

**Report on Environmental Assessment and
Environment Management Plan for Nagaland
Multi-sectoral Health Project (NMHP) (P149340)**

ABBREVIATIONS

ANM	Auxiliary Nurse Midwife
BMW	Bio-Medical Waste
BMWM	Bio-Medical Waste Management
CHC	Community Health Centre
CMO	Chief Medical Officer
DH	District Hospital
DH&FW	Department of Health and Family Welfare
EA	Environmental Assessment
EE	Executive Engineer
EPA	Environment Protection Act
HCMC	Health Centre Management Committee
HIV	Human Immune Deficiency Virus
ICT	Information and communication technology
IEC	Information Education & Communication
EMP	Environmental Management Plan
IMEP	Infection Management and Environment Plan
KMC	Kohima Municipal Corporation
MMU	Mobile Medical Unit
MO	Medical Officer
MOEF	Ministry of Environment and Forest
NFHS	National family and Health Survey
NGO	Non Governmental Organization
NPCB	Nagaland Pollution Control Board
NRHM	National Rural Health Mission
OT	Operation Theatre
PHC	Primary Health Centre
PIP	Project Implementation Plan
PMU	Project Management Unit
SC	Sub Centre
SRS	Sample Registration Survey
TOT	Training of Trainers
UHC	Urban Health Committee
UT	Union Territory
VHC	Village Health Committee

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1.0 INTRODUCTION

1.1 Background

Nagaland has a population of approximately 2 million (0.16% of India's population), spread over 11 districts, 74 blocks and 1,502 villages. The State has a population density of 119 persons per sq.km, compared to the national average of 382 per sq.km. and to an average of 176 per sq.km. for the north-eastern states of India. It is one of the five least densely populated states in India (the other states/ UTs being Sikkim, Mizoram, Arunachal Pradesh and Andaman and Nicobar Islands).

Scheduled Tribes form an overwhelming majority of the state's population. About 86.5%¹ (93% in rural areas) of Nagaland's population is tribal belonging to 16 tribes with many sub-tribes and clans. Each tribe has its distinct socio-cultural practices and exhibit strong bondage. The 16 major tribes include Angami, Ao, Chakhesang, Chang, Khamniungan, Kuki, Konyak, Kachari, Lotha, Phom, Pochury, Rengma, Sumi, Sangtam, Yimchungr, and Zeliang along with other sub-tribes.

The state is predominantly rural with about 71% population living in rural areas. The population density is about 119 persons per sq. km. with a sex ratio of 931 compared national averages of 940. The population density varies from low of 76 in Tuensang, Longleng and Khiphire to the high of 410 in Dimapur.

The literacy level in Nagaland is much higher than the national average. The overall literacy in Nagaland is 80% with male literacy being 83% and female literacy being 76% compare to national average of 74%, 82% and 65% respectively. 72% percent of the children between the ages of 6-17 years attend school. In contrast to several other states in India, there is a consistent, if slight, gender disparity in school attendance in Nagaland in favour of girls. In all the three age groups and in both urban and rural areas, school attendance is higher for girls than for boys **Error! Bookmark not defined.**

The economy in Nagaland is largely agrarian (72%), following traditional practices. The workforce participation ratio is about 58% (72% including marginal workers). The workforce participation is much higher in rural areas (64%) compared to urban areas (43%). The women participation in workforce is also quite high about 52.5% women (62% in rural areas and 30% in urban areas) are working. Of the total workforce about 44% are women.

The population below poverty line is about 32.67% compared to national average of 37.2%. The Gross State Domestic Product (GSDP) of Nagaland is Rs. 9,871 crores in 2012-13 (at constant 2004-05 prices) with about 55.4% being contributed by service sector followed by 27.5% being contributed by agricultural sector and only about 3% being contributed by manufacturing sector². The per capita income of Nagaland in 2011-12 is Rs. 41,522 (at

¹ As per Census 2011

² http://planningcommission.nic.in/data/datatable/1612/table_61.pdf

constant 2004-05 prices) compare to national average of Rs. 38,005 (at constant 2004-05 prices)³.

Among the externally aided project in Nagaland, World Bank's North East Rural Livelihood Project (NERLP), Nagaland Afforestation and Eco-development Project is funded by Japan International Cooperation Agency (JICA) and NE Capital Cities Development Investment Program by Asian Development Bank (ADB) are the ongoing programmes. In addition, according to FCRA wing Ministry of Home Affairs, Govt of India, NGOs in Nagaland received about 28 crore in the year 2011-12⁴.

1.2 Health Status in Nagaland

Infant mortality rate, as of 2013, has been estimated to be 18 per 1,000 live births (SRS 2013); maternal mortality ratio has been estimated to be 240 per 100,000 births as of 2007⁵, with malnourishment (stunting) amongst under-five children estimated to be 39% from data available for 2005-06. Data from UNICEF Coverage Evaluation Survey of 2009 indicates only 27.8% children of the age of 12-23 months are fully immunized, 40.6% partially immunized and about 31.6% did not receive any vaccination at all. 9.5% of the children immunized belong to the poorest families. Only 31% of births in the state are institutional deliveries.⁶

Crude Birth Rate is 15.6 compared to Crude Death rate of 3.2 per 1,000 population. At current fertility levels, a woman in Nagaland will have an average of 3.7 children in her lifetime. The fertility level in Nagaland is the fourth highest among all Indian states and the second highest among all North-eastern states⁷.

Health Indicators	Total	Rural	Urban
Crude Birth Rate (Per 1,000 population) (SRS 2013)	15.6	15.7	15.1
Crude Death Rate (Per 1,000 population) (SRS 2013)	3.2	3.4	2.8
Infant Mortality Rate (Per 1,000 live birth) (SRS 2013)	18	18	18
Total Fertility Rate (2004-05)	3.7	4.2	2.7
Maternal Mortality Rate (per 100,000 live births) ⁵ (2007)	240		

At household level allopathic system of medicine is generally used by about 92 percent of the population.

1.3 Health Care Infrastructure in Nagaland

³ <http://pbplanning.gov.in/pdf/Statewise%20GSDP%20PCI%20and%20G.R.pdf>

⁴ Receipt and Utilization of Foreign Contribution by Voluntary Associations, FCRA Annual Report 2011-12, Ministry of Home Affairs, Govt of India

⁵ <http://nrhm.gov.in/images/pdf/monitoring/crm/4th-crm/report/nagaland.pdf>

⁶ NFHS-3 (2005-06)

⁷ NFHS-3 (2005-06)

As of 2012-13, Nagaland has 398 Sub-Centers (SCs), with each SC servicing a population of about 5,000⁸ or two villages. The mean distance between the SC and the farthest point of a village is approximately 6 kms. Over 62% of the SCs in the state are not accessible by motorized transport.⁹

The state has 130 Primary Health Centres (PHCs), with each PHC servicing a population of approximately 15,700. The farthest distance to a PHC is 15 kms. Data from the Directorate of Health and Family Welfare indicates that 25% of the PHCs (33 in number) have three staff nurses each and function 24X7.

Twenty one Community Health Centres (CHCs) provide round the clock services in the state, with each CHC servicing a population of approximately 94,000. The farthest distance to a CHC is 31 kms; the district of Longleng alone does not have a single CHC.

Table (2): Population Per Health Facility				
District	Population Per			
	District Hospital	CHC	PHC	SC
Longleng	50,593		16,864	6,324
Kephrie	74,033	74,033	18,508	3,896
Pheren	94,954	94,954	11,869	5,935
Zunheboto	1,41,014	70,507	10,847	3,000
Phek	1,63,294	54,431	7,100	3,798
Wokha	1,66,239	83,120	13,853	4,493
Mokokchung	1,93,171	64,390	13,798	3,788
Tuensang	1,96,801	98,401	16,400	5,179
Mon	2,50,671	1,25,336	16,711	5,013
Kohima	2,70,063	90,021	19,290	6,752
Dimapur	3,79,769	1,89,885	47,471	8,080
Nagaland	1,80,055	94,314	15,719	5,002

Source: Nagaland NRHM PIP 2012-13

Each district in Nagaland is supported by a district hospital, which is often designated as a first referral unit. Also, a functional Mobile Medical Unit (MMU) is available in all eleven districts.

Distribution of health facilities across the districts is not even, with the districts of Peren, Longleng and Kiphire particularly lacking in basic and primary health facilities.

⁸ Nagaland NRHM PIP 2012-13

⁹ NRHM CRM Report, 2009

Table (3): District wise Health Care Infrastructure in Nagaland (2012-13)

Sl. No.	District	Health units					Total
		District Hospital	Community Health Centre	Primary Health Centre	Dispensary	Sub- centre	
1	Kohima	1	3	14	-	40	58
2	Dimapur	1	2	9	1	51	64
3	Mokokchung	1	3	16	2	39	61
4	Tuensang	1	2	13	-	50	66
5	Zunheboto	1	2	13	-	44	60
6	Wokha	1	2	12	-	37	52
7	Phek	1	3	23	-	47	74
8	Mon	1	2	15	-	47	65
9	Peren	1	1	8	-	16	26
10	Longleng	1	-	3	-	8	12
11	Kiphire	1	1	4	-	19	25
Total		11	21	130	3	398	563

Source: Department of Health and Family Welfare, 2014

Adequacy of man power is always a problem in delivery of services in Nagaland especially the doctors that limit the delivery of services as required. In case of PHCs, as of March 2012, only 78% have Doctors (67% with at least one doctor and 11% with two doctors); 47% PHCs have no Lab technicians and 23% without Pharmacists. Also, only 14% PHCs have lady doctor. Also, majority of CHCs (95%) do not have Surgeons and/or Gynaecologists as required. Similar is the case with specialists at CHCs. Services are further limited with availability of infrastructure e.g. only about 17.2% Sub-Centre has ANM quarter, only 81% PHCs have labour rooms, 31% PHCs have minor Operation Theatres and 25% PHCs have referral transport.

Geographic accessibility, as well as availability and quality of services, are key challenges faced by the state. Over 80% of the population lives in rural areas while health facilities are available in only 42% of villages in the state. The state and central governments have made significant investments in infrastructure, mobile medical units, human resources, and demand side interventions to improve access to and availability of public health care.

Despite these continuous efforts, majority of the health facilities are challenged by the availability of basic facilities like water supply, power and sanitation, preventing optimal provision of services. On availability of infrastructure in the health facilities, the data indicates that majority of the Sub Centre (97%), PHCs (95%) and CHC (100%) are function in government buildings and rest on rent free premises given by Village councils¹⁰. In

¹⁰ Rural Health Statistics of India, 2012, Ministry of Health and Family Welfare, Govt. of India

Nagaland, about 51% SC and 16% PHCs do not have regular water supply. Similarly, about 44% SC and 14% PHC do not have electricity supply. Also, a third of the SCs and a fifth of the PHCs are not approachable with all-weather motorable road. These facilities are quite low compared to national average. Even though, facilities those which have access to water supply and electricity including CHCs and District Hospitals) often complain about its adequacy for proper delivery of services. Primary visit to some of the health facilities suggests that in absence of adequate water supply and/ or adequate electricity supply, delivery of some services are either reduced or temporarily shut down.

Table (4): Status of Basic Facilities at SC and PHC in Nagaland		
	Sub-Centre	PHC
In Nagaland		
Without regular Water Supply	51.3%	15.9%
Without Electricity Supply	43.9%	14.3%
Without all-weather motorable approach road	32.8%	24.6%
All India Average		
Without regular Water Supply	25.5%	10.7%
Without Electricity Supply	25.5%	8.0%
Without all weather motorable approach road	6.6%	5.8%
Source: Rural Health Statistics of India, 2012, Ministry of Health and Family Welfare, Govt. of India		

1.4 Communitisation in Health

Subsequent to the enactment of the “Nagaland Communitisation of Public Institutions and Services Act, 2002”, the Department of Health and Family Welfare has leveraged the communitization strategy to build public ownership of public health care in the state. Communitisation calls for a partnership between the government and the community with the objective of promoting and protecting the health and well-being of the people in the state with the active participation of the community. The community is represented by the various health committees organized at the grassroots level, including the Village Health Committees (VHCs), Urban Health Committees (UHCs), and the Health Centre Management Committee (HCMCs). The health institutions in rural areas were the first to be communitised. As of date, all public health facilities in the state, with the exception of DHs, have been communitised. With the communitization process, the health committees are called upon to exercise their supportive role in the four main areas of (1) administrative, financial and technical management of CHCs, PHCs and SCs; (2) preventive health care; (3) Promotion of indigenous medicine; and (4) mobilization of local resources for improved service delivery. The active involvement of the community in the functioning of the health facilities has resulted in community ownership of the assets in health care service provision created by

Government and led to an improvement in the availability of health care personnel, maintenance of health facilities, and availability of medicines¹¹.

2.0 THE CURRENT PROJECT

The project aims to contribute to overall health sector development in the state. The project development objective (PDO) is *to improve health services and increase their utilization by communities in targeted locations in Nagaland*. The key result areas of the project include:

- Increase in utilization of basic health services, such as immunization, antenatal care and outpatient consultations (disaggregated by gender). This is intended to reflect the results of the range of activities in different areas supported by the project.
- Improvement in HNP-related behaviours by targeted communities (i.e. hygiene, breastfeeding and weaning practices, care and nutrition of pregnant mothers). This is an indicator of the results of project support to community-level activities, which will include mobilization to improve health, nutrition and hygiene-related behaviours.
- Increase in availability at targeted health facilities of reliable electricity, safe water supply and adequate sanitation. This is intended to reflect results of investments to improve conditions in health facilities.
- Planned human resource and supply chain management are functional. This is intended to reflect results of project support to development of key components of the government health system.

The Key components of the project are:

Component 1: Community-level capacity development and investments

This component will encompass support to community engagement and management of health services, as well as to community-level interventions in several sectors with an impact on HNP services and outcomes. The component will support capacity-building of Village Health Committees as well as provide results-based financial resources for the community to make investments to improve HNP services and in areas with the potential to affect HNP outcomes. Training and ongoing support to Village Health Committees will improve their capacity to oversee and manage health services as well as to manage implementation of project-financed investments. The project will support increased representation by women and foster the involvement of women's self-help groups. Grants to Village Health Committees will be disbursed on the basis of measurable (and verified) results in matters that have an impact on health and nutrition. Examples could include: increase in the number of children fully immunized in the community, increase in the number of households who practice safe hygiene behaviours, increase in knowledge of good nutritional practices and other care for pregnant women in the community, etc.

In turn, Village Health Committees would be empowered to use the grants and other

¹¹ An Impact Evaluation Study on Communitization in the Health Sector, 2009. Department of Health and Family Welfare, GoN

available resources (i.e. from other government programs) for investments that are priorities for their communities and which have potential impacts on health and nutrition. Examples could be improving community water supply, improving sanitation facilities, investing in health and nutrition service infrastructure and equipment, incentivizing health and nutrition workers, mobilizing the community to improve health and nutrition-related knowledge and behaviours, etc.

Component 2: Improvements in health facility power supply, water supply and sanitation

This component will finance investments in off-grid electricity supply, water supply and sanitation in targeted health facilities. Investments in off-grid power solutions will be adapted to the needs of each facility to assure a basic level of functioning (i.e. lighting and high priority equipment). In larger facilities, (PHCs, CHCs and District Hospitals) solar energy technology will be needed, while smaller facilities, particularly sub-centers, will only require battery and inverter systems that can be charged by the grid when it is available. Peak energy needs (i.e. for some types of equipment such as x-ray machines) cannot be met by off-grid solutions and so a combination of power from the grid and existing diesel generation sets will be used. Detailed technical assessment of each targeted facility will be done to inform implementation by a contracted supplier that will ensure supply and installation of equipment, repairs and maintenance, and necessary training. Training of health workers and Village Health Committees will foster their involvement and support for ongoing operations and maintenance.

Implementation of water and sanitation investments in health facilities will be decentralized to Village Health Committees. Financing of these investments is additional to the results-based grants under Component 1, but the same implementation, support and monitoring mechanisms will be used. Technical support contracted at the state level will provide guidance to Village Health Committees on implementation of water and sanitation investments, starting with detailed technical assessment of each targeted health facility. Improvements will include setting up roof- and rain-water harvesting and storage, making repairs and improving piped water connections (most of which are linked to springs or streams that serve the entire community), and improving toilets and sanitation infrastructure. Implementation by Village Health Committees will foster local ownership of the investments, crucial to sustained operation and maintenance.

While directly improving the quality and attractiveness of health services, these planned investments in alternative power and green water and sanitation facilities may have potential community-wide benefits in terms of demonstration effects as well as ensuring services (particularly reliable electricity) that may not be available elsewhere in remote communities.

Component 3: Health System Development

This component will support development of key parts of the health system that will improve the management and effectiveness of government health services in Nagaland, with a focus on state-level systems. Development of the health supply chain management system will include improving planning and ordering, procurement, quality assurance, stock management, distribution, storage, and reporting and information systems. Along with required policy and process improvements, including adoption of standard operating procedures, investments will encompass training, equipment and warehouse improvements. The project will also support investment in ICT systems to improve management and

delivery of health services. On the basis of an integrated platform, priority systems adapted to the Nagaland context will be developed, including ICT applications for supply chain, financial and human resource management. Program management applications will be designed to improve existing reporting and monitoring, notably in order to reduce the reporting burden on front-line health workers, while a helpline will be established in order to support both health workers and patients. This component will also contribute to addressing health human resource constraints, including improving human resource management and supporting implementation of a health human resource strategy for the state that is currently under development. The project will support improvements in medical waste management under this component, as well as meet priority requirements for improving municipal waste management in several urban areas of the state. The project may intervene on other systemic components of the government health system as needs arise during the course of implementation, and will also contribute to addressing priority gaps in health service delivery in targeted locations that cannot be filled through community action under Component 1 or from other sources.

This component will also support rigorous monitoring and evaluation in order to ensure that lessons learned, notably on the community-level initiatives under Component 1, but also including health service and system development under Components 2 and 3, are captured. The required capacity to manage the project, as well as technical assistance and studies/evaluations needed during the course of implementation, will also be supported.

2.1 Potential Environmental Impact of the Project

Bio medical waste management is one of the key sub-components identified under the project for health facilities to improve medical waste management.

The project entails a range of minor civil works ,which include warehouse rehabilitation, upgrading of paramedical training centre, infrastructure repair/rehabilitation in targeted health facilities (including repair/ rehabilitation of existing buildings, modifications and extensions of existing buildings), medical waste management facilities (i.e. pits, incinerators), rehabilitation of Mokokchung District Hospital rehabilitation. Additionally, works may be undertaken to support investments to augment existing power, water and sanitation facilities.

Review of the proposed project suggests that mitigation measures must be adopted to manage the following environmental risks:

1. Non-compliance of repair, reconstruction and construction of new infrastructure with green/er building norms;
2. Improper access and water logging conditions affecting functionality of health facilities;
3. Inappropriate design leading to sub-optimal ventilation, drainage, water supply and sanitation;
4. Loss of trees during expansion of health infrastructure;
5. Improper disposal of construction waste;
6. Poor housekeeping and building maintenance (including seepage from ceiling and walls);
7. Unhygienic conditions;
8. Violation of safety standards in repair, reconstruction, and expansion of buildings in health care facilities; and
9. Poor bio-medical waste management at health care facilities.

2.2 Risks Due to Poor Bio-medical Waste Management

All health facilities have the primary responsibility of ensuring that ‘No Harm’ is done to its patients. Health facilities are a significant source of infections which may pass from one patient to another or from staff members to patients or from within its environment or from its neighbouring environment and facilities to users. The waste generated in health facilities is often contaminated by biological and chemical waste that results from its care and treatment interventions.

The key risks due to poor management of bio-medical waste include contaminations, passing on infections between beneficiaries, service providers, visitors to health facilities, waste handlers and an adverse impact on the environment including water, soil, air and surroundings due to improper disposal.

3.0 KEY LEGAL AND REGULATORY FRAMEWORK

In recent years, there has been a growing awareness of the need for safe management of hospital waste for effective health service delivery. The Department of Health and Family Welfare, Government of Nagaland is committed to implementing the National legislation and its amendments for management of bio-medical waste generated by its health facilities.

A. Regulatory Framework for Construction Safety

- **National Building Codes of India 2005:** Many of the building infrastructures related to the DH, CHC, PHC and SC may need repair, reconstruction and expansion. In case of any demolition, debris and dust control may be required as per the code.

B. Current Legal, Administrative and Operational Framework for Biomedical Waste Management in India

Policy and Regulatory Mechanism:

- **The Environment Protection Act (EPA) 1986:** The EPA is an umbrella legislation designed to provide a framework for environment protection of all activities.
- **The Bio-medical Waste Management & Handling Rules, 1998:** Implemented in India in 1998 through a notification by Ministry of Environment & Forest for safe handling, segregation, storage, transportation, treatment and disposal of bio-medical waste generated from health care establishments. These rules were amended in the years 2000 and 2003. The State Pollution Control Boards have been notified as the prescribed authority for implementing the provisions of these rules in their respective states/UTs. The Central Pollution Control Board advises the government and lays down procedures and standards for prevention of environmental pollution across the country.
- **National Guidelines on Hospital Waste Management, 2002:** Issued by the Ministry of Health & Family Welfare, Govt. of India. These guidelines include safety

measures, waste management, training and related administrative functions in hospitals and its environment.

- Infection Management and Environment Policy Framework, 2007: The Ministry of Health & Family Welfare commissioned the development of a National Policy document to address the issues relating to infection control and waste management and define a framework for implementation of an Infection Management and Environment Plan (IMEP) in healthcare facilities. This policy document was commissioned under the Reproductive and Child Health Program Phase - II, with technical and financial support from DFID and the World Bank. The final IMEP document comprises of 2 volumes:
 - A Policy Framework document which gives a broad overview and contains generic guidance to central and state level institutions on the type of systems and processes to be established for infection control and bio-medical waste management.
 - A set of Operational Guidelines which are designed as instruction manuals for healthcare workers at primary level healthcare facilities, i.e. Community Health Centres, Primary Health Centres and Sub Centres. These guidelines are in the form of simple pictorial presentations of the various steps needed to manage infectious waste in a hygienic, safe and environmentally sound manner.
- **Bio Medical Waste (Management and Handling) rules, 2011:** The Ministry of Environment & Forests has already gazetted and initiated the public notification process of its draft Bio-Medical Waste (Management and Handling) Rules, 2011. These rules have described the duties and responsibilities of occupier and operator in detail, besides the procedures for certification, authorization, monitoring etc. The changes made in the 2011 Rules which are relevant to this report are as follows;
 - It has been stipulated that every occupier of the healthcare facility shall set up the required biomedical waste treatment equipment's prior to commencement of its operation or make necessary arrangements through an authorized common bio medical waste treatment facility.
 - In the earlier rules, occupiers of an institution, which provided service to less than 1000 patients per month, need not take authorization from the prescribed authority.
 - Under the new rules, every occupier, irrespective of the number of patients served or the quantum of bio medical waste generated is required to obtain authorization.
 - Under existing rules, there was an overlap with regard to color coding and segregation of waste. Now, the color codes have been clearly specified to avoid confusion and overlapping (Table-5).
 - The number of categories of waste has been reduced from ten to eight. Color coding for non-infectious waste has also been prescribed.
 - Duties and responsibilities of the occupier including occupational safety and training requirements have been delineated in detail.
 - Similarly, duties and responsibilities of the operator of the waste treatment facility are also provided in detail.

- Use of chlorinated plastic bags for segregation of waste by the occupier and incineration of the same by the operator is prohibited under the revised rules.

A table of comparison giving details of classification of categories of waste as provided in the above Rules, 1998 and 2011 is appended as Annexure I.

Color coding	Type of container to be used	Waste category Number	Treatment options as per schedule I
Yellow	Non-chlorinated plastic bags	Category 1,2,5,6	Incineration
Red	Non-chlorinated plastic bags/puncture proof container for sharps	Category 3,4,7 (4-Waste sharps) (In the earlier rules, soiled wastes are for Red color)	Autoclaving/ Microwaving/ Chemical treatment /shredding
Blue	Non-chlorinated plastic bags container	Category 8(chemical wastes)	Autoclaving/ Microwaving/ Chemical treatment /shredding
Black	Non-chlorinated plastic bags	Municipal waste	Disposal in Municipal dump sites

4.0 THE CURRENT PRACTICE OF BIO-MEDICAL WASTE MANAGEMENT IN NAGALAND

4.1 Preliminary Assessment of Quantum of Bio-Medical Waste Generated in Nagaland

There are 11 District hospitals in Nagaland with bed strength ranging from 50 to 300. And 21 CHC with 30 beds each and 130 PHCs with average of 6 bed each. The total bed strength in District hospital is about 1,075, in CHC about 630 and in PHC about 846 beds.

Sl. No.	District	Health units			Total
		District Hospital	Community Health Centre	Primary Health Centre	
1	Kohima	300	90	84	474
2	Dimapur	150	60	48	258
3	Mokokchung	150	90	102	342
4	Tuensang	100	60	90	250
5	Zunheboto	50	60	108	218
6	Wokha	50	60	78	188

Sl. No.	District	Health units			Total
		District Hospital	Community Health Centre	Primary Health Centre	
7	Phek	75	90	138	303
8	Mon	50	60	102	212
9	Peren	50	30	54	134
10	Longleng	50		18	68
11	Kiphire	50	30	24	104
Total		1075	630	846	2551

Source: Department of Health and Family Welfare, Nagaland

Though there has been no proper assessment of bio-medical waste generated in Nagaland, the data from Naga Hospital in Kohima suggests that an average of 540 kgs of bio medical waste (from yellow, red and blue containers) is generated from the health facility each month. A preliminary assessment from Dimapur district hospital indicates that 1,600 – 1,700 kg of medical waste is generated each month. This suggests that bio-medical waste generated per in-patient bed per month is approximately 1.2 to 1.5 kg.

Sl. No.	District Hospitals	In-patients	OPD	Deliveries conducted at facility	C -Section deliveries at facility	Number of MTPs conducted at facility	Operation major (General and spinal anaesthesia)	Operation minor (No or local anaesthesia)
1	Kohima	5,774	91,720	1,696	259	16	1,633	2,675
2	Dimapur	14,827	1,29,567	2,946	577	79	3,136	19,504
3	Mokokchung	13,585	37,503	773	209	187	566	1,412
4	Tuensang	2,133	5,922	519	65	85	130	191
5	Zunheboto	917	8,173	371	44	26	100	125
6	Wokha	1,414	11,154	394	12	43	227	290
7	Phek	1,216	7,613	164	24	0	31	275
8	Mon	2,781	19,887	571	71	233	366	325
9	Peren	353	5,693	101	2	7	3	186
10	Longleng	688	5,081	209	0	1	0	77
11	Kiphrie	1,520	8,444	299	12	80	13	380

Source: Department of Health and Family Welfare, Nagaland

Services	Average CHC	Average PHC
Deliveries conducted at the Facility	87	17
Inpatient	230	18
OPD attendance (All)	3,460	1174
Operation major (General and spinal anaesthesia)	2	
Operation minor (No or local anaesthesia)	117	12
Total No. of Laboratory Testing	1,408	178
Source: Department of Health and Family Welfare, Nagaland		

Data extrapolation suggests that on an average a PHC in Nagaland generates about 2 – 5 kg of bio-medical waste per month, while a CHC on an average generates approximately 30 – 50 kg of waste each month. While the DH in Peren generates a low throughput of 30-50 kg of bio-medical waste in a month, DH Dimapur generates a high volume of bio-medical waste (1500 – 1800 kg per month). The table below presents a rough estimate of bio-medical waste generated by different district hospitals in Nagaland.

Sl. No.	District Hospitals	Kgs Per Month
1	Kohima	540 - 720
2	Dimapur	1500 - 1800
3	Mokokchung	1400 - 1700
4	Tuensang	220 - 270
5	Zunheboto	90 - 120
6	Wokha	140 - 180
7	Phek	120 - 160
8	Mon	280 - 350
9	Peren	30 - 50
10	Longleng	70 - 90
11	Kiphrie	150 - 190
Source: Estimated based on preliminary assessments from Kohima and Dimapur Hospital, February 2014		

4.2 Current Practices of Bio-Medical Waste Management in Nagaland

Visits to selected SCs, PHCs, CHCs and DHs indicate that most facilities have functional needle cutters and segregation of bio-medical waste in colour coded bins is practiced . At the SCs, PHCs and CHCs, the segregated waste (except placenta), once it surpasses the storage capacity of the health facility (after every 2-3 days) is mixed and burnt. Most health facilities are equipped with a burning pit or have dug shallow pits to burn the waste within the premises. Following traditional practices, in rural areas, the placenta is collected by the household and buried in respective homes. However, in urban areas, due to space constraints, placenta is buried within the premises of the health facility.



Merima Sub-Centre, Kohima



Pit used for burning all waste including bio-medical waste



Recently distributed coloured bins in Kimipfuphe PHC



Burning pit used in Kimipfuphe PHC for all waste including bio-medical waste



Viswema CHC



Burning pit used in Viswema CHC for all waste including bio-medical waste



Use of Colour coded bins along with list of materials for each bin in Naga Hospital, Kohima

The practice of disposal of bio-medical waste in district hospitals differs. Dimapur district hospital uses an incinerator which is functional. Not all district hospitals have incinerators and some have non-functional incinerators, such as the Naga Hospital in Kohima.

The Nagaland Pollution Control board (NPCB) and Kohima Municipal Corporation (KMC) since 2011 have collaborated to operationalize a bio-medical waste collection van, which collects bio-medical wastes from all public and private health facilities registered with NPCB every 2-3 days and charges Rs. 600 per 70 cubic feet of bio-medical waste. The waste is transferred to a designated dump site, where sharps are disposed in a special sharps pit and other waste (including anatomical waste) is deep buried. The burial site is located away from normal municipal waste dump sites and has fencing to prevent entry of animals.



Non-functional Incinerator at Naga Hospital at Kohima



Bio-medical waste collection van of Kohima Municipal Corporation

Bio-medical waste at the Dimapur DH is segregated and stored in an enclosed place for 3-4 days (see the photographs below) and once the storage capacity is exceeded, the waste is incinerated. Sharps are disposed off in a special pit created on the hospital campus. Remaining waste (including non-hazardous waste) is burnt. On an average, the incinerator (capacity of 50kgs/hour) runs for 3-4 hours after every 3-4 days.



Bio-medical waste stored for incineration at Dimapur Dist. Hospital



Incinerator at Dimapur District Hospital



Burning of waste at Dimapur Dist. Hospital



Pit for sharps at Dimapur Dist. Hospital

4.3 Areas of Further Study

Discussion with NPCB indicates that the current operating cost of incinerators installed at the Dimapur and Kohima DHs is Rs. 70,000 per month. Given the existing patient load, incinerators may not be cost effective proposition for waste disposal. Therefore, it is important to undertake a systematic assessment of quantum of bio-medical waste generated at each of health facility and devise customized options for bio-medical waste management (for both solid and liquid bio-medical waste). Even at the SC or PHC level the volume of bio-medical waste that is generated is very small as compared to the national average, this coupled with the mixing of waste after segregation and burning it in open pits in the hospital premises exacerbates the problem further. The proposed study will also need to look at these facilities and suggest solutions for dealing with the generated bio-medical waste.

5.0 ENVIRONMENT MANAGEMENT PLAN

The incorporation of environmental concerns during planning, designing, implementation and monitoring stages by formulating Environmental Management Guidelines will serve to enhance positive impacts and mitigate negative impacts in the development of the proposed project activities.

5.1 In support of green/er building design, the following environment friendly elements¹² for building may be considered:

- Reduce exposed, hard paved surface on site (open areas surrounding the building) and maintain native vegetation cover on site
- Passive architectural design and systems to reduce energy consumption and maintain comfort (courtyard, roof insulation, ventilators, etc.)
- Good fenestration design (design of openings such as windows, doors, etc.) for reducing direct heat gain and glare while maximizing daylight penetration
- Efficient artificial lighting system (reduce overall lighting power density)
- Thermal efficiency of building envelope (design external wall sections and select construction materials to reduce heat gain)
- Use of energy efficient appliances (use of appliances that have BEE star labeling of '3 Star' or more)
- Use of renewable energy on site (use of solar water heaters, solar lights)
- Reduction in building and landscape water demand (use of low-flow fixtures)
- Rainwater harvesting (rooftop rainwater harvesting for direct use through storage tanks or for recharging ground water through recharge pits) – unless the site has high groundwater table

¹² SVAGRIHA version 1.2, TERI and Adarsh, 2011

- Waste management (segregation and treatment/proper disposal of wastes including any biomedical waste, organic wastes, recyclable wastes)
- Reduce embodied energy of building (use of PPC cement that contains fly ash)
- Use of low-energy materials in interiors (use of bamboo, low VOC and lead-free paints, exposed brick-finish, etc.)

Additionally, the option of securing green building certification such as GRIHA¹³ guidance-cum-rating system may be explored.

5.2 The following types of bio-medical wastes are generated from various levels of health facilities in Nagaland.

At District Hospitals

- Human tissue, organs, body parts and placenta etc from operation theatres,
- Cotton, gauze dressings, POP's soiled with blood, pus and other human discharge,
- All types of plastic i.e. plastic syringes, I.V. lines, I.V. bottles and bags,
- Discarded medicines and Cytotoxic drugs, and solid chemical waste,
- Soiled linen of patients from isolation wards, intensive care units, acute wards, OT and labour rooms,
- Leftover food in patients and visitors plates, stationary, fruits waste, unsoiled dressings, gauze and cotton,
- Needles and blades ,
- Broken glass, bottles, tubes, vials, petri dishes,
- Microbiological and other pathological waste,
- Liquid waste from wards, laboratories and autopsy room,
- Silver nitrate from radiology department,
- Mercury waste: broken thermometers and sphygmomanometer, and
- Blood bank waste: discarded expired infected blood or its products

At CHCs and PHCs

- Placenta, body parts, and human tissue from Operation theatres,
- Cotton, gauze dressings soiled with blood, pus and other human discharge,
- All types of plastic i.e. plastic syringes, I.V. lines, I.V. bottles, bags,
- Discarded medicines and solid chemical waste,
- Soiled linen of patients wards, OT and labour rooms,
- Leftover food in patients and visitors plates, stationary, fruits waste, unsoiled dressings, gauze and cotton,
- Needles, blades, broken glass, bottles, tubes and vials,
- Liquid waste from wards,
- Silver nitrate - radiology department, and
- Mercury waste: broken thermometers and sphygmomanometer.

¹³ <http://www.grihaindia.org>

At Sub-Centre

- Cotton, gauze dressings soiled with blood, pus and other human discharge,
- All types of plastic i.e. plastic syringes, I.V. lines, I.V. bottles, bags,
- Discarded medicines and solid chemical waste,
- Needles, blades, broken glass, bottles, tubes and vials,
- Mercury waste: Broken thermometers and sphygmomanometer, and
- Placenta and other waste from delivery room (from those sub-centres which conduct normal deliveries)

For effective and efficient collection, segregation, transfer and disposal of bio-medical waste the following inputs are critical:

- Availability of updated training modules, teaching aids in sufficient numbers for health staff;
- Linkages with training institutes to deliver centralized training for trainers;
- Training plan and training schedule for ongoing training and refresher courses in health care waste management;
- Regional/district or facility based champions for health care waste management to implement decentralized training plans;
- Consistent supply of equipment, reagents and consumables including personal protective gear for implementation of health care waste management;
- Infrastructure availability in terms of deep burial pits and sharps pit for waste disposal
- Assured financing for IEC campaigns to promote appropriate behaviors amongst stakeholders—patients, attendants, service providers and waste handlers for management of health care waste.
- Financing for routine assessments to identify gaps and initiate mitigation methods.

The regulatory framework for environmental management in the health sector in India is provided by the Bio-Medical Waste (Management and Handling) Rules (2011). The Rules, besides identifying eight categories of waste, also recommend treatment and disposal methods and the standards to be laid down for the same (as per Schedule-1).

6.0 INSTITUTIONAL MECHANISMS FOR BIO-MEDICAL WASTE MANAGEMENT

A Bio-medical Waste Management Cell under the chairmanship of an officer of at-least Joint Director level must be constituted. The Cell may have a board of advisors comprising

- Mission Director, NRHM
- Commissioner, Health
- Chairman, State Pollution Control Board
- Chairman, Municipal Corporation
- Dean, Medical College (*once operational*)

For day to day functioning, the Cell may be supported by three State Nodal Officers (Terms of Reference to be provided) for Environmental Health, two Data Entry Operators and one support staff.

The Cell will be responsible for planning, capacity building, implementation, monitoring and assessment of all interventions for bio-medical waste management in the state. The mandate for the BMWWM Cell will be developed in consultation with various stakeholders and widely disseminated.

At the district level, the Chief Medical Officer of the district will be the designated nodal officer and bear the overall responsibility of bio-medical waste management capacity building, implementation and monitoring in the district. The CMO will be supported by a team comprising an environment officer (Terms of Reference to be provided), and a data entry operator.

At each health facility, the Medical Officer in charge of the health facility will bear the overall responsibility for implementation of bio-medical waste management interventions at the health facility. S/he will be supported by the ANM, and volunteers from the community (two at the CHC level and one at the PHC level) for robust implementation.

As per the initial concept, the project is already committed to support improvement in bio-medical waste management in the state. In order to improve the bio-medical waste management in the state, the project identifies support towards (a) Medical waste management facilities, (b) Medical waste management equipment and consumables, and (c) capacity building on bio-medical waste management. This will include any necessary expert support that may be required to research and plan for appropriate technology suitable to local context and incorporating its learning to scale up state wide.

7.0 CAPACITY BUILDING FOR BIO-MEDICAL WASTE MANAGEMENT

7.1 Continuous Capacity Building Mechanisms for Bio-medical Waste Management

Knowledge of the different types of waste generated and the guidance available as per the National Bio-medical Waste Management Rules and the Infection Management and Environment Plans amongst all cadres of health professionals and stakeholders is key to the successful implementation of health care waste management. To build the knowledge levels and support behaviors and practices conducive to sustainable bio-medical waste management, it is important to institutionalize capacity development and strengthening mechanism in the state.

7.2 Training Methodology

A cascading training with creation of a critical pool of master trainers through a formalized training program at the state level is proposed. The master trainers will roll out a decentralized district based training program, identifying facility based champions for BMWWM to ensure success of planned interventions.

The state may consider recruitment of a professional BMWWM firm to deploy the periodic training at the state level. Alternatively, identified state trainers could avail certified

appropriate training programs within the country. The training would entail in-situ orientation and practising of cradle to grave (segregation, disinfection, storage, transfer and disposal) management of the lifecycle of bio-medical waste.

The master trainers would train district level personnel comprising members of the district BMW Cell, at least two medical officers from each district, one senior Health and/or Sanitary Staff of the Municipal Corporation/ Municipality and community volunteers as per a scheduled training plan.

The district based teams would undertake facility based BMW training programs as per plan over the life of the project. Refresher training programs would be conducted three times a year. This would entail, one face to face training and twice a year, virtual engagements using mobile telephony or internet based blended learning/assessment program.

7.3 Training Program

A detailed training schedule of the cascading training program (including ToTs, district level and facility based training) along with blended refresher learning and assessment programs will be drawn out by the State BMW Cell of the Directorate of Health and Family Welfare.

Training aids, training modules, IEC materials, assessment tools will be developed and procured in necessary numbers to support the training program. Orientation visits to similar training programs undertaken in the states of Karnataka (Karnataka Health Systems Development and Reform Project) and Tamil Nadu (Tamil Nadu Health Systems Project) may be undertaken by members of the State BMW Cell to help devise the structure, aids and content for the training programs. Materials hitherto developed by the Bank supported health systems projects in the states of Karnataka, Rajsathan, Tamil Nadu and Uttar Pradesh may be used to support the training programs.

The training program will include

- Information on, and justification for, all aspects of bio-medical waste policy
- Information on the role and responsibilities of each health facility staff members in implementing the policy; and
- Technical instructions, relevant for the target group, on the application of waste management practices

The state level officials will be given training in the policy framework, planning and legal aspects. The state level officials will also be trained in implementing and monitoring the bio-medical waste management at the state level. The district level officials will be trained in implementing the bio-medical waste management at the district level. The medical officers at the facility level will be trained in planning, implementing and monitoring the bio-medical waste management plan at the facility level. The Municipal Health and/or Sanitary officer in the Municipal Corporation/ Municipality will also be trained on planning, monitoring and implementation of bio-medical waste management and in turn train the lower level municipal staffs handling medical and other hazardous waste.

The training for nursing, para-medical staff, laboratory technicians, ward boys and class IV employees will be conducted in-situ at the respective health facilities by the district.

7.4 Involvement of NGOs and Communitization Groups

The Health Communitization groups and NGOs working on environmental issues in the state will be key stakeholders of the BMWM interventions in the state. From participating in design and methodology of the capacity building programs, to facilitating implementation, to oversight and assessment of the interventions, they are identified as key partners of the State and District based BMWM Cells. Their roles and responsibilities will be finalized during planned stakeholder consultations.

7.5 IEC-Activities

The Project Management Unit will facilitate the development and printing of IEC materials, training modules, and training aids in consultation with the State BMWM Cell for deployment in health facilities across the state. The technical specifications for the materials will be discussed and No Objected to by the Bank Team.

Behaviour Change Communication on BMWM using the communitization forum will also be a strategy adopted in the state.

8.0 MONITORING PLAN

The State and District BMWM Cells will be tasked with quality assurance of the training programs as well as implementation practices in health facilities of the states. Wherever additional support will be required, the Cells will facilitate availability of the support to ensure robust implementation and impact of the interventions.

- 8.1** Reporting formats will be developed through consultation by the State BMWM Cells to track performance of BMWM knowledge, behaviors and practices. These will be deployed in each health facility and training on how to use and report on the formats would be an essential session of the facility based training programs. The identified BMWM champion of the facility will be tasked with reporting on the BMWM performance of the facility. Data will be collated at the district by the District BMWM Cells . The District BMWM Cells will be tasked with making field visits to validate data, and provide additional support to facilities demonstrating poor compliance with or performance with respect to BMWM. The results of the internal review findings should be circulated and discussed at a state level meeting at PMU along with concerned nodal officer and Project Director every six months..
- 8.2** Twice a year virtual assessments of BMWM knowledge will be undertaken for all health personnel in the state.
- 8.3** An independent baseline assessment of BMWM practices in the state will be undertaken prior to the effectiveness of the project. Similar independent assessments will be undertaken at the mid-term and at the end of the project term.

Mechanisms must be instituted to felicitate or recognize well performing districts/health facilities with respect to BMWM in the state.

9.0 ROLES AND RESPONSIBILITY

The roles and responsibilities of State and District BMWM cells and key stakeholders of BMWM interventions in the state are enumerated below:.

Project Director

- The Project Director will be the head of the Bio-Medical Waste Management System in the state
- The Project Director will be responsible for the provision of budgetary support to BMWM interventions in the state.

State BMWM Cell

- Developing linkages with other Medical Colleges in North-east India for BMWM capacity building interventions in state
- Finalizing training curricula, teaching aids and training modules for BMWM interventions
- Developing training plan for BMWM capacity building in state
- Finalizing procurement plan and specifications for goods, works and services required in support of BMWM interventions,
- Commissioning of consultancies planned under the component which may include independent assessments, blended refresher trainings, IEC material and training material development etc.
- Quarterly review of BMWM performance of districts

District BMWM Cell

- Deployment of training programs as per approved training plan
- Supportive supervision of BMWM practices in health facilities
- Collation of facility based reports and their review
- Ensuring availability of supplies for robust implementation of program.

State Nodal Officer – Bio-medical Waste Management

- S/he will be directly responsible for planning, implementation, co-ordination and monitoring of waste management activities under the guidance of the Project Director and assisted by CMOs from various districts
- S/he will ensure that all Environmental Guidelines suggested in this EMP is complied with at the various level of the organization
- S/he will be responsible all monitoring plan and reporting system as under EMP
- S/he will be responsible for all training and capacity building activities as prescribed in EMP

Chief Medical Officer (at District Level)

- CMO will be responsible for the bio-medical Waste Management System in the district and act as nodal officer for planning, implementation, co-ordination and monitoring of all Bio-medical Waste Management for all institutions in the district
- Responsible for facilitating baseline, mid-term and endline assessment of BMWM knowledge, behaviors and practises in the district
- Responsible for facilitating training and capacity building in the district and ensure adequate training of key staff members, Municipal Health and Sanitary officers, communitization groups and NGOs

- Responsible for IEC activities in the district

Medical Officer (at Facility Level)

- Responsible for implementation of EMP at facility level
- Responsible for training of staffs at facility level
- Responsible for maintenance of record at facility level

10.0 BUDGETARY PROVISIONS

The projected cost for implementing the EMP will be arrived at after proper assessment by the Directorate. The key elements of cost associated will include:

1. Organizational Cost i.e. Cost of Human Resources (Nodal Officer and Others)
2. Training and Capacity Building Cost (including state, district and sub-district level trainings)
3. IEC and Exposure Visits
4. Monitoring (Internal and External Audits)
5. Special Studies e.g. systematic assessment of quantum of bio-medical waste generated at each of these facilities and also look at the better options for bio-medical waste management (for both solid and liquid bio-medical waste) suitable to local context; and others
6. Necessary equipments and infrastructure, consumables including personal protective gear for bio-medical waste management
7. Miscellaneous

11.0 STAKEHOLDER CONSULTATION

Consultation with various stakeholder groups (in addition to various staff members at DH&FW and other Govt departments) was done during the primary visits especially with staffs at Sub-Centre, PHCs, CHCs and District Hospitals; members of community groups including members of women societies and members of village councils at different places; Municipal Corporation and members of Nagaland Pollution Control Board.

In addition to above, a prior informed stakeholder consultation workshop was organised with various stakeholders to share the draft findings of environmental and social assessment and draft management plan to seek their views and suggestions. The consultation workshop was attended by participation from various stakeholder groups included Secretary Health and Family Welfare, senior officials from DH&FW, Member Secretary from Nagaland Pollution Control Board (NPCB), member of Environmental Advisory Board of NPCB, CEOs of Kohima Municipal Corporation (KMC) and Dimapur Municipal Corporation (DMC), staffs from KMC involved in Bio-Medical Waste Management (BMWM), Chairman of Village Health Committee Vishvema, members from civil society organizations and colleges from World Bank. Minutes of the same has been presented in Annexure –V of this report. Presented below are the key highlights and suggestions from the consultation workshop.

After the initial introduction and presentation by Mr. Angami (Secretary Health and family Welfare) and Dr. Nandira Changkija, Member Secretary from NPCB explained the stages of BMWM and system of registration with NPCB; CEO-KMC and staffs involved in BMWM at

Kohima explained the segregation problems with BMW being received by them on daily basis; staffs from various facilities shared their practices and concern with existing incineration installed; the Chairman of Village Council and other community members felt the need for better awareness on the risks and practices. The project team felt that it was quite commendable to see the enthusiasm of the stakeholder groups as most of the stakeholder were willing to collaborate and improve upon the bio-medical waste management system in the state.

Key Suggestions from Stakeholder Consultation Workshop:

- Common BMW disposal facilities to be developed at district headquarter level involving municipal bodies.
- A committee involving representation from DH&FW, Municipal Corporations and NPCB may be setup for monitoring of BMWM at the state level.
- A scientific study to be conducted to find suitable mechanism of bio-medical waste management at different levels of health care facilities (suitable to local situation and quantum to bio-medical waste).
- Capacity building of all health personnel and staffs of Municipal bodies involved (or to be involved) in bio-medical waste management need to be trained properly.
- Members of the community groups also needs to be sensitized with the risk involved and importance of bio-medical waste management.

ANNEXURE I: MANAGEMENT MEASURES

The proposed project has assigned importance to environment management for enhancing the positive impacts and mitigating the negative impacts of the proposed activities. Therefore, a set of guidelines has been proposed based on the analysis of the positive and negative environmental impacts. The environmental management measures to enhance positive impacts for the various activities of NMHP and presented in table below. These measures are identified for each activity at a broad level. The guidelines for the same are given in Annexure.

MANAGEMENT MEASURES				
Sl. No.	Activity	Management Measures Proposed	References	Responsibility
1	Bio-Medical Waste Management at all levels of health care facilities	<p>Follow the for safe handling, segregation, storage, transportation, treatment and disposal of bio-medical waste generated from health care establishments prescribed as under Bio-Medical Waste (Management and Handling) Rules (2011).</p> <p>a. Conduct scientific study of appropriate disposal mechanism suitable to local situation and quantum of bio-medical waste</p> <p>b. Use existing Infection Management and Environment Plan (IMEP)¹⁴ developed by NRHM in collaboration with DFID and World bank in 2007 for CHC, PHC and SC</p>	Annexure - II	State BMWM Cell under chairmanship of State Nodal Officer on Bio-Medical Waste Management
2	Civil work while repair, reconstruction and	Safety standards to be followed as per National Building Code 2005	Annexure - III	Project Director assisted by CMO In charge at

¹⁴ In 2007, the National Rural Health Mission (NRHM) under MOHFW, with technical and financial support of the World Bank and the Department of International Development (DFID), India, developed and adopted an Infection Management and Environment Plan¹⁴ (IMEP) which defines a framework for implementation of infection control and waste management in healthcare facilities. The IMEP contains a Policy Framework as well as the operational guidelines for Sub Centres (SCs), Primary Health Centres (PHCs) and Community Health centres (CHCs) to manage infectious waste in a hygienic, safe and environmentally sound manner.

MANAGEMENT MEASURES				
Sl. No.	Activity	Management Measures Proposed	References	Responsibility
	expansion of buildings in health care facilities			district level
3	Capacity building and Training on bio-medical waste management	Training of all health care staffs focusing on bio-medical waste management	As per Institutional strengthening and capacity building plan in subsequent section	State BMWM Cell under chairmanship of State Nodal Office on BMWM for TOT programs and District BMWM Cell under chairmanship of the CMO for facility based training programs
4	Monitoring of compliance to EMP	Internal and external audit to monitor and review the adherence to EMP dealing bio-medical waste management plan	As per Monitoring plan in subsequent section	District BMWM Cells under chairmansip of the CMO, BMWM

ANNEXURE II: BIO MEDICAL WASTE MANAGEMENT RULES 2011

Category	Waste Category	Treatment and Disposal- 1998	Treatment and disposal 2011
1	Human Anatomical Waste(human tissues, organs, body parts)	Incineration/Deep burial	Incineration
2	Animal Waste (animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)	Incineration/deep burial	Incineration
3	Microbiology & Biotechnology Waste and <i>other Laboratory waste</i> (wastes from laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)(<i>wastes from clinical samples, pathology, biochemistry, hematology, blood bank,</i>)	Local autoclaving/microwaving/incineration	Disinfection at source by chemical treatment or by autoclaving /microwaving followed by mutilation/shredding and after treatment final disposal in secured landfill or disposal of recyclable wastes (plastics or glass) through registered or authorized recyclers.
4	Waste sharps (needles, syringes, scalpels, blades, glass, etc, that may cause puncture and cuts. This includes both used and unused sharps.)	Disinfection (chemical treatment /autoclaving/microwaving and mutilation/shredding)	Disinfection by chemical treatment or destruction by needle and tip cutters, autoclaving or microwaving followed by mutilation or microwaving followed by mutilation or shredding, whichever is applicable and final disposal through authorized CBWTF or disposal in secured landfill or designated concrete waste sharp pit.
5	Discarded medicines and Cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)	Incineration, destruction and drug disposal in secured landfills	Disposal in secured landfill or incineration

Category	Waste Category	Treatment and Disposal- 1998	Treatment and disposal 2011
6	Solid waste (Items contaminated with blood, and body fluids, including cotton, dressings, soiled plaster casts, lines, beddings, other material contaminated with blood)	Incineration/autoclaving/microwaving	Incineration
7	<i>(Infectious)</i> Solid waste (Waste generated from disposable items other than the waste sharps such as tubings, catheters, intravenous sets etc)	Disinfection by chemical treatment /autoclaving/microwaving and mutilation shredding	Disinfection by chemical treatment or autoclaving or Microwaving followed by mutilation or shredding and after treatment final disposal through registered or authorized recyclers
8	Chemical Waste(chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc)	Chemical treatment and discharge into drains for liquids and secure landfill for solids	Chemical treatment and discharge into drains meeting the norms notified under these rules and solids disposal in secured landfill

Note; Words in italics are additions to Draft Rules 2011.

Following two categories that were present in Rules 1998 have been removed in Draft Rules 2011.

1.	Liquid waste(waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)	Disinfection by chemical treatment and discharge into drains
2.	Incineration Ash (ash from incineration of any biomedical waste)	Disposal in municipal landfill

ANNEXURE III: ENVIRONMENTAL MANAGEMENT GUIDELINES

Given the quantum of waste generated at each type of facilities and geographic distribution of locations of these facilities, installation of incinerator at each of the facility or centralise disposal system may not be cost effective. It may be useful to undertake a systematic assessment of quantum of bio-medical waste generated at each of these facilities and also look at the better options for bio-medical waste management suitable to local context. Hence, it is proposed as follows:

1. A scientific study to be conducted for assessment of quantum of bio-medical waste generated at district hospitals and options to be developed for bio-medical waste management suitable to local context following norms prescribed as under Bio-Medical Waste (Management and Handling) Rules (2011) and/or appropriately meeting the basic premise on which these norms are set.
2. For CHCs, PHCs, and SCs the Infection Management and Environment Plan (IMEP) framework and guidelines should be adopted¹⁵.
 - a. IMEP Policy Framework: <http://nrhm.gov.in/images/pdf/guidelines/nrhm-guidelines/imep/imep-policy-framework.pdf>
 - b. IMEP Guidelines CHC: <http://nrhm.gov.in/images/pdf/guidelines/nrhm-guidelines/imep/imep-guidelines-in-chc.pdf>
 - c. IMEP Guidelines PHC: <http://nrhm.gov.in/images/pdf/guidelines/nrhm-guidelines/imep/imep-guidelines-in-phc.pdf>
 - d. IMEP Guidelines SC: <http://nrhm.gov.in/images/pdf/guidelines/nrhm-guidelines/imep/imep-guidelines-in-subcentres.pdf>

¹⁵ In 2007, the National Rural Health Mission (NRHM) under MOHFW, with technical and financial support of the World Bank and the Department of International Development (DFID), India, developed and adopted an Infection Management and Environment Plan¹⁵ (IMEP) which defines a framework for implementation of infection control and waste management in healthcare facilities. The IMEP contains a Policy Framework as well as the operational guidelines for Sub Centres (SCs), Primary Health Centres (PHCs) and Community Health centres (CHCs) to manage infectious waste in a hygienic, safe and environmentally sound manner.

ANNEXURE IV: CONSTRUCTION STAGE GUIDELINES

Safety standards to be followed while repair, reconstruction, and expansion of buildings in health care facilities.

All construction activity should adhere to National Building Codes of India 2005.

Debris & Dust control

Many of the building infrastructures related to the DH, CHC, PHC and SC may need repair, reconstruction and expansion. In case of any demolition required, the building area should be covered with tarpaulins supported on temporary scaffoldings. Water should be sprayed on the ground to suppress dust. This will control the dust spreading in the vicinity. Only controlled blasting carried out by a qualified person should be allowed under exceptional circumstances. The construction debris should be dumped in only areas designated by the authorities. Renovation should be carried only on buildings certified by qualified engineers /competent authorities.

ANNEXURE V: MINUTES OF STAKEHOLDER CONSULTATION WORKSHOP

Stakeholder Consultation Workshop on Environment and Social Management Framework for Nagaland Multisectoral Health Project

Venue: ISDP Conference Hall, Directorate of Health and Family Welfare, Kohima

Date: 28th February 2014

Participants: Participation from various stakeholder groups included Secretary Health and Family Welfare, senior officials from DH&FW, Member Secretary from Nagaland Pollution Control Board (NPCB), member of Environmental Advisory Board of NPCB, CEOs of Kohima Municipal Corporation (KMC) and Dimapur Municipal Corporation (DMC), staffs from KMC involved in Bio-Medical Waste Management (BMWM), Chairman of Village Health Committee Vishvema, members from civil society organizations and colleges from World Bank. A detail list of participants is enclosed herewith.

The Proceedings of the Workshop

The workshop was initiated by Mr. Angami (Secretary Health and family Welfare) and Dr. Nandira Changkija by introducing the World Bank project and going over the presentation on ESMF. This followed by discussions on issues and practice related to Bio-medical waste management in the state, and seeking views and suggestions on how to further improve upon the bio-medical waste management (BMWM) practices. The key points emerged from the workshop includes as follows:

- Member Secretary from NPCB mentioned that there are three main stages of BMWM i.e. segregation and handling (of biomedical waste); transportation (in colour coded vans); safe disposal. As a demo project with KMC, a disposal site was setup and BMW are collected from all the registered facilities including NHAK and private facilities in Kohima. The CEO-KMC also mentioned that to BMW being received by them are not segregated and hence poses a challenge while disposing.
- The member secretary from NPCB mentioned that from rural areas (for CHCs, PHCs and SCs) given the low quantity of bio-medical waste and problem of electricity supply in the health facilities, it will not be cost effective to install incinerators. Hence it is best that they use the deep burial rather than incineration.
- The Director Health mentioned that, the BMWM system started in 2010-11 in Nagaland with proposal for installation of incinerators and distribution of colour coded bins to district hospitals and facilities with high case loads. Based on the experiences so far, day-to-day operations and management of the installations are far more difficult. The segregation of the waste is one of the most important aspects and if not done at source the remaining efforts become futile.
- The current set of incinerators installed in four district hospitals including NHAK and Dimapur district hospitals are not-functional or partially functional because of various reasons including its location (being near to residential areas), small and congested operational area among other problems. Director health mentioned that initially these incinerators were to be located as common facility for the district under the jurisdiction of municipal bodies, but with paucity of time to spend fund allocated to it, decision of

locating it to district hospital was taken. Also running cost of a 50-70Kgs capacity incinerator is about Rs.70,000 per month and many facilities as well as municipal bodies will have difficulties in funding for the same.

- It was felt by many participants that capacity building and training of the health care professionals, nurses, technical staffs and other staffs at the health facilities are important on BMWM, and in addition, the front line workers of the health facilities and municipal bodies may need to be trained as well. Community may need to be also sensitized with the risk and management of BMW.
- Though the EMP plans for periodic monitoring and internal and external audits, it was felt by some participants that there should be ownership of BMWM at facility level and someone at the facility level should ensure that it is followed and do day-to-day monitoring. It was also felt by some of the participants that a committee involving representation from DH&FW, Municipal Corporations and NPCB may be useful to monitor at the state level and take things forward.
- The CEO of KMC and DMC and other stakeholders including from NPCB feel that at district headquarter level, there should be common disposal facility to be developed with municipal bodies and preferably under their control so that they can do the collection (using bio-medical waste collection vans), institute user charges, and take the operational and management responsibility of running the incinerator and ensuring safe disposal of other hazardous wastes as per norms laid out by the government.
- CEO of KMC also mention that they have got 94 acres of land for solid waste dump, and DMC though have issues with existing dumping ground but are in process of developing new site which are allocated to them. Both CEOs from KMC and DMC felt that they can earmark some part of the dumping ground specific for BMWM and ready to take responsibility of running common BMW disposal system.
- The member secretary of NPCB also mentioned that each of the facilities generating BMW need to be registered with NPCB. And by that manner, NPCB will also help in identifying the right choice of location for incinerator and other BMW disposal locations and may undertake training.
- On the social management framework, participants felt that there are good provisions laid out under the Communitization Act, however, utilising them for better gender and community participation has been not always upto the desired mark and there is a lot of scope to improve upon by finding ways for enhanced community participation.
- The project team felt that it was quite commendable to see the enthusiasm of the stakeholder groups as most of the stakeholder were willing to collaborate and improve upon the bio-medical waste management system in the state. And as mentioned in the proposed World Bank project, support for filling the gaps can be provided from the project for better management of bio-medical waste.
- On the social safeguard the project team informed the stakeholders that a complete component under the project is dedicated to improve the community empowerment (the details of which are being developed by the technical team).

Key suggestions to take forward

- Common BMW disposal facilities to be developed at district headquarter level involving municipal bodies.
- A committee involving representation from DH&FW, Municipal Corporations and NPCB may be setup for monitoring of BMW at the state level.
- A scientific study to be conducted to find suitable mechanism of bio-medical waste management at different levels of health care facilities (suitable to local situation and quantum to bio-medical waste).
- Capacity building of all health personnel and staffs of Municipal bodies involved (or to be involved) in bio-medical waste management need to be trained properly.
- Members of the community groups also needs to be sensitized with the risk involved and importance of bio-medical waste management

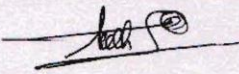
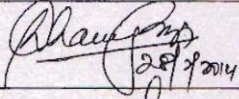
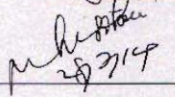
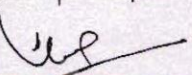
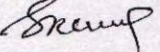
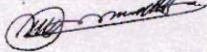
List of Participants

Meeting of Stakeholder Consultation on Environment and Social Management Framework for Nagaland Multi-Sectoral Health Project

Date: 28th Feb. 2014

Venue: IDSP Hall

Sl. No	Name	Designation & Deptt/Institution	Contact no. & Email address	Signature
1.	SHRI BELU ANGHIM	Secretary AHWFW	9436000129	
2.	Ganesh Sharma	Liaison officer DMC	9436430966	
3.	Dr R. Rose	SpO FWHB. Member Expert Appraisal Team on EWSM	Sharma.ganesh1965@gmail.com 9856070109	
4.	Dr Arino	CMO Kohima	9436011851	
5.	Dr Joy Ch. Angain	Kochuik Foundation	drjoyceangain@yahoo.co.in 9436011068	
6.	Nalhinphrelie	Sr. Sanitation Inspector	9402481869	
7.	PELHOUTSEILIE	Asst. Sanitation Inspector	9856244019	
8.	ARIJO	Sardar	9438692941	
9.	Thomas Malingme	Sardar	9615045506	
10.	RISONIL JOHN	M. Spex, NPCB	9436003731	
11.	Zakhekhoto Kiso	J.A.O. KMC	9436001089 zakhekhoto@phs.com	
12.	Elizabeth ngully	CEO, KMC	9436009224 ceokmc-ng@nic.in	 28/02/14
13.	PATRICK MULLEN	World Bank	pmullen@worldbank.org	
14.	Anilk Nayam	World Bank		
15.	Dr. Kika	DD MRHM	9436006134	
16.	RANJAN B. VERMA	WORLD BANK	9313378688	

Sl. No	Name	Designation	Signature	Contact no.
17	DR. N.M. Kithan	Addl. Director HFW		09436009183
18	DR. N.L. CHANIGUSA	Addl. Dir. HFW.	 28/9/2014	09436001614 nechaniguz@rediffmail.com
19	Dr Neikietuo Chuseta	MD at m	 28/9/14	943601896
20	Dr G. Kemp	Director (H)		9402831903
21	SABUL RHETSO	Chairman, C.H.C Vibukema		9436000778
22	DR. NEIKHRIELIE	M.S NHAH		943600960
23				
24				