indirectly, endemic iodine deficiency can lead to motor and mental deficiency, which affects the level of education of the community and thus affecting its overall economy. Ironically, this nutritional deficiency affects regions that are poorer and more remote, perhaps causing progress for economic improvements to lag.

4.3 Hazards of Occupation and Terrain

Figure 4.3 Farmers with heavy loads of hay after harvest

The hazardous character of the terrain also influences the type of injuries that occur amongst the population. In these regions, most people tend to live through sustenance agriculture and animal herding. Distances between grazing grounds and villages are great, and paths are sometimes arduous, creating the larger possibility of injuries during commute. As a result, orthopedic injuries such as

[7] Basil S. Hetzel, ed. "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency," Oxford University Press, Delhi, 2004: 163

fractures and strains are common. Inexperience in setting bones had worsened the problem by creating distorted limbs.[8]

4.4 Preconceptions about Health

Isolation in the mountains has created certain preconceptions about health - both superstitious and religious in nature. Geoff Childs, during his time in the Nubri valley, a valley adjacent to Tsum on the western side, found that people's conceptions and beliefs regarding Buddhism had a large influence on the way they think about illnesses and death. In Child's Tibetan Diary, Pema Döndrup voices his thoughts regarding health:

> If illness is the reminder of impermanence, then it is also the reminder of virtuous effort. Illness teaches one to overcome ignorance. At the time of your death, if you lack the religious inclination that will benefit yourself, then even scores of caretakers will be unable to prevent the infectious spread of the disease. But just because you do not have caretakers doesn't necessarily mean that the illness will develop. If it is not time for you to die, then you will not die, even if you have no caretakers at all. If it is my time to die, so be it as the life force is gone. If it is not my time to die, then I will remain here since my life force is not at an end. Fear of illness and fear of death represent the suffering induced by our tendency to grasp at that which is impermanent. If one is not liberated from this grasping tendency, how is one to achieve Buddhahood? If one does not seek Buddhahood, what is the point of practicing religion?[9]

Here Pema Döndrup emphasizes that practicing Buddhism is one of the main focuses in life and that whatever else happens in life in terms of health is a test and reminder of the teachings of Buddhism, rather than a result of external forces such as lack of caretakers.

At the Khumjung Clinic in the Everest region, Sir Edmund Hillary recounts that when his acquaintance Mingmatsering had become sick with worms, his reasoning was that he was being poisoned by witchcraft. Mingmatsering then hypothesized that he must have accidentally offended someone who is now getting revenge by inflicting illness upon him. Another man, Angtembu, attests that he had "carried a witch on his back for a week" when he was afflicted

[8] Sir Edmund Hillary. *Schoolhouse in the Clouds*, New York: Doubleday & Company, 1964:111

[9] Pema Döndrup, quoted in Geoff Childs. *Tibetan Diary*, Berkeley: University of California Press, 2004: 168

with back pain after walking through a village notorious for harboring a witch.[10] These supernatural explanations are evidence that there is a lack of medical knowledge amongst the population.

The gap between the urban wealth and rural poverty in the mountains might be the greatest factor that influences health care in remote villages of the Himalayas. Not only are these villages already lacking in medical facilities, the people's own knowledge of their own poverty discourages them from seeking professional health assistance. Childs recalls that even when he had finally convinced his friend Tashi to seek medical help, further discomfort of unknown settings was still present:

> I realized when we arrived at the sparkling, newly constructed hospital that part of his hesitancy stemmed from the intimidation villagers feel when entering modern settings. Well-scrubbed urban dwellers often treat their rural compatriots with disdain, even turning their noses upward in disgust. The rural-urban chasm is so deep in Nepal that those with the least access to medical care feel the greatest reluctance to seek help when ill.[11]

Though discrimination may not be characteristic of all health care in mountainous regions, it might be likely to occur in other regions aside from Nubri.

The irregularities of the Himalayas have created a unique and regular pattern of health status throughout the region. Nestled in a valley in northern Nepal east of Nubri Valley, Tsum Valley is indeed shaped by these geological factors and thus the health status and mentality of its population is characteristic of its neighboring areas.

5. Health Care in a Hidden Valley

There are two types of medicinal care available in Tsum: Traditional Tibetan medicine (TTM) and allopathic medicine. In total, there are a total of eight medical facilities in Tsum, **Table 5**.

[10] See note 8
[11] See note 8

Table 5. Medical Facilities in Upper and Lower Tsum

Medicine	Number	Location
Traditional Tibetan	3	Nyinloe, Domche, Rachhen Goenpa
Allopathic	5	Chhogang, Ts'humning, Tsumche

5.1 Traditional Healing

As Tibetan-speaking people of Mongolian descent, Tsumbas practice Buddhism and look to Gautama Buddha and Padmasambava as models and teachers of compassion, impermanence, and detachments—three essential teachings of Buddhist philosophy. As both leaders and teachers of Buddhism, lamas in Tsum have become an intermediate means of connecting to more divine beings such as Gautama Buddha. These Buddhist lamas also offer traditional faith healing through events such as 'empowerments' (Tibetan: *wang*), or simply by request. During healings, a layman seeking assistance would first offer the high lama a *kata*, a white scarf made of silk that symbolizes purity, and usually any amount of money determined by the layman himself. The lama would then bless the patient by placing a basket full of scriptures where mantras are written above the man's head while chanting.

In the particular example of healing bites from bedbugs and fleas, with which our team had been afflicted, a high lama initiated the healing practice by gathering a lump of butter and green herbs freshly picked from the fields. A helper then crushes the herbs together with his hands and allows its extracts to fall upon the butter. While the medicine is made, the lama closed his eyes and muttered mantras by using his *mala*, prayer beads. As if he had collected these mantras in his mouth, he then blew and spat at the areas where we were bitten, and then repeated the process for other areas. He then blessed the butter that had been combined with herbal extracts and sent us off with the advice

Figure 5.1 Tibetan herbal medicine

to apply this herbal mixture for the next week.[12] This type of herbal and spiritual healing is still available in the Tsum Valley.

One of the main benefits of Tsum's secluded nature is that its land is still largely preserved, apart from the cultivated agricultural fields. Here in Tsum, over fifty species of medicinal herbs still grow and are used by local Amchis, traditional doctors that utilize herbs for medicine. There are three locations where Tibetan Medicinal care is formally offered. Lama Sherab Rinpoche from Nyinloe had recently established two clinics in Upper Tsum and in Lower Tsum through funding collected by an American NGO called Nepal SEEDS (Social Educational Environmental Development Services). The Tsum Shenphen Men-Tsee-Khang was established in May 2003 in the village of Nyinloe while the Shen Phen clinic in Domche was established in August 2008. Two nuns trained in basic TTM and fundamental allopathic medicine oversee these clinics: Ani Tsering Dolma and Ani Kunzang, respectively. Tsumbas are also able to seek health assistance from an amchi who lives and teaches at the Rachhen Nunnery in Upper Tsum. The Rachhen Nunnery receives funding from the Kopan Monastery.

5.1.1 Shen Phen Clinic in Dumje

The Shen Phen Clinic is responsible for offering the only health care available in the whole Village Development Committee (VCD) of Domche of approximately 1500 people. Most of the inhabitants of Domche are farmers or nomads.

The clinic is two stories, larger and newer than the houses that surround it. The first floor serves as a school for young children who is taught by Ani Kunzang.The part of the building that is dedicated for medical practice is composed of two rooms that can be accessed from the second floor balcony. The main room serves the purpose of general checkups, composed of shelves of tibetan herbal medicine with few allopathic medicine and equiped with a stethoscope and sphygomanometer. There were also some medicine from Malaysia which Lama Sherab Rinpoche had brought with him from his trips to that country. When more thorough examination needs to be performed, the second room provides a wooden table covered in a wicker mat to make a table.

[12] Field Notes: November 15, 2010, Relzam

As both an amchi and a teacher, Ani Kunzang resides in this same building. Though she is not a full traditional tibetan medical doctor, she has gone to several schools of TTM including the Shelkar Men-Tsee-Khang and Drakar Men-Tsee-Khang in Kathmandu. After working for four years in the Shen Phen Men-Tsee-Khang Clinic in Nyinloe, then taking a gap year to meditate at Goenpa Lungrang, Ani Kunzang moved to this village as soon as the clinic was established in 2008.

Currently, the clinic sees about ten to twelve patients a week, twenty-five to thirty a month. The most common illnesses that promts people visit the clinic concern gastric problems, common colds, dental problems, and wounds from injuries. Though Ani Kunzang feels that she is capable of "perfectly curing undangerous diseases" and to make herbal medicine, she feels that her skills are inadequate in certain procedures such as infant delivery and surgical operation. Because her training is limited, she has no choice but to refer those with serious illnesses to Kathmandu.[13]

Figure 5.1.1 Shen Phen Clinic, Domche

Though the extent of medical technology at this clinic is limited, Lama Sherab Rinpoche had created this clinic and the one in Nyinloe not to serve as a source of modern health care for Tsumbas, but with the intention to preserve the tradition of tibetan medicine. For this reason, it is also important to him to train young local nuns such as Ani Kunzang and Ani Tsering Dolma to become amchis and to learn to make herbal medicine from local herbs. Not

[13] Kunzang, Interview by authors, Domche, Lower Tsum, November 15, 2010

only would this help to keep the clinic more sustainable by using products grown in Tsum Valley, his vision would also help in empowering young women, and especially monastic ones, through medical knowledge. Lama Sherab Rinpoche also believes that Tsumbas still have more faith in and are comfortable with TTM, and thus, will be more likely to seek help at these clinics when they need it.[14]

Additionally, the amchis in Tsum, although trained in Kathmandu, actually originate from Tsum which may affect their level of commitment to the local population. For example, unheralded, we arrived at the Shen Phen clinic three times to find it open during the day. The government and health post clinics were often closed during their posted running hours.[15]

This clinic is, for now, sustainable through funding from SEEDS. The locals contributed to its construction by working freely, without pay, for ten days. This perhaps shows that locals support the introduction of medical care in their village. Curently, most of the Tibetan herbal medicine stocked in this clinic had been transported from Bouddhanath by donkeys, porters, or Ani Kunzang herself. The frequency that medicine is transported into the clinic is fluctuates based on the inventory; as soon as the clinic runs out of a certain medicine, Ani Kunzang would contact Lama Sherab Rinpoche to send additional supply by previously mentioned methods. The clinic is an apparently beneficial addition to the village, with the next closest healthpost being about three hours away in Chhogang, and seems to be currently running smoothly. However, future sustainability of the Shen Phen Clinic is unknown when considering the burdensome method of maintaining supplies that is time consuming. As the clinic relies heavily on funds from charitable aid, though, there is a chance that funding could unintentionally stop. In order to make certain that resources can be sustained in the long run, there needs to be a more constant and permanent source of income and supply. This is further complicated by the fact that the government cannot be relied upon for such dependable support as it has been in conflict in the past decade. The inadequecy of the government's support for health posts in Tsum will be discussed in subsequent sections.

[14] Lama Sherab Rinpoche, Interview by authors, Bouddhanath, Katmandu, November 30, 2010
[15] In Tsumling (Nov 14 and 15) and Chhogang (Nov 16), during our trek up the valley, both PHASE health posts and the Chhogang government health post were closed during their posted running hours.

5.2 Allopathic Medicine

There are two government health posts in Tsum Valley that offer allopathic medical care. One health post is located in Upper Tsum in the village known to locals as Chhogang. The other is located in Ts'humning in Lower Tsum. On 4 July 2010, a United Kingdom and Austrian NGO called PHASE Nepal (Practical Help Achieving Self-Empowerment) signed a partnership agreement with the District Development Committee (DDC) and District Health Office (DHO) of Gorkha to implement seven new community health programs in the Northern VCDs of the Gorkha district, including Tsum (http://www.phasenepal.org/news.htm).[16] Thus, three additional NGO clinics have recently been established by PHASE Nepal – one in Chhogang, Ts'humning, and Tsumche.

5.2.1 PHASE Nepal

PHASE (Practical Help Achieving Self-Empowerment), is an NGO based in the United Kingdom and Austria. As mentioned previously, PHASE has established health posts in Chhogang and Ts'humning that offer general treatments, safe delivery options, family planning, and behavior change health education. While PHASE health posts offer basic health options, it does not offer immunization as government health posts claim to do every three months. One of the most pressing problems in PHASE's early development is its lack of trained professionals to staff the health posts.

PHASE is unique in that it brings in foreign volunteer doctors one-week long at a time to train local health care personnel. PHASE's nurse training program combined with a trekking vacation package, is likely beneficial. However, the magnitude of its effect is not clear. Further research should be conducted on the efficacy of such programs, as in many cases, language barriers may exist between the fully-trained English doctors and the Nepali nurses.

Among the many aspects of these NGO health posts considered, the rotation of health assistants from one post to the next every two to three years would be enormously beneficial to maintain the health care personnel's interest in the population. They say they have health training for birth

[16] "PHASE Nepal News", October 11, 2010. http://www.phasenepal.org/news.htm

giving, but cultural barriers and long distances to health posts are the main impediments to put this training to use. Birth giving is still done primarily on the ground floor of the house in the stables, with the husband acting as mid-wife.

One of the things that PHASE does that is good for sustaining the manpower, is employee rotations from one health post to another every two to three years. This should greatly affect the level of commitment by the health care providers. For example, nurses will not maintain commitment from slow growth, but from job mobility. The rotation of nurses being conducted is great for the prospects of health in the Tsum valley and for the long-term success of the PHASE health posts.

On the other hand, PHASE health assistant's, unlike the amchis, are not from the area and may lack the same level of commitment to the health status of the local people. This is also partially accounted for by PHASE's rotation scheme.

For PHASE, evidence of a lack of manpower is simultaneously evidence of the presence of commitment. The only nurse in station in Chhogang travels between the two health posts, often a day's walk away, to fill the empty posts. By no means an easy task, PHASE's efforts to bring health to the valley are commendable.

Government health posts offer immunization every three months, on paper; but in reality, almost no Tsumbas have ever received a vaccination locally. It's not clear why that may be. However, one could speculate a few observed reasons as to why that is the case: i) that the health assistants lack the proper training or confidence required to administer them; ii) that vaccinations are not perceived as necessary or important for the health of the local people, either by themselves or by the health officials; and/or iii) that the current demographic information of the area is not sufficient for the complete administration of them.

5.2.1 Health Conditions

Previous health surveys have been conducted in the Tsum Valley in the year 2005 and 2009. In both instances, the major clinical findings reveal that major sicknesses are caused by daily

customs and habits of the people such as sanitation, food and beverage intake, and occupation. The following is a summary of the two surveys.

In 2005, a team of people led by Frances Howland visited the Tsum Valley in order to asses the health care needs of the Tsumbas. Their assesment process includes a health survey and questionairre. Because the project was prepared for the GLK (Geshe Lama Konchok) Sangha Project sponsored by donations from FPMT (Foundation for the Preservation of the Mahayana Tradition), Howland separately assessed the health of the monastic community in Mu Goenpa and Rachhen Nunnery, and the laymen. In both groups, the most common health problems were chronic, consisting of gastrointestinal problems, arthritis, headache, eye problems and diarrhea. They found that separately, the monastic community also suffered from high blood pressure, while other Tsumbas suffered from tooth pain and accidents. Howland also found that there is no iodized salt available in Tsum other than ones transported from Kathmandu. As a result, most people eat Tibetan rock salt that does not contain iodine and is therefore at risk of Iodine Deficiency Disorder (IDD). There were also many people suffering from cataract as there had never been an eye camp in Tsum. A large inadequecy in health care that Howland encountered in 2005 was that there was essentially no mother and child care. Deliveries occur at home with no professional help and there is a high rate of mother and infant mortality. The overall lack of health management in the valley has caused many preventable and managable health care issues to be neglected, including immunization, malnutrition, and nutritional deficiencies.

The survey conducted by the Tsum Welfare Committee in 2009 reveal similar findings. The top five most prevalent illnesses in lower and upper Tsum are acid peptic disease, upper respiratory tract infection, osteoarthritis, polyarthritis, and worm infestation.[17] Dr. Poudel observed, "As a whole, both health status and health awareness are very low in people of lower Tsum,"[18] because status of hygine and education is higher in Upper Tsum than Lower Tsum. As Howland found in her survey, the causes of these diseases are related to daily habits such as excessive alcohol consumption, poor sanitation with regards to food preparation, large consumption of butter tea, spicy meals, and arduous labor. The TWC team had also conducted specialized survey for

[17] Bidhan N. Poudel. "Analytical Report of Remote Mobile Health Camp—Tsum 2009," Tsum Welfare Committee, NAMS, Bir Hospital, Kathmandu, (2009): 3
[18] *Ibid*., 4

women, as health care for women is inadequate in the Tsum Valley. They found that the most common illness for women was cervicitis, which also can be assumed is caused by poor hygiene. It appears that in the four years between 2005 and 2009, not much health care improvement had taken place as evinced by the similar results of the two surveys as well as the similar recommendations that they provide as to how healthcare in the valley. The consolidated major findings of the two surveys are summarized in Box 5.2.1.[19,20]

Box 5.2.1: Consolidation of major findings in the 2005 and 2009 health surveys

- Most common health problems:
  - Acid Peptic Disease
  - Upper respiratory tract infection
  - Arthritis
  - Diarrhea and worm infestation
- Most serious health related issues:
  - Lack of sanitation and hygiene
  - Lack of maternal health care
  - Excessive consumption of Alcohol
  - Lack of immunization
  - Nutritional deficiency

6. Health Care Shortage between Tall Mountains

In 1997, when Tsum Valley was still closed to outsiders, a multidisciplinary team visited the Tsum Valley in order to survey the region and develop a profile from which the possibility of tourism can be assessed. In Prospects for Tourism in Chhekambar, Bhandari concludes, "A health post meets the needs of the local people."[21] While it is true that there are health posts in the area and eight total locations where one may seek medical assistance, to say that it meets the needs of the local people is optimistic. In fact, many people still live extremely far away, some being at least three hours away from these health posts. The health posts themselves sometimes provide inadequate care. As Poudel and Howland reported and as observed, the shortcomings in health do not only come from institutional mismanagement but also from people's actions from habits and traditions.

[19] Frances Howland, "Tsum Valley in Nepal—A State of Health," GLK Himalayan Sangha Project, Kathmandu, 2005
[20] Poudel, 2009
[21] Bishnu Bhandari, *Prospects for Tourism in Chhekampar*, Kathmandu: IUCN Nepal, 1997: xix

6.1 Observed Limitations of Health Posts and Clinics

Some of the most crucial problems presented by health posts and clinics is inherent in the secluded nature of Tsum Valley. As in other mountainous regions, the scattered features of the population's homes in the valley present difficulties in health accesibility. Because health care facilities are not available in every village, many Tsumbas often find themselves very far away from the nearest health post. For example, for anyone living in the village of Yarchog, the closest health care facility is about three hours away in Ts'humning far down in the valley (**Appendix I**). When this factor is coupled with the rugged terrain such as in Lower Tsum, the combination would render health care unreachable to those who are ill and live far away from a health post.

The problem is further exacerbated by the inadequate number of health care personnel staffing available health posts and clinics. When a person whose house is considerably distant does make the effort to seek health care, he or she might not find the clinic open. In Chhogang village where the government health post and the PHASE Nepal Clinic is based in the same building, both facilities could sporadically be closed during a weekday as we observed.[22] There are two local health assistants employed by the government here who are knowledgable in prescribing medication for basic illnesses such as the coommon cold or diarrhea. The health assistants at these government-run health posts do not work continuously, however, but have holidays that total to about three months in a span of one year. All health care workers also leave the villages to go home during Losar and Dashain, leaving the health posts deserted.[23] On our way from Arughat to Tsum, we had run into a health assistant on his way to Kathmandu to drop off his son at school—another reason that health posts are sometimes unexpectedly closed. If the situation is dire, however, one may sometimes seek out the health assistant, who has the key to the health post, at his house.[24]

Both the government health facilities and TTM clinics provide health care at the most basic level. This means that the whole valley lacks emergency health care. This is a grave problem as the facilities are not able to deal with serious illnesses such as eye problems, tuberculosis, and cancer. In one case, earlier this year, our translator Mingmar's father passed away because of a

[22] Field notes, November 16, 2010, Chhogang, Upper Tsum
[23] Lobsang Yeshi, Interview by authors, Chhogang, November 16, 2010
[24] Namgyal Lama, Interview by authors, Chhogang, November 22, 2010

failure of the valley's plan for emergency care. The father's state of health had been deteriorating for some time because of liver cancer, but on the day the family noticed that his condition was quickly deteriorating, the emergency helicopter that is the only option for quick commute into Kathmandu refused to transport Mingmar and his father because of poor weather conditions. With no other choice, Mingmar attempted to bring his father to a hospital into China, a closer trek than Arughat. However, because his condition was so bad, he passed away during the trip in Pema.

There is also a tremendous lack of maternal care in the valley. Almost no mother in the Tsum valley go to a medical facility to give birth. Through an informal interview with a family in Yarchog, we found that the tradition of giving birth takes place on the first floor of the house, in the area where cattle and other animals usually reside. This is because the process of giving birth is impure, and thus may not take place where the family lives. The only helper present during this event is the husband. After she gives birth, a lama must then clense the mother and infant as purification so that they may once again enter the house.[25] If complications should arrise, the only option a family has is to find the local medical health provider who could well be several hours-walk away. Even Ani Kunzang of Domche admits that she does not know much about what to do during labor complications and has absolutely no experience in helping mothers in those situations. She wished that she would be better trained so that she could give knowledgable suggestions to mothers during post- and ante-natal care. In fact, Ani Kunzang's mother had been a victim of the lack of maternal care in the valley; her mother passed away during labor. In Domche, five mothers have died during labor in about a five-year span, though children are mostly born healthy.[26]

6.2 Daily Habits

6.2.1 Alcohol

It is known that the people of Tsum consumes an excessive amount of alcohol daily. When asked how much one drinks it seems to be a taboo subject to which many respondents giggle at and

[25] Field notes, November 14, 2010, Yarchog, Lower Tsum
[26] Kunzang, Interview by authors, Domche, November 15, 2010,

say that they drink whenever it is available, but with no specific counts.[27,28] This response might be caused by the fact that people drink with no limitatioins and thus actually do not know how much they drink. The reason why most people drink is that it is "ancient tradition" and its what their ancestors have done.[29] But in the past, wine was only consumed during auspicious occations in a very small cup, implying that there used to be a limit. Now, according to Lama Sherab Rinpoche, there is a new tradition. The cups are larger and the woman who makes the alcohol usually offers more alcohol without limit.[30] Even now, many local health care personnel have failed to convince the locals to lessen the consuption of alcohol because of this believe that it is tradition.[31] This apparent shift in tradition to emphasize a more giving society has dire consequences in terms of health as evinced by the stories of Mingmar's father's death and a lama's recent death from liver cancer.[32]

Various efforts have been attempted by the monastic community and local health care givers to decrease alcohol consumption. Nearly all of these efforts have been met with failure. According to Lhakpa Dorjyi, "well-knowledged people from outside are the only ones who can stop alcohol drinking."[33] The only group that would have the necessary authority to convince Tsumbas to drink less alcohol or abstain altogether are outsiders because they have the perceived power to fine the locals for alcohol consumption.

6.2.2 Sanitation

Poor sanitation and hygiene has caused many preventable illnesses to linger in Tsum Valley. Just this year, four children died as a result of vomiting and diarrhea.[34] This large sanitation problem is caused by a lack of awareness and education about cleanliness. Even though our interviews reveal that people perceive diseases to come from lack of sanitation, it seems that locals have not

[27] Lobsang Yeshi, Interview by authors, Chhogang, November 16, 2010
[28] Lhakpa Dorjyi, Interview by authors, Domche, November 23, 2010
[29] See notes 26 and 27 above
[30] Lama Sherab Rinpoche, Interview by authors, Bouddhanath, November 30, 2010
[31] Kalpana Sunuwar, Interview by authors, Chhogang, November 22, 2010
[32] Kunzang, interview by authors, Domche, November 15, 2010
[33] Lhakpa Dorjyi, interview by authors, Domche, November 23, 2010
[34] Kunzang, November 15, 2010

fully internalized the reason why sanitation causes illness. This is evident when we interviewed a local who was covered in soil but who knew that diseases come from poor hygiene.

Tradition also plays a role in sanitation. In the valley, Tsumbas often carry their own spoons so that they do not have to share utensils. This is a surprising habit—to be wary of another person's impurities—because most Tsumbas rarely wash their hands. According to Punya Parajuli, this is because the mouth is where people traditionally believe pollution comes from, not the hands.[35] When performing offerings of butter lamps and tea to high deities, Tibetans usually use a piece of cloth to cover their mouths to keep the offerings pure. This can also be seen when a *lhamo*, a shaman possessed by a goddess, in Ladakh gave offerings to a goddess with a red handkerchief placed over her mouth.[36]

Economic situations can also inhibit a person to practice good sanitary habits. When asked what he thinks he should do to improve his hygiene, Lhakpa Dorjyi said that he should wash his hands, a correct answer. However, he goes further to say that it is difficult to keep up with hygiene and mentioned that he did not even have money to buy soap to wash his face, so it is hard for him to wash his hands properly.[37] Most households also do not have soap to wash dishes with. They simply lick their dishes clean, and wash their plates with just water, risking contamination of food for the whole family. In these cases, awareness of the problem was not enough to solve the sanitation problem.

Though the British Gurkha Welfare Society had placed many new water taps to bring water closer to villages in order to promote better sanitation, the problem remains that water from these sources is still incredibly cold, discouraging Tsumbas to wash hands and shower. Women have an even greater problem as it is not culturally appropriate to wash in plain sight.

One of the aims of the British Gorkha society is to supply every two to three households with a water tap. This would increase the proximity of water and subsequently improve the quantity

[35] Punya Parajuli, interview by authors, Bouddhanath, Kathmandu, December 1, 2010
[36] Field notes: October 2010, Ladakh, India
[37] Lhakpa Dorjyi, November 23, 2010

available. However, this would not necessarily reduce the cultural restrictions associated with washing, nor would it increase the temperature of the water – the main deterrent to washing.

Parabolic solar cookers are recommended as a means to heat water, though they are yet unaffordable to the majority of the population.

The need for better access to water, preferably warmer water, is essential in improving sanitation. With better water access, improved awareness, and improved overall economic status, sanitation can be enhanced and many diseases will be eliminated.

6.2.3 Cullinary Habits: Smokeless Stoves

In the last few decades, smokeless stoves have begun to proliferate in Upper Tsum. Because of the visible and apparent health benefits of smokeless stoves, Tsumbas in Lower and Upper Tsum recognize their superiority to the traditional style of open-fire stoves in the main room of the house.[38,39] The smokeless stoves, or chimney stoves, all come from the Tibet border. Their price ranges from NRs 4,000-7,000 with options available for Tsumbas to purchase used stoves. Transport takes five days walking, often carried by two people.[40] In Chhogang, the central village of Tsum, a smokeless stove owned by the government health post's health assistant, Namgyal Lama, cost NRs 8600 (800 Yuan) with transport costs included.[41] Lobsang Yeshi, another Chhogang resident, bought a similar stove four years ago at NRs 5375 (500 Yuan) not including transport costs.[42]

In Upper Tsum, nearly all of the houses have smokeless stoves. Due to their proximity to Tibet, and their relative affluence compared to their Lower Tsum neighbors, they have been able to adjust to the smokeless stoves for the perceivable health reasons as well as the reduced risk of fire.[43] As estimated by Namgyal Lama, 90% of families in Upper Tsum have smokeless stoves,

[38] Lhakpa Dorjyi, interview by authors, Domche. November 23, 2010.
[39] Lobsang Yeshi, interview by authors, Chhogang, November 16, 2010.
[40] Informal interview with Lobsang Gyalpa, interview by authors, Logpag, November 25, 2010.
[41] Namgyal Lama, interview by authors, Chhogang, November 22, 2010.
[42] Lobsang Yeshi, 2010.
[43] Namgyal Lama, 2010.

while only 10% of families in Lower Tsum do.[44] What we found is that, actually, this number is even less. In Hripche for example, one of the larger villages in Lower Tsum, only two out of twenty-four households (8.3%) have smokeless stoves. They are thus at greater risk to eye-related disease and respiratory disease due to the smoke, as well as house fires.

It's important to address that, as we would expect, increases in income combined with the available choices for improving health care allow Tsumbas to improve their health quality on their own.

6.3 Nutrition

The variety of foods available in Tsum is quite limited. During the course of our fieldwork, our team consumed rice and potatoes every single day, which was actually luxurious. Lower Tsum has, in general, more variety of foods than Upper Tsum because it is lower in altitude, is more humid, and is warmer in climate. The staple food consumed by locals in the whole Tsum Valley is known as Sangong (Nepali) or San (Tsumge). This variation to the Tibetan *tsampa* is made of barley and buckwhat flour and mixed with water. Though the foods available are not varied, the consuption of barley and buckwheat gives locals somewhat adequate nutrition as it is rich in protein and fiber. Rations from Kathmandu and the Chinese border are also improving the nutritive variation in their diet.

But hidden nutrition deficiencies are not always apparent such as iron deficiency (possibly because of the low consumption of meat as a result of Tsum being a 'no kill zone'), Vitamin A deficiency,[45] and iodine deficiency. Though iodine deficiency had been better controled because of the USI program in Nepal, the popoulation is again at risk of this deficiency because of the new Chinese rations program that brings in non-iodized salt into the northern Himalayan regions of Nepal.

[44] *Ibid.*
[45] Howland, 2005.

7. Iodine Deficiency Disorders (IDD)

7.1 What is iodine deficiency?

More than a third of the world's population is currently at risk to varying degrees of brain damage caused by iodine deficiency.[46] Sometimes referred to as the 'Ancient Scourge' or the 'Hidden Hunger', iodine deficiency disorders (IDD) are possible at all ages of life, beginning with the fetus during pregnancy. Iodine deficiency is not a recent development. It has been a part of human history as long as river valley floods, and heavy mountainside rainfall and glaciations. These environmental processes leach the top-soil of iodine, causing deformities in all forms of plant life and in the cereals they produce (**Figure 7.1**). Therefore, iodine deficiency can be found throughout the food chain where top-soil iodine content is low. People relying on subsistence agriculture are thus at greater risk to iodine deficiency than those with access to more varied diets and food items.

Iodine is essential for the proper function of the thyroid gland in humans and animals. In neonatal development, iodine is especially important for physical and mental development (**Figure 2**).

[46] Basil S. Hetzel. "The Nature and Magnitude of the Iodine Deficiency Disorders (IDD)," 2004. Delhi, Oxford University Press, Calcutta Chennai Mumbai.

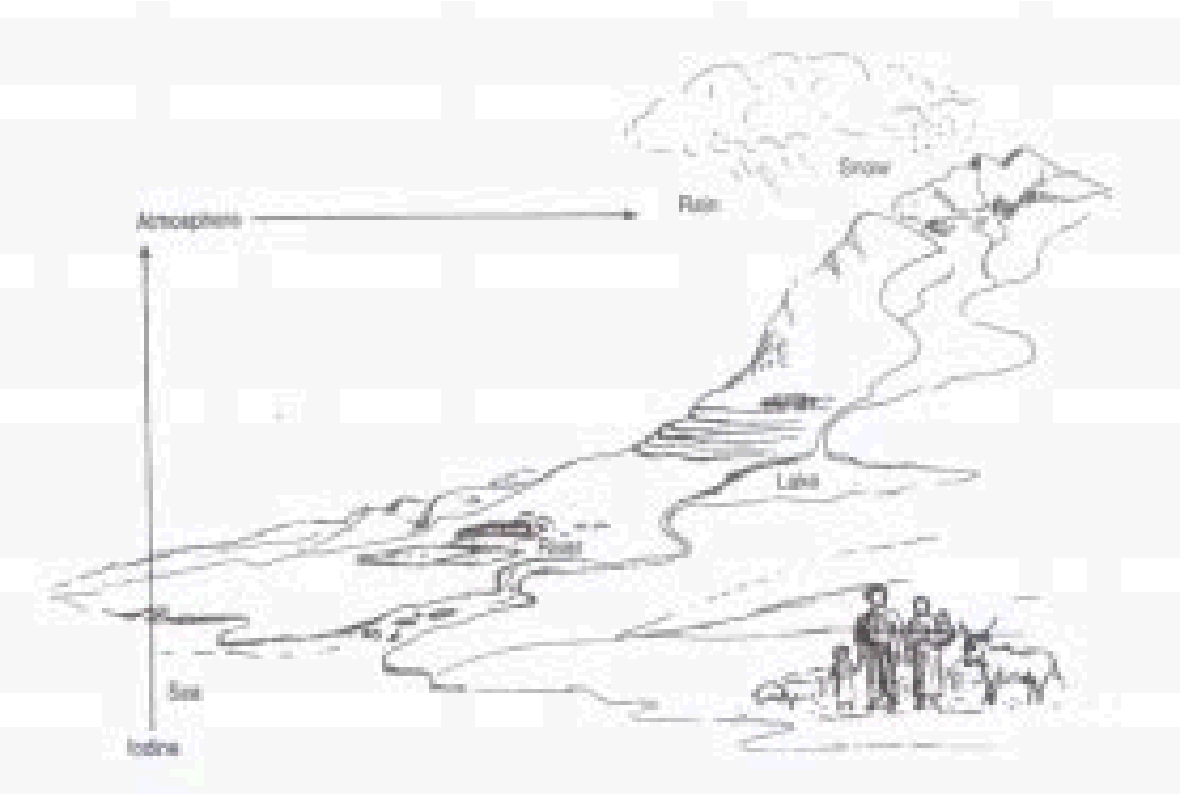

Figure 7.1: *Iodine cycle in nature: The atmosphere absorbs iodine from the sea which then returns through the rain and snow to the mountainous regions. It is then carried by rivers to the lower hills and plains, eventually returning to the sea. High rainfall, snow and flooding increase the loss of soil iodine, which has often been already denuded by past glaciation. This causes the low iodine content of food for man and animals*[47].

In later stages of life, iodine deficiency can cause further problems. As explained in Basil S. Hetzel's introduction to the International Council for Control of Iodine Deficiency Disorders' (ICCIDD) program, "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency":

> Iodine is an essential element for human and animal development because it is a constituent of the thyroid hormones, thyroxine (T4) and triiodo-thyronine (T3)… In iodine deficiency, the thyroid gland enlarges to form a goitre to maintain the

[47] Basil S. Hetzel. "The Story of Iodine Deficiency: an International Challenge in Nutrition," 1989. Oxford University Press, Oxford and New Delhi.

> level of thyroid hormones in the blood but eventually the level falls with increasing effects on the development of the brain and other organs.[48]

In short, when sufficient iodine is absent, the human body responds by forming a goiter as a short-term solution, so to speak (**Figure 7.3**). The presence of a goiter signifies severe iodine deficiency.

Throughout the last century, the medical sciences have established great amounts of evidence for the relationship between iodine and physical health. As stated by Abhinav Vaidya, assistant professor of community medicine at Kathmandu Medical College, Nepal:

> Two effects of [iodine] deficiency are clinically obvious. Growth retardation in childhood called cretinism and the enlargement of the thyroid gland in adults called goitre. What is less known, however, is the subtle effect of the deficiency on the development of brain tissue, which can lead to reduced IQ and poor academic performance.[49]

Despite the significant scientific advancements, however, effective elimination programs had not proliferated until two decades ago, when political support for global action became reality. In 1990, at the World Summit for Children, with the support of the United Nations (UN) system, through the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), the goal of the virtual elimination of IDDs by the year 2000 was set. This effort was to include countries in an informal global partnership, the UN and bilateral aid agencies, technical agencies, and, perhaps most importantly, the salt industry.

[48] Basil S. Hetzel, "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency: A global program for human development with a model applicable to a variety of health, social and environmental problems." 2004. Oxford University Press, Delhi.
[49] Siva, 2010.

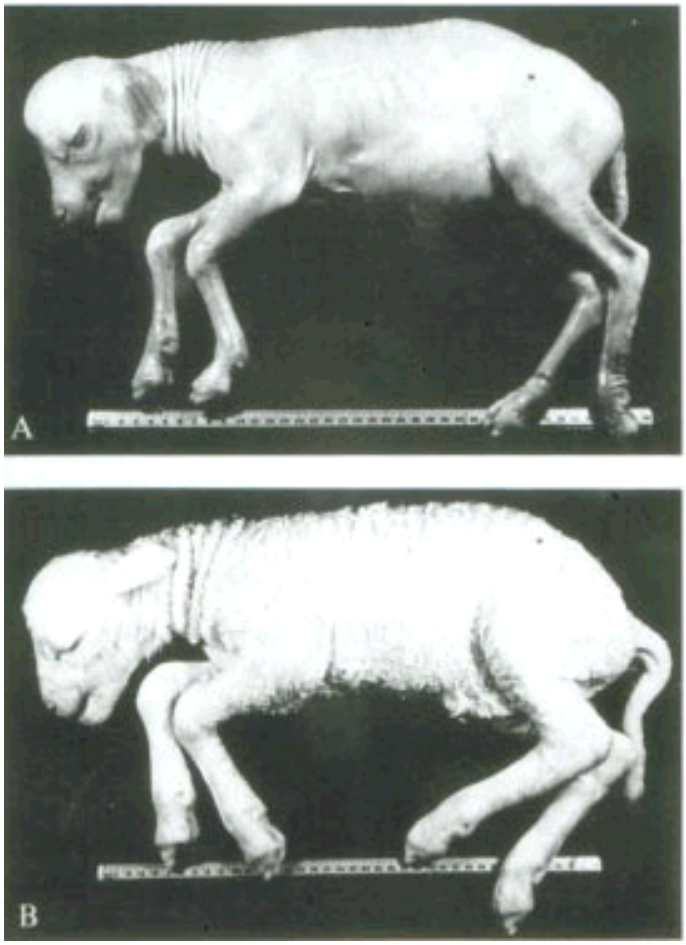

Figure 7.2: *"Effect of severe iodine deficiency during pregnancy on lamb development. A 140 day old lamb fetus (normal gestation period 150 days) was subjected to severe iodine deficiency through feeding the mother an iodine deficient diet (5-8 μg per day) for 6 months prior to and during pregnancy, compared to a control lamb of the same age fed the same diet with the addition of an iodine supplement. The iodine deficient lamb shows absence of wool coat, subluxation of the leg joints and a dome-like appearance of the head due to skeletal retardation. The brain was smaller and contained a reduced number of cells, compared to the control. From: Potter et al (1982)."*[50]

Iodine deficiency is now considered the most common cause of preventable brain damage in the world today.[51] In the last two decades, great strides have been made towards the elimination of iodine deficiency globally. Of the world's roughly 6.77 billion people, more than two billion are

[50] Basil S Hetzel. "Section IV: The Scientific Basis for the Elimination of Brain Damage due to Iodine Deficiency." "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency: A global program for human development with a model applicable to a variety of health, social and environmental problems." 2004. Oxford University Press, Delhi.
[51] WHO, 1994, cited in *Ibid*.

at risk to the negative effects of iodine deficiency in 130 countries.[52] Identified as the most common cause of preventable brain damage in the world, iodine deficiency is still a problem in many countries, even though the target for the 1990 summit's goal has since passed.

The main problem faced by these countries in regards to iodine deficiency is sustainability. Unlike the case where a minimum successful vaccination percentage would be enough to eliminate a disease from returning to a population, iodine deficiency requires constant maintenance and surveillance of the economic conditions. Thus, the continuous supply of iodine in the many available forms is necessary. USI is the WHO's global primary intervention strategy for the control of IDD primarily because: i) salt is widely available at low cost; and ii) it can be consumed throughout the year.[53] Intra-muscular depots of iodized oil are also available at nearly the same cost as salt iodization (5-10 US cents per person per year) where existing primary health care facilities are available.[54]

[52] Hetzel, 2004.
[53] Nayana Siva, 2010
[54] Delange F., Basil S. Hertzel "Section IV: The Scientific Basis for the Elimination of Brain Damage due to Iodine Deficiency". "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency: A global program for human development with a model applicable to a variety of health, social and environmental problems." 2004. Oxford University Press, Delhi.

Figure 7.3: *A photograph of a Tsumba woman with goiter. If this woman were to have a child, she or he would likely be at high risk for birth defects. The larger a mother's goiter is, the more likely the child will have brain damage. Photograph by Nick Dawson, 2005.*[55]

7.2 Iodine in Nepal

IDDs have been increasingly less common in Nepal ever since the Nepal Ministry of Health began its efforts to address the absence of essential vitamins and minerals in the Nepali diet in the 1960's. At one point, IDDs had even been "virtually eliminated."[56] IDD control was determined by UNICEF in the late 1990's as the most successful control for any micronutrient deficiency in Nepal.[57] Prior to that, IDD was a very common illness in Nepal. In the 1980's, IDD was so widespread that Nepal was even referred to as "the Himalayan Goiter Belt."[58] Before that,

[55] Frances Howland, "Tsum Valley in Nepal: A State of Health," 2005. Report prepared for the GLK Himalayan Sangha Project. Kathmandu, Nepal.
[56] Nayana Siva, 2010.
[57] *Ibid*.
[58] *Ibid.*

in the 1970's, goiters were considered such a normal part of Himalayan life that women living in the mountains would adorn themselves with jewelry made especially for their goiters.[59]

Nepal's geo-ecological structure is the main source of the iodine deficiency in its inhabitants. Iodine, a poison, yet an essential vitamin in small amounts, is found in the topsoil of much of the earth's soil. Nepal however, suffers drastically from topsoil erosion due to its location within and to the south of the Himalayas. The altitude variation creates the absence of iodine in the basic and higher levels of the food chain – from grain to cattle and, eventually, to people. Thus, where iodine requirements may be relaxed in places with high iodine topsoil content, Nepal cannot ignore the issue and allow for consumer choices to produce the adequate amount, let alone it's widespread poverty and iodine awareness levels. The iodine content of salt, for example, (iodized salt is not the only method available to prevent IDD) must be greater in Nepal than in neighboring India to make up for the lack of iodine in other consumed items. In Nepal, the legal requirement for salt iodine content is 30 parts per million (ppm), while in India and China, the legal requirement is merely half that, 15ppm. The standard as recommended by the WHO is far greater at 50ppm. To maintain universal iodization at 50ppm for any country is more costly than maintaining it at a lower iodization level.

Currently, Nepal is one of twenty countries to have successfully implemented USI. In 1993, the WHO, along with the Nepali government and the Salt Trading Corporation, Nepal's only salt supplier, initiated the USI program in Nepal. Salt iodization is the WHO's recommended strategy for the control of iodine deficiency because of its low cost availability and its ability to be consumed throughout the year.

Despite the tremendous progress made in earlier decades, however, more recent data show that iodine control in recent years has, if not reversed, then certainly stagnated for the country as a whole.[60] In UNICEF'S 2008 report, all of South Asia's nations except Pakistan and Nepal had improved their proportion of households consuming adequately iodized salt. Using survey data from 1995 and 2005, Nepal's rate declined from 68% to 63%. According to the analysis, Nepal,

[59] *Ibid.* Abhinav Vaidya, assistant professor of community medicine at Kathmandu Medical College, Nepal
[60] Siva, 2010

like Chad, after having made much progress in increasing the household consumption of iodized salt, is having difficulty making further progress due to issues relating to salt production and importation.[61]

Pankaj Joshi, Division Manager to Nepal's Salt Trading Corporation, stated that the major problem Nepal faced, in regards to sustaining the population's healthy iodine consumption of 150 μg per day, was its open borders with China and India. As stated earlier, China and India do not adhere to the same iodine requirements as Nepal due to their geo-ecological advantages and likely also, in part, due to the sheer magnitude of cost with regards to their enormous populations. Thus, while committed to the goal of USI and as Nepal's only salt supplier, the Salt Trading Corporation is still unable to control the entire salt supply within the country.

Iodine is only able to cover the surface of salt grains, not penetrate into the actual mineral. Because, holding weight constant, a bag of smaller salt particles has a greater surface area than a bag of larger salt particles, smaller salt particles are able to hold higher contents of iodine than larger ones. At each level of refinement, salt particles are ground up at further cost. This is why the cost of producing refined salt is much greater than the cost of producing local, unprepared salt. Salt from China, in many cases, still comes in block form or large chunks, thus obviously carrying very little iodine, if any at all. However, salt from Nepal is still cheaper throughout much of the country than its less-refined alternative due to the combination of monopoly power and governmental price ceilings.

Though the price of Nepali salt (that is, salt that is iodized, more expensively, between 30-50ppm to account for the greater absence of iodine in the soil) may be even less or equal to the price of Indian salt (iodized at 15ppm) at many of the border regions, people may still choose to buy the wrong salt at their own risk. This is often the case when the nearest iodized salt supplier may be many miles towards Kathmandu, while the nearest grocery store lies just a few minutes away, albeit across an international border. To buy salt, the cost of crossing these borders is arbitrarily small, while the cost of walking several miles is fairly high. In these cases, the small price of salt,

[61] UNICEF 2008 report

NRs 11 in Nepal and NRs 17 in India, is much less relevant than the other costs associated with purchasing and consuming it.

In the southern border regions, perhaps, the need for highly iodized salt is not so great, as the land is relatively flat by that point, and top-soil erosion less problematic. However, the problem is greatly exaggerated in the mountain areas.

7.3 Iodine in Tsum

In the Tsum valley, middle-aged to elderly men and women with visible goiters can still be found living and functioning within the communities. However, to a large extent, IDD has been controlled in the area and the appearance of children born with visible goiters in the past decade is very low, by our own observations. This is likely due to the efforts of the Ministry of Health and the Salt Trading Corp. towards achieving their main iodine-related objective: to supply the entire population of Nepal with adequate amounts of iodized salt so that all the salt that is consumed in Nepal is iodized.[62]

The commencement of a seven-year Chinese rations program marks the most difficult hurdle for iodine deficiency control, not only in Tsum, but also the ten other Nepalese border districts included in the program's radius.

7.3.1 Salt from Nepal

In Philim, one of the main villages along the four-day trek to the Tsum Valley and the Manaslu Conservation Area to the northwest, a rations house can be found located on the southeastern hill above the village. Here, sacks of rice and salt from Kathmandu are kept and distributed at inconsistent intervals by the local government. After three days on the back of a donkey (**Figure 7.3.1)**, some of the rice and salt is unloaded in Philim for household distribution while the rest continues up the valley to Lower and Upper Tsum, which, in some cases, may take up to another week. Because of the nature of transport in the area and various organizational difficulties, huge

[62] Pankaj Joshi, December 2, 2010

amounts of salt and rice may come at once. In 2009, 1100 kundrol (sacks in the local dialect, approx. 30kg) of salt and rice arrived, often 40 kundrol at a time.[63] During the tourist season, for example, pack animal resources are often diverted for income generating purposes. When the supplies arrive, the presiding village head, in this case Janga Bahadur Gurung, sends out a notice to all of the villages above to come and collect their rice and salt. This type of event occurs two to three times a year. Although the 50kg of rice and 30kg of salt per household are paid for by the government and the World Food Program (WFP), after Philim, the transport costs must be borne by the households themselves.[64] Depending on the work they have there and the availability of family members, porters, and pack animals, an additional wait may ensue whereby the rice and salt sits in storage in the shaded rations house until they are collected.

Figure 7.3.1 A line of donkeys carrying rations from Arughat

This sequence of events regarding the transport of rice and salt has very important implications for the iodine consumption of the Tsumbas. The two biggest threats to preserving the iodine content of salt are heat and moisture. Along these mountain paths, that is exactly what the packages encounter. During the day, the sun can be quite hot, and donkeys walking under it with heavy baggage produce their own heat and sweat which further induce the iodine to abandon the salt. As time wears on, the iodine content of the salt may decrease substantially. According to the head of the Research Centre for Society and Health in the UK, David Brodie, who is also involved in IDD research in Nepal, "Putting [iodised salt] on the back of a yak and carrying it for 3 days can result in the loss of a proportion of iodine; it drops from something like 50 parts per

[63] Janga Bahadur Gurung, interview by the authors, Philim, Nov 14, 2010.
[64] *Ibid.*

million at source down to something like 15."[65] So, if three days is all it takes for Nepali salt to become Chinese salt, then it's a smart investment for the Tsumbas to buy the much less expensive Chinese salt (approximately half the price) than the Nepali one.[66] Thus, the necessity for strong packaging material like high-density polyethylene (HDPE) packaging becomes apparent. HDPE packages are quite strong, relatively, and are able to keep out water to a degree. Unfortunately, though environmentally friendly alternatives exist, like paper bags or gunny bags made of jute, they are still not available at the profitable level for even the Salt Trading Corporation monopoly.[67] A project of that magnitude, able to maintain sufficient iodine content in the salt, has an estimated start-up cost of 25 million USD. According to Joshi, the costs for such a project cannot be borne by the company without substantial encouragement from national and international agencies.

In addition to the costs associated with providing the people of Tsum with iodized salt, there is still the presence of uncertainty in regards to the benefits of iodized salt.[68] Since the salt is already paid for, yet without transportation costs included, the rations "gift" itself, if we may call it that, is more of an imposition of costs to the local people who can either pay for the transportation or allow the resources to rot away, however undesirably, in the rations house in Philim. In Ts'humning, a day's hike uphill, the debate over whether or not the people should pay for the supplies from their own savings or from the local government money continues as evidence that: a) either the salt is not as affordable as the Ministry of Health might like to think; or b) that awareness of the benefits of iodized salt is not sufficient to create the necessary demand for iodine deficiency to be eradicated at the consumer level.

7.3.1.1 Successful Practices Towards A Healthy Consumption of Iodine

Among all these difficulties, some efforts do affect iodine consumption in the positive direction, however (**Table 7.3.1.1**). For example, in some cases, a villager may come representing several families or even his whole village. If he arrives with a list of families' names he is granted permission from the rations distributor in Philim to carry the salt and rice out. This kind of

[65] Siva, 2010
[66] Lobsang Yeshi, interview by the authors, Chhogang, Nov 16, 2010.
[67] Pankaj Joshi, December 2, 2010
[68] Gopal Lama, November 14, 2010

arrangement reduces the transit time of the iodized salt by allowing villagers to claim their goods while carrying on with their own business when the rations arrive unexpectedly.

Table 7.3.1.1: Logistical arrangements to improve iodine distribution

Type of Effort	Explanation
Rations house in Philim	**Cool, dry storage for iodized salt allows for delays in rations pick-up**
Social arrangements for rations collection	**Decreases rations pick-up time**
Telephone communication	**Decreases information dissemination time**

The construction of the rations house also has a positive effect. As stated before, heat reduces the iodine content of salt. Simply by keeping the salt in a cool, shaded space, iodine is not lost as quickly. In many places throughout Nepal, because it is so cheap and because people lack a basic awareness of optimal iodized salt storage methods, salt is kept outdoors in the direct sunlight, greatly reducing the iodine content of the salt and thus its health benefits. Philim and the Tsumbas further on, seem to have avoided this unfortunate storage and vending method.
The availability of subscriber telephone dialing (STD) service locations in the Tsum valley greatly improves the speed at which information regarding rations arrivals – and emergencies, for that matter – is disseminated.

Though not necessarily a logistic arrangement, in much of Nepal, traditional cooking methods include washing salt before preparing it in food. In Tsum, this is not widely practiced, though salt is often cooked within the various dishes, reducing its iodine content.

7.3.2 Packaged Noodles and Flavor Sachets

An interesting study, conducted in the Khumbu region of the Himalayas to the south-east of Tsum by a medical team from the Department of Medical and Surgical Sciences of the University of Otago, Dunedin, New Zealand, using palpation methods, urinary samples, and

finger-prick blood samples concluded the presence of iodine in the area to be insufficient and quite complex:

> The prevalence of severe iodine deficiency has decreased since the 1960s, but mild iodine deficiency persists, particularly in women of childbearing age. The consumption of high-iodine uncooked instant noodles and flavour sachets by school-aged children contributed to their low prevalence of goitre and excessive UIC values. This finding may obscure a more severe iodine deficiency in the population, while increasing the risk of iodine-induced hyperthyroidism in children. Ongoing monitoring is essential.[69]

Based on observational data, this could easily be the case in Tsum. Instant noodles are prevalent throughout the area and are often consumed as snacks, though adults are more seldom to consume them uncooked. The reverse problem of IDD, hyperthyroidism, is a result of over-consuming iodine, a poison in significant amounts, as stated above. Among the major findings is that the consumption of uncooked instant noodles negatively impacts the ability of researchers to accurately identify severe iodine deficiencies. Children who had consumed the iodine rich flavor sachets were at less risk to IDDs, yet at greater risk to hyperthyroidism. 31% of children below fourteen years of age had urinary iodine concentrations greater than 300 μg /l (or > 300 μg). This is far above the recommended daily intake of iodine for children of this age who require less iodine than older subjects (**Table 7.3.2**).

Table 7.3.2. *Recommended daily intake of iodine*

90 μg for pre-school children (0 to 59 months);
120 μg for schoolchildren (6 to 12 years);
150 μg for adults (above 12 years); and
200 μg for pregnant and lactating women

From WHO/UNICEF/ICCIDD (2001)

[69] E.E. Heydon, et al., "Iodine status in a Sherpa community in a village of the Khumbu region of Nepal." Department of Medical and Surgical Sciences, University of Otago, Dunedin, New Zealand. Public Health Nutr. 2009 Sep;12(9):1431-6. Epub 2008 Dec 24.

Certainly, the consumption of more iodine-rich, uncooked instant noodles cannot be taken as a serious suggestion for the removal of IDD in the Himalayas due to their lack of significant nutritional content and their association with hyperthyroidism. However, it's valuable to note that the iodine content of these noodle packages is much more successfully kept throughout the very same transport difficulties that the Salt Trading Corp. faces when shipping their iodized salt up to the highlands. In other words, the transportation of salt iodized at the national requirement is possible, though not on such a large scale.

7.3.3 The Price of Salt at the Tibetan Border

As one progresses up the valley towards China, specifically the Tibet Autonomous Region (TAR), the number of market interactions between local people and Nepalis declines significantly. By the time one reaches Upper Tsum, nearly all of the goods one encounters are purchased at the border between Tsum and the TAR. The Tsumbas living within 30 Km of the border, as well as their counterparts on the other side, have a special political position whereby they are not required to obtain visas to move back and forth across the border up to 30Km on either side.[70] This arrangement has allowed for the somewhat smooth transition from ancient trading routes to slightly modern ones without permanently cutting off the Tsumbas from their Tibetan ancestors with the coming of the Chinese regime in the 1950's.

Many aspects of transportation affect the way Tsumbas purchase goods from Tibet. A trip from Nyinloe to Tibet and back can take up to a week, including shopping time on the other side.[71] To maximize the benefit of traveling several days to and from the border for supplies, people in these regions buy salt only once or twice a year in bulk.[72] This means that when non-iodized salt is purchased, that same non-iodized salt may be consumed uninterruptedly for up to a year. In the case of Mingmar Lama and his family, 100kg of non-iodized salt was purchased at once at NRs 6 per kg because it was cheaper than the iodized alternative in 2010.[73]

7.4 Chinese Universal Salt Iodization

[70] Nyima Lama, interview by the authors, Kathmandu, December 1, 2010.
[71] Mingmar Lama, interview by the authors, Nyinloe, November 18, 2010.
[72] *Ibid.*
[73] *Ibid.*

The People's Republic of China has made great progress towards the reduction of IDDs for the majority of its population (**Figure 7.4**). In 1991, in response to the aforementioned World Summit for Children, Premier Li Ping signed the *Declaration and Plan of Action of the Peoples Republic of China (PRC)*. Within the declaration was the goal of eliminating IDD by the year 2002. Indeed, China is even celebrated by the international community as one of the great successes in the fight against IDDs. In Section V of the WHO's, "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency," M.G. Venkatesh Mannar summarizes this belief:

> In China, the coverage of iodized salt has increased from 54% (of which 39.9% met standards) in 1995 to 95.2% (of which 88.8% met standards) in 2002. The Total Goitre Rate in children has been reduced from 20.4% in 1995 to 5.8% in 2002. Essentially, China has reached the goal of Universal Salt Iodization.[74]

Such a claim is quite difficult to believe. As a proportion of a population, 5.8% goiter rates may sound rather attractive, but that does not imply that USI has "essentially" been reached. With a child population younger than five years old of 86,881, a 5.8% Total Goiter Rate in children means that roughly 5,039 children still suffer from severe iodine deficiency (goiters are evidence of highly developed iodine deficiency).[75] Furthermore, with the concentration of these iodine deficient areas falling into the southern coastal provinces with available sea salt production, and the western provinces with large lake deposits (i.e. Tibet), the success of the Chinese program is substantially uneven. In the PRC's case, because of the massive population size, it would be much wiser to approach USI success from a province-by-province measure.

[74] M.G. Venkatesh Mannar, "Section V: Iodized Salt for the Elimination of Iodine Deficiency Disorders." "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency: A global program for human development with a model applicable to a variety of health, social and environmental problems." 2004. Oxford University Press, Delhi.
[75] UNICEF, "Info by country, China Statistics" Dec 8, 2010. http://www.unicef.org/infobycountry/china_statistics.html#71

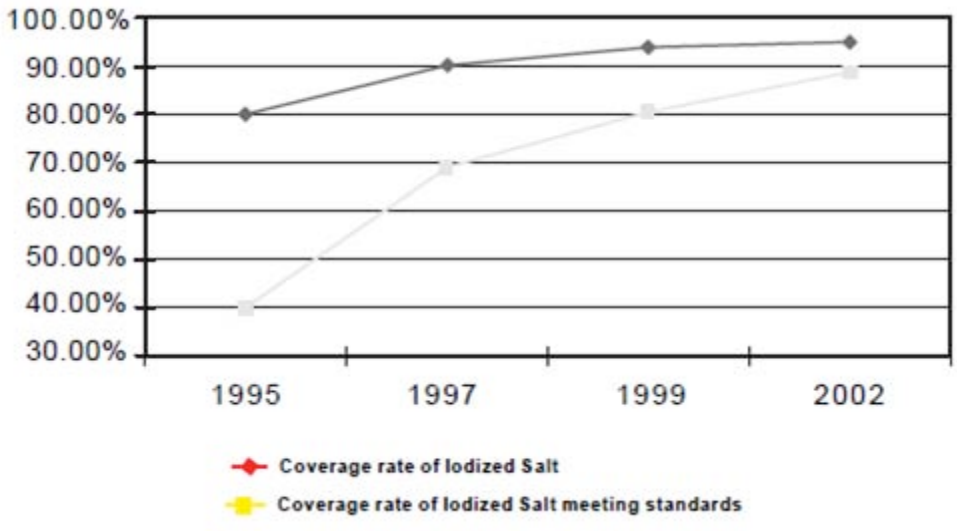

Fig 7.4: *Progress with Salt Iodization in China. From: Mannar (2004)*

In regards to our discussion of Tsum, the failure of the Chinese USI program in Tibet is most relevant. The incoming salt from Tibet is perhaps just as unreliable as the salt coming from Nepal. To account for the dissolution of iodine during transportation, the Salt Trading Corp. specially refines and iodizes salt at 50ppm to be sent to the more iodine needy regions of Nepal. Currently, no data has been recorded on the iodine content of salt that arrives in Tsum from Nepal. According to Joshi on the other hand, the salt coming from Tibet cannot have more than 15ppm of iodine – half the legal iodine salt content requirement of Nepal – by the time it reaches consumers in Tsum. On the Tibet side, as stated by Z.P. Chen in Section VIII of the WHO's iodine report, "China and East Asia Region," "The major obstacle to USI is the wide availability of cheap, raw salt harvested from the mountain lakes and bartered for barley and other foodstuffs."[76] The presence of an abundant supply of unrefined (therefore inexpensive) and non-iodized (therefore lacking in iodine-related health benefits) salt lake deposits creates an oversupply of affordable non-iodized salt.[77] Thus, if combined with poverty and a lack of awareness of the benefits of iodized salt, the cheap, non-iodized salt from Tibetan lake deposits poses a very serious threat to the health of people in Tsum and Tibet.

[76] Z.P. Chen, "China and East Asia Region. Reports from the Regions and the Countries by

[77] ICCIDD Regional Coordinators (RC)." "Towards the Global Elimination of Brain Damage Due to Iodine Deficiency: A global program for human development with a model applicable to a variety of health, social and environmental problems." 2004. Oxford University Press, Delhi.

To put it differently, poverty limits the choices of consumers to choose the healthier salt; increasing the income of consumers would increase their demand for higher quality food items. Awareness of the benefits of iodized salt would further increase demand for iodized salt, increasing its consumption, albeit while also increasing its price. This is evinced in the Tsumba community by the proliferation of smokeless stoves in Upper Tsum in the last decade.

7.4.1 Problems Associated With Transportation and Border Politics

One of the foreseeable problems associated with the border politics of Tsum can be found in the market structure associated with the Tsumbas political status. On the Tibetan side of the mountain passes, one can access a road with a day's walk. There, goods from throughout China can be purchased -- from horses to smokeless stoves. Because Tsumbas are not permitted to go past the Chinese checkpoints within to enter Tibet further, the suppliers must come to them. In other words, knowing that, among other things, these consumers are not here for window shopping, suppliers have a distinct advantage in their bargaining position due to the difficulties associated with arrival; and furthermore, Tsumbas, even if they were willing to go further into the country to seek more competitive markets, cannot legally access them.

Among the benefits of this "loose" border policy is a complex picture of health-related costs. The bargaining position of suppliers, combined with little governmental regulation and concern for the quality of products sold to Nepal, i.e. Tsumbas, and even less Chinese literacy on the Tsumbas part, creates the proper conditions for the sale of expired and unhealthy foods.[78] Informed consumers should normally be able to make healthy decisions on their own. However, the inability of most Tsumbas to read Chinese puts them at a significant disadvantage when looking for healthy food items for the next year or half-year – whatever they are not able to grow on their own land. Additionally, because there is little disincentive from either the Chinese government or the Nepali government for Chinese businessmen to sell expired food, there is little reason for them to not sell products that they were unable to sell in time in China and the Tibet Autonomous Region (TAR) aside from a personal sense of ethics. An international health program cannot rely merely on individual ethical conduct to solve endemic problems like iodine

[78] Nyima Lama, 2010.

deficiency. The market conditions must be considered by both Nepali and Chinese governments in order to best sustain the health of their own and respective citizens.

Assuming that expiration dates are a relevant detail regarding health, this market structure is very unhealthy for the people of Tsum. Moreover, in light of all that has been discussed regarding the preservation of iodine *on* salt, it should be quite clear that older, worn, and unwanted bags of salt are much less likely to provide sufficient iodine to keep a population healthy and free of IDDs.

Throughout the last three years, the Chinese have closed the border at unpredictable moments, usually for two to three month intervals, thus affecting trade between the Tsumbas and the Tibetans.[79] The inability to access trade with Tibet may have mixed effects. On the one hand, less trade to the north, where iodine is much more difficult to find, would force Tsumbas to turn their attention southward. Here, our hope would be that the salt arriving from Philim has sufficient remaining iodine. On the other hand, forcing Tsumbas to wait several months before re-opening the borders could further exacerbate the problematic market structure, discussed earlier regarding expired food items, due to their increased need, or demand, for such items, expired or not. Furthermore, it would be interesting to know what kinds of economic adjustments Tsumbas were able to make in light of this uncertainty.[80]

It is stated earlier that Nepali salt is cheaper than Indian or Chinese salt in many areas of Nepal. This is not the case in Tsum. Because transportation costs make the Nepali salt much more expensive than the Chinese salt, no matter how much free salt they get, as long as the transportation costs are included in the price, they will continue to buy non-iodized Chinese salt.

As well as iodized salt being barely available from Kathmandu, one can also buy iodized salt from China. However, the price discrepancy is very great – a 200% increase in price from *non*-iodized to iodized! In some cases, the actual price discrepancy is interpreted as evidence of the health benefits of one over the other. A special kind of price signal that iodized salt has a health value because it costs twice as much. If a government subsidy was placed on iodized salt, the

[79] Mingmar Lama, 2010
[80] Nidhiya Menon, "Rainfall Uncertainty and Occupational Choice in Agricultural Households of Rural Nepal," 2009. Journal of Development Studies, July 2009, v. 45, iss. 6, pp. 864-88

more health conscious consumers might not be able to identify which of the two was the more healthy kind. An awareness campaign would necessarily have to accompany such a subsidy for it to be successful.

7.4.2 The Chinese Rations Program

This year, in 2010, the Chinese began a seven-year rations program in the ten northern border regions of Nepal. The political agenda for this program has mixed interpretations. According to Nyima Lama, President of the Tsum Welfare Committee, himself a Maoist leader, China's political agenda is to create in the Tsumbas a sense of loyalty in which, in exchange for gifts of salt, rice, tea, sugar and solar panels (**Figure 7.4.2, Appendix III**), Tsumbas will repay the kindness of the Chinese during or after the seven-year rations program with unskilled labor in road-building in the area – perhaps even in Nepali territory.[81] To others, the picture is about Chinese control of Tibet: to use that sense of loyalty as a means of tightening their border control with regards to illegal immigration and information dissemination.[82]

Figure 7.4.2 Sugar, tea, rice, and salt from the Chinese Rations Program

With the Chinese rations program now in place for the next seven years, we might expect that many people, even those aware and wealthy enough to choose to pay for the Nepali salt, will likely still consume their Tibetan salt first before spending any additional money. On top of buying additional salt in the cumbersome fashion described above, a family would also have to discard the salt given them from the Chinese rations program. It should be noted that there may also be a cultural cost associated with rejecting gifts-given in Tibetan society. In other words, the

[81] Nyima Lama, 2010
[82] Confidential Interview, 2010.

cultural unacceptability of rejecting gifts may encourage people to swallow the non-iodized rations salt.

Before concluding, however invalidly, that the Chinese are intentionally undermining the efforts of the Nepali Ministry of Health and the Salt Trading Corp. to achieve the USI of Nepal, we should reiterate China's inability to control the iodine content in their own western provinces.

7.4.3 Responding to the Chinese Rations Program

The Salt Trading Corp., as stated earlier, strives to maintain that all the salt that is consumed in Nepal, not sold, is iodized.[83] The reason for making this distinction is that, aside from ensuring that all the salt that enters Nepal is properly iodized (there are few places in Nepal with sufficient natural resources for the mass production of salt), the company seeks to ensure that all the salt that loses its initial iodine content once within Nepal's borders is re-iodized at or above the legal requirement. Due to "mismanagement" at many levels of production and distribution, salt can sometimes take up to a year to arrive at its predetermined location - be it the Nepali border, a retail center, or a family household.[84] In these cases, re-iodization is necessary.

Mobile salt iodization plants are the preferred method for re-iodization of salt within the country. This is because mobile plants are relatively effective means for re-iodization where access is possible, while they also impose few costs on retailers and consumers. As opposed to seizing old salt and shipping it back to manufacturing plants in the industrial centers of the country, thereby restricting businessmen and households from their immediate capital-related and nutritive needs, mobile salt iodization plants allow the Salt Trading Corp. to re-iodize "old" salt and simultaneously allow consumers to carry on their own business, free from much inconvenience. The seizures are temporary and re-iodization is free of charge to all persons, who may or may not be at fault of mismanagement.[85]

[83] Pankaj Joshi, December 2, 2010.
[84] *Ibid.*
[85] *Ibid.*

7.5 Iodine Monitoring in Tsum

One of the flaws with the current system of iodine monitoring in Nepal is that in mountainous regions like Tsum, systems of iodine monitoring are seldom. The Salt Trading Corp., along with the Nepali government, conducts random salt sampling throughout the country at all times of the year. However, there are not enough audit bodies surveying the Tsum Valley as evinced by the fact that during our interview with Pankaj Joshi, we found that the Salt Trading Company was not aware of: i) the Chinese rations program; and ii) that many households are using Tibetan rock salt, and not Nepali salt. Thus, the frequency of random salt sampling and visits by general monitoring bodies in Tsum is not high enough.

With regards to the problem of open borders in Tsum, it's clear that since goods are permitted to pass freely across the border, and people partially so, some regulatory device is necessary to ensure the healthy iodine consumption of Tsumbas. Without information, the entire iodization apparatus falls apart. For example, in order to know where to send mobile salt iodization plants, one needs to know where the non-iodized salt is located! Therefore, the establishment of customs posts along all of the ten border districts (those receiving Chinese rations and with close market interactions with areas of China at risk to iodine deficiency) at any level of organizational sophistication would be extremely beneficial for the monitoring capabilities of those willing to combat IDDs in the Himalayas. In regards to the Chinese rations program, it is essential that such posts are established in these areas. Supplied with a pencil and paper and a nearby telephone, posts like these could be of much benefit for Tsumbas with regards to iodine deficiency because of the problems associated with various market structures and the distribution of non-iodized salt as a result of the rations program.

Aside from the difficulties associated with establishing customs posts along the northern borders of Nepal (e.g. political will, logistic difficulties, and the likely costs associated with unwilling Tsumbas), there are also the challenges of bringing mobile salt iodization plants into the Himalayan regions. The definition of mobile must be vastly extended to address the iodine needs of people in these areas. Without the establishment of roads, mobile salt iodization plants will have to be borne on the backs of porters and pack animals, or via helicopter transport. This type of intervention should be conducted as often as possible, as non-iodized salt is continuously

brought in from China throughout the year. Furthermore, seizure of non-iodized salt for re-iodization in the lowlands would repeat the same problems associated with iodine leaching and should not be taken seriously.

7.5.1 Audit Bodies and Monitoring Techniques

In addition to customs check points along the border of Tibet, further monitoring processes regarding health should be established and maintained in these regions. Every five years, the UN conducts a general survey of Nepal containing methods of monitoring iodine deficiency. From January to April of 2011, they will travel throughout the country, including the Himalayan regions conducting random salt sampling and counts of visible goiters. However, these teams should rely on urinary analysis also, otherwise subtler effects of iodine deficiency will not be picked up in the data. According to the WHO's 2007 report, "Assessment of iodine deficiency disorders and monitoring their elimination: A guide for program managers":

> Once a salt iodization programme has been initiated, the principal impact indicator recommended is the population median urinary iodine level. Changes in goitre prevalence lag behind changes in iodine status, and therefore cannot be relied upon to accurately reflectcurrent iodine intake.[86]

However, a health center should also be established in the valley in the long term as a means to monitor the presence of IDDs. Such a health care facility should be able to provide those already suffering from IDDs with relief, as well as develop research on the most effective means for removing the endemic malnutrition from the valley.

7.6 Awareness of the Importance of Iodine

Another one of the central impediments to USI in the Tsum Valley is a lack of awareness of the general benefits of iodine for the human body and for neonatal development.

[86] Bruno de Benoist,. "Assessment of iodine deficiency disorders and monitoring their elimination: A guide for program managers" 2007. WHO, UNICEF, ICCIDD

One goiterous subject in Chhogang, of visible mental retardation, though still a working member of the community, stated without preemption that the goiter on his neck was the result of eating his own phlegm as a child. Though his explanation is incorrect, one must consider the circumstances whereby he would come to think such a thing and choose to spread the idea.[87]

Another Chhogang resident expressed his choice of Tibetan rock salt over Nepali salt because of the better taste.[88] This becomes an added cost to changing salt types comes from the process of habit forming and changing. In the words of Richard Posner, "Behavior is habitual when it is done without conscious thought, or more precisely with limited thought. "More technically, behavior is habitual when cost and benefit are time dependent and cost is negatively related to time and benefit positively related to it."[89]

More gravely, Kunzang, the amchi at Domche, was also unaware of the relationship between iodine and health, including its necessary role in the development of the fetus and young children, as well as its relationship to goiter development.[90]

There are conflicting perspectives on the best way to educate people in Himalayan regions with regards to healthy lifestyles, iodized salt storage and food preparation. Pankaj Joshi, of the Salt Trading Corp., is of the vein of reasoning that because children are the only ones in these regions to have gone, or are still going to school, they are the best target for iodine awareness programs.[91] Jaap Maljers, a medical entrepreneur, suggested that educating young women is the best strategy for improving the health quality of people in remote areas like these because "they are the ones who control the food."[92] In light of the observed cultural aspects of people in these regions regarding food preparation and the relative simplicity of proper iodine use, the latter appears to be the better option. However, one should note that the absence of well-established

[87] Anonymous, interview by authors, Chhogang, November 16, 2010.
[88] Lobsang Yeshi, 2010.
[89] Richard Posner, Gary S. Becker, "Uncommon Sense: Economic Insights, from Marriage to Terrorism," 2009. The University of Chicago Press.
[90] Kunzang, interview by authors, Domche, November 15, 2010.
[91] Pankaj Joshi, December 2, 2010.
[92] Jaap Maljers, interview by authors, Logpag, November 14, 2010.

women's groups in Tsum might make this course of action less successful than it would be in similar regions, as in Nubri, for example.

Another approach used by the Ministry of Health and the Salt Trading Corp. is to celebrate February as iodine awareness month. Throughout the month, education programs for students and social workers are conducted to carry the social message about salt throughout Nepal. However, there is little evidence to suggest that these programs have been a success in Tsum. The need for iodine advocacy programs in Tsum is very great. Therefore, special effort should be made to extend iodine awareness programs into the Tsum valley.

In regards to all these factors, several suggestions should be adopted to improve the health condition of Tsumbas with regard to healthy iodine consumption (**Box 7.3.1**).

Box 7.3.1: Suggestions for the reduction of IDDs in Tsum

- **Logistical**
  - Streamline methods for getting salt into the valley quicker
  - Establish a customs post with direct contact with the mobile salt iodization plants
  - Health education should be conducted for young women and mothers
  - Since we cannot rely on the political situation to change, more directed efforts like those of the Salt Trading Corp. should be encouraged, especially improvements in mobile salt iodization.
  - In the event that USI is unable to compete with the numerous detrimental market forces, iodine oil injections should be administered from a primary health care facility. The facility will be better maintained if the tourism industry is established to maximally benefit the local people.
- **Political**

  Although it is unlikely that the Chinese will be able to iodize their rations salt expensively (i.e. 30-50ppm) based on appeals by the Nepali government, such an appeal should be made regardless, i.e. attempt to enforce political legislation from China that only salt iodized at the Nepali requirement of 30ppm will be allowed into Nepal, or block the rations program altogether.

8. Tourism

After fourteen years of appeals to the Nepali and Chinese government offices in Kathmandu, Nyima Lama, as president of the Tsum Welfare Committee (TWC), was finally able to open up Tsum to visitors in 2008.[93] Tourism in the Tsum valley is very appealing to many trekking groups, as evinced by the presence of several trekking agencies on reconnaissance treks throughout the valley during our visit.

Tsum has a unique character of combined religiosity and natural preservation. Throughout the valley, religious monuments are visible and abundant. And, due to its significance as an important Beyul, or hidden valley, the Tsumbas have fairly skillfully maintained the religious aspect of sustaining the area as a no-killing zone. Thus, the presence of evasive and endangered species like Blue Sheep, Himalayan Thar, and Musk Deer is very great.

Tourism relates to the physical wellbeing of the Tsumbas in its roles of income generation and outside interaction. With regards to iodine deficiency, increases in income from the tourism industry will likely increase the Tsumbas' demand for more varied foods. As their dependence on their own agricultural yield decreases, their food will come from more distant locations. If these foods come from iodine-rich top-soil locations, the presence of IDDs will likely decrease in Tsumba society. As we would hope from a theoretical analysis, Tsumbas do take opportunities to improve their health when their incomes increase and awareness of what adjustments can be made towards healthier lifestyles is present. This is evinced by the recent arrival of smokeless stoves in Upper Tsum. As iodized salt becomes less of a luxury item to Tsumbas, we can expect them to consume more of it, given that, relatively, it does not become even more expensive as they get wealthier.

Tourism also decreases remoteness, which thereby increases the willingness of doctors and professionals to visit and stay, however permanently, in the area. This is one of the essential difficulties faced by the various allopathic health posts located throughout the valley. On the one hand, this type of development is needed immediately. On the other, allowing tourism to become

[93] Nyima Lama, interview by the authors, Kathmandu, December 1, 2010.

established without the right direction would remove many of the aforementioned health benefits from arising. Tsum must not become "another Everest" in this regard. According to Rup Chandra Gurung, the window of opportunity for Tsum is merely ten years long.[94]

The proposition of Ghana Gurung and the World Wildlife Fund (WWF) to establish Tsum as the site for a premium tourism project is highly recommended, as it will reduce the stress of tourist volume on the population. These stresses are often associated with the actual trekking groups themselves and the numerous Nepali staff they employ.[95] If trekking is restricted to the environmentally and religiously minded, as well as those who may care about health care in the valley, trekking groups will hopefully take the responsibility of preservation as well.

The significance of Tsum as a beyul can be encouraged as well to improve the health of the Tsumbas while simultaneously increasing demand for religious tourism. For example, in paying respect to the various protective deities, several practices would be helpful for the improvement of health in the valley. First, hygiene itself is important for the observance of the deities.[96] Keeping the whole body clean, especially the mouth, a source of impurity, would be great for the Tsumbas' health additional to its religious value. Smoking cigarettes and drinking alcohol may also offend the deities.[97] These religious considerations would greatly reduce the risk of many illnesses faced by the Tsumbas.

Because Tsum has such a living Tibetan culture, and because of the Tsumbas preservation of Tsum as a sacred valley, the sufficient demand for such a product will likely develop strength over the next few years as knowledge of Tsum's uniqueness becomes more widespread, via word-of-mouth and the marketing of the Tsum Welfare Committee.

[94] Rup Chandra Gurung, interview by authors, November 17, 2010.
[95] Punya Parajuli, 2010.
[96] *Ibid.*
[97] *Ibid.*

9. Local Voices

Lobsang Yeshi, a resident of Chhogang, described that a good health care facility is one that is ready to help whenever a sick person comes to the post.[98] By this simple definition of a good health care facility, current available health care in Tsum Valley does not meet the needs of the locals. The lack of faith in local medical institutions is apparent.

Most locals and doctors interviewed expressed both interest and need for a larger hospital to take care of more serious diseases and emergency cases. However, if given the choice between development by building a road for motor vehicles into the valley or by building a large hospital, locals expressed more interest in the creation of the road.[99,100] With a new large, technologically advanced hospital, the people of the valley would be medically safer. However with a road, the possibilities of improvements are innumerable. The locals would have a better opportunity for economic advancements, there would be a faster commute from the remote valley to a large hospital, thereby also improving health care, and the valley would be less isolated. As Lhakpa Dorjyi expressed, he would rather have roads because he wants to know what is going on in the world and learn from 'Westerners' so that he can change his mind about the world.[101] The observed preference to roads over a hospital might imply that there is a lack of faith in the current health care offered in the valley. But we must also keep in mind that it might also be because health is not currently a priority to Tsumbas, whereas economic advancements are.

10. Conclusion

The health care situation in the Tsum Valley is complex and has much potential for improvement. Recent events regarding USI and the Chinese rations program suggest that in the ten border VCD districts of Nepal, iodized salt consumption may not be the best method for eliminating iodine deficiency disorders due in part to detrimental market structures and difficulties associated with transportation.

[98] Lobsang Yeshi, November 16, 2010
[99] *Ibid.*
[100] Kunzang, November 15, 2010
[101] Lhakpa Dorjyi, November 23, 2010

The current health care apparatus in Tsum is inadequate and health awareness is insufficient. Not only are the current structures unprepared to support the population in the difficulties faced by Tsumbas now, with the addition of strong forces affecting the risk of iodine deficiency disorders, the health care centers will not be able to sustain an even moderately healthy population.

Based on analyses of available medical facilities in Tsum, after considering the opinions and awareness of the local people, it seems that the best way to improve health care is to establish well-managed, sustainable primary health care centers. As Patrick Beresford, a volunteering doctor of PHASE suggested, "Incremental health care [is] better for the long run," meaning that a health care system that builds slowly from the basics has a better chance of being sustainable in the coming decades. Because current economic conditions in the valley would not be able to sustain a hospital, a primary health care center could provide for a strong foundation to build upon for the future of health in Tsum. These centers should also come with plans to spread awareness and knowledge of diseases because simple adjustments of sanitation, alcohol consumption, and nutrition would greatly improve the health of Tsumbas. Further improvements of health facilities should be able to be maintained by economic income from limited tourism.

Because the forces which aggravate iodine deficiency are much more difficult to adjust, given the current political environment in Nepal and China (TAR), iodine oil injections should be considered seriously as the best alternative. Furthermore, because they require a functioning and reliable health care system, the factors affecting the economic development of the valley must be considered. The recurrence of iodine deficiency disorders in the Tsum Valley could possibly create a four-fold vicious cycle due to the effects of iodine deficiency on brain development (**Figure 9**).

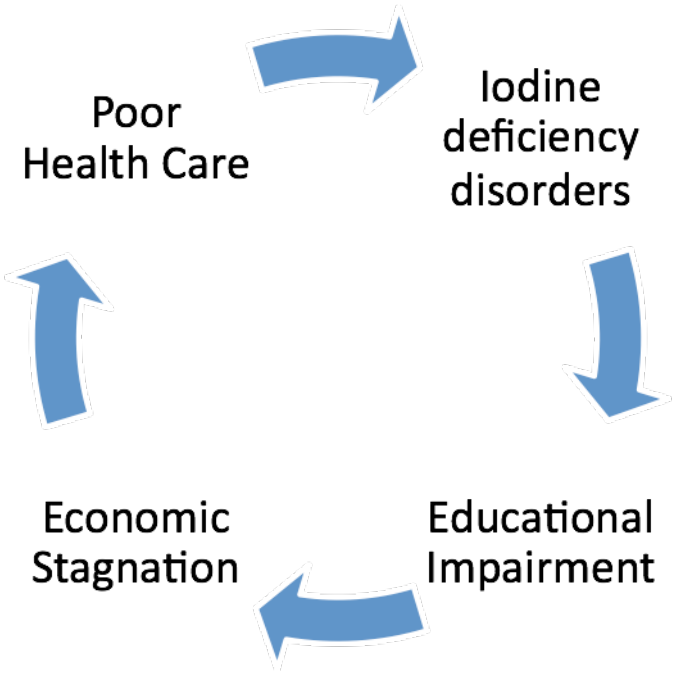

Figure 9. A four-fold vicious cycle of Iodine Deficiency Disorders

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APPENDIX I: TREKKING LOG: Heading North- One Way

Day	Locations[102]	Date	Hours	Notes
1.	Kathmandu—Arughat	08/11/2010	8h 10m	By bus
2.	Arughat—Soti Khola	09/11/2010	3h 30m	Lunch
	Soti Khola—Liding		30m	Stayed the night
3.	Liding—Machha Khola	10/11/2010	4h 45m	Lunch
	Machha Khola—Tatopani		2h 15m	Tatopani: hot spring, stayed the night
4.	Tatopani—Yaru Khola	11/11/2010	3h 40m	Lunch
	Yaru Khola—Jagat		1h 15m	Jagat: checkpost for MCA, stayed the night
5.	Jagat—Philim	12/11/2010	3h	Lunch, Last stop for Nepali rations paid by the government
	Philim—Logpag		3h 35m	Stayed the night, first village in Lower Tsum
6.	Logpag—Ts'humning	13/11/2010	4h 15m	Chinese rations dropped off at head of village's home
7.	Ts'humning—Goenpa	14/11/2010	3h 5m	All uphill, two very old monasteries in Goenpa
	Goenpa—Yarchog		40m	Yarchog: where no tourists have ever gone
8.	Yarchog—Relzam	15/11/2010	1h 15m	Relzam: Empowerment
	Relzam—Domche		1h 30m	Stopped for interview with Ani Kunzang
	Domche—Relzam		40m	Stayed the night
9.	Relzam—Chhogang	16/11/2010	2h 30m	Stayed the night, horse festival
10.	Chhogang—Ngakyu	17/11/2010	4h	Stayed the night
11.	Ngakyu—Nyinloe	18/11/2010	3h	Stayed the night inTranslator's home
12.	Nyinloe—Mu Goenpa	19/11/2010	1h 30m	Full Moon
13.	Mu Goenpa—Ngoenlha Grochen	20/11/2010	6h	Travelled by horses

NOTE: On the way down our team only took two days to walk from Logpag to Arughat, walking about 12 hours each day

[102] Nepali village names based on Shangri-la Maps 2009, Tsum village names based on local language. (See pp. **12**)

APPENDIX II: List of Interviewees

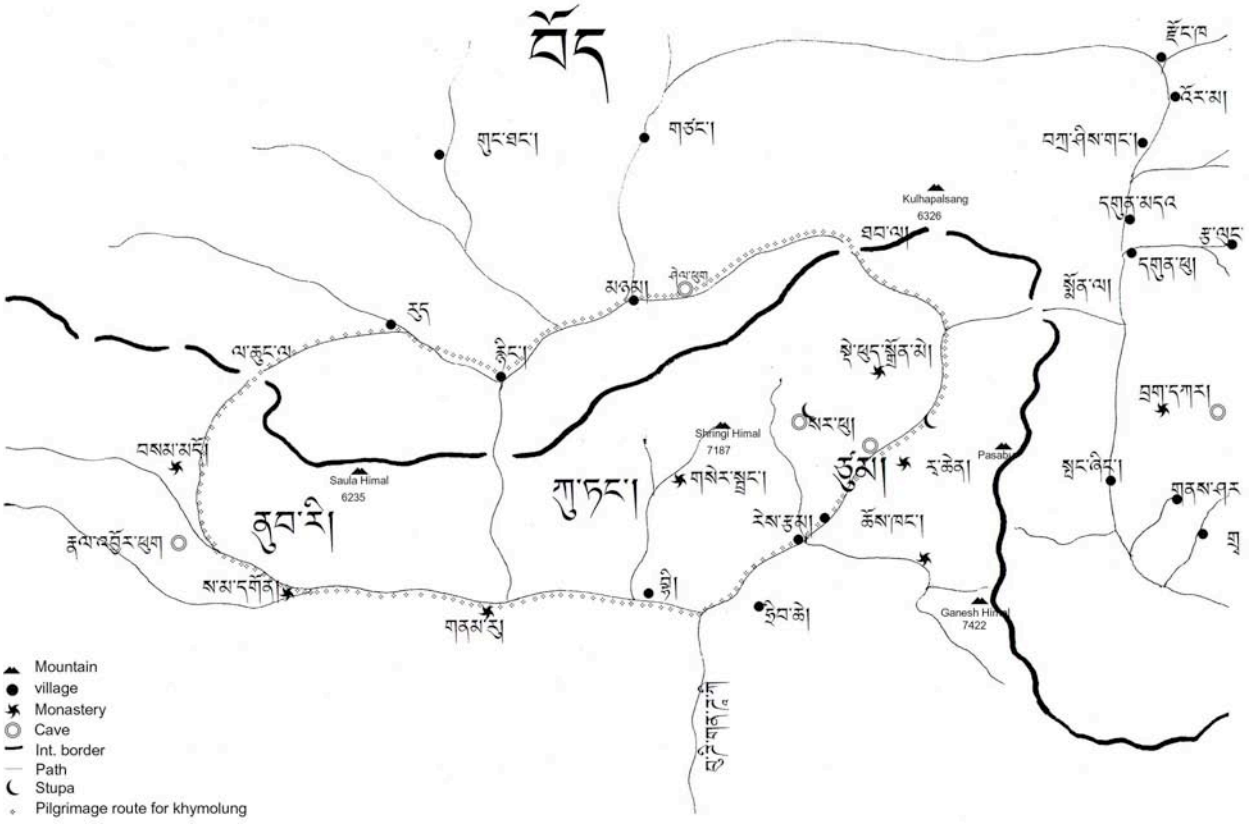
Location of Interview	Name of Interviewee	Relevant Affiliation	Date of Interview
Philim	Mr. Janga Bahadur Gurung	Third Degree Labor Government Officer	12/11/2010
Logpag	Dr. Jaap Maljers	Trekker, Medical Entrepreneur	12/11/2010
Ts'humning	Mr. Gopal Lama	Head of Ts'humning, Ex-Representative of Nepal Congress, President of Health Clinic Committee	14/11/2010
Domche	Ani Kunzang	Amchi- Shen Phen Clinic, Domche	15/11/2010
Chhogang	Mr. Lobsang Yeshi	Resident of Chhogang Village	16/11/2010
Chhogang	Mr. Rub Chandra Gurung	Head of Himalayan Ecological Trekking	17/11/2010
Chhogang	Dr. Patrick Beresford	PHASE Nepal Volunteer Doctor	22/11/2010
Chhogang	Ms. Kalpana Sunuwar	PHASE Nepal Nurse from Dolkha	22/11/2010
Chhogang	Mr. Namgyal Lama	Government Health Post Health Assistant	22/11/2010
Domche	Mr. Lhakpa Dorjyi	Senior of Domche Village	23/11/2010
Upper Tsum	Mr. Mingmar Lama	Translator, Resident of Nyinloe Village	15-23/11/2010
Bouddhanath	Lama Sherab Rinpoche	Founder of Tsum Shen Phen Clinic, Nyinloe and Shen Phen Clinic, Domche; affiliated with Kopan Monastery	30/11/2010
Swayambunath	Mr. Nyima Lama	President of TWC	01/12/2010
Bouddhanath	Mr. Punya Parajuli	Beyul Expert, Ecotourism in Yolmo	01/12/2010
Kathmandu	Mr. Pankaj Joshi	Division Manager of Salt Trading Corporation Limited	02/12/2010

APPENDIX III: Receipt from Chinese Tea Rations

(Translation provided by Pasang Dorje)

APPENDIX IV: Map of Khymolung, Sacred Valley of Happiness

(Sketch courtesy of Tenzing Lhundub)



Suggested Future Research

- Iodine deficiency disorder prevalence in Tsum using palpation and urinary sampling methods
- Effect of Chinese border closings on economic decisions of Tsumbas
- Geographical analysis of income as it relates to proximity to border and to land fertility
- Impact of awareness campaigns on sanitation behavior
- Impact of tourism on the economy and subsequent influence on health care sustainability
- Effectiveness of training locals to become medical personnel
- Effect of introducing maternal medical care into Tsum Valley
- Health effects associated with traditions of incestuous-marriage and polandry

Julian Goetz, Madeline Frost, Vanessa Soetanto (Tsum Crew 2010)