

# Initial Environmental Examination

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October 2016

## Myanmar: Greater Mekong Subregion Health Security Project

Prepared by the Ministry of Health and Sports for the Asian Development Bank.

## CURRENCY EQUIVALENTS

(as of 22 September 2016)

Currency unit	–	kyat/s (MK)
MK1.00	=	\$0.00080
\$1.00	=	MK1,244.50

## ABBREVIATIONS

ADB	–	Asian Development Bank
AIDS	–	Acquired Immune Deficiency Syndrome
APSED	–	Asia Pacific Strategy for Emerging Diseases
BOD	–	Biological oxygen demand
CDC	–	Communicable Diseases Control
CEP	–	Commitment on Environmental Protection
COD	–	Chemical oxygen demand
EA	–	Environmental assessment / Executing Agency
EARF	–	Environmental Assessment and Review Framework
EIA	–	Environmental Impact Assessment
EIAR	–	Environmental Impact Assessment Report
EMP	–	Environmental Management Plan
GMS	–	Greater Mekong Subregion
HIV	–	Human Immunodeficiency Virus
IA	–	Implementing Agency
IEE	–	Initial Environmental Examination
IHR	–	International Health Regulations
INGO	–	International non-government organization
IP	–	Indigenous peoples
IPC	–	Infection Prevention and Control
MEVs	–	Migrants and mobile populations, ethnic minorities, and other vulnerable groups
MOECAF	–	Ministry of Environmental Conservation and Forestry
MOHS	–	Ministry of Health and Sports
NGO	–	Non-government organization
PM	–	Particulate matter
PMU	–	Project Management Unit
REA	–	Rapid Environmental Assessment
RHD	–	Regional Health Department
SHD	–	State Health Department
SWM	–	Solid Waste Management
WHO	–	World Health Organization

## WEIGHTS AND MEASURES

Ha	–	Hectare
Kg	–	Kilogram
Km	–	Kilometer
L / l	–	Liter
M	–	Meter
Mg	–	Milligram
Mg	–	Microgram

## **NOTE**

In this report, "\$" refers to US dollars.

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## I. INTRODUCTION

### A. Background of the Project

1. The Greater Mekong Subregion (GMS) comprises Cambodia, China (Yunnan and Guangxi), Laos, Myanmar, Thailand, and Viet Nam, with a population of about 326 million people. The region has gone through rapid economic development, with overall GDP growth of 5-10% per year during the past decade. The major demographic, economic and technological differences among the GMS countries, combined with improved connectivity and trade facilitation, bring about substantial business dynamics. Regional investments have increased rapidly, stimulated by regional security, low cost labor, and improved connectivity. Better roads, ports and trade agreements facilitate participation in the global market. Regional tourism has also increased dramatically. GMS Countries are industrializing rapidly, resulting in a rapid increase in migrant workers, mostly internally, but also externally. Urbanization is increasing rapidly, and creating new challenges that require major investments. This has also increased the risk of the spread of communicable diseases associated with increased connectivity, employment, and social and physical living environment.

2. Under the GMS economic development program, the Governments of Cambodia, Lao People's Democratic Republic (Lao PDR), Viet Nam and Myanmar, and the Asian Development Bank (ADB) aim to achieve core capacities for the control of emerging infectious diseases and other major public health threats based on international standards of the World Health Organization (WHO). A GMS Health Security Project (the Project) of \$132.2 million has been proposed for 2016 including a contribution of \$125 from ADB's Special Funds resources, and government counterpart funds of \$7.2 million. The Project follows other health projects for communicable diseases control (CDC), Human Immunodeficiency Virus (HIV), Malaria, and related regional technical assistance.<sup>1</sup>

### B. Purpose and Structure of the Report

3. The project is categorized as a Category B project in accordance with ADB's Safeguards Policy Statement 2009 (SPS). The Initial Environmental Examination (IEE) presented in this report is to assess the environmental impacts of the project and propose measures to mitigate negative impacts. The IEE has been prepared following the procedures described in the Environmental Assessment Review Framework (EARF) established for the project.

4. The following methodology has been implemented in the preparation of the IEE:

- (i) Review of project-related documents and literature relevant to the project areas initially surveyed.
- (ii) Site visits to view the environmental conditions in representative project areas and the general location of the projects.
- (iii) Consultation with local and national authorities to source information on project area characteristics and potential project impacts.
- (iv) Identification of existing environmental and socio-economic characteristics to develop project baseline data.
- (v) Analysis of typical environmental impacts of project components and

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<sup>1</sup> Including Community Action for HIV Prevention in 2001; GMS Regional Communicable Diseases Control Project in 2004; Second GMS Communicable Diseases Control Project in 2010; GMS Capacity Building for HIV/AIDS Prevention Project in 2012; Japan Fund for Poverty Reduction projects such as for Model Healthy Village; and technical assistance for malaria and dengue control, health education, e-Health, and related areas.

- identification of suitable typical mitigation measures to ameliorate potential impacts.
- (vi) Development of institutional arrangements for implementation of environmental management and monitoring.

## II. DESCRIPTION OF THE PROJECT

### A. Project Rationale

5. The Republic of the Union of Myanmar, aiming to comply with WHO standards to achieve GMS health security, has requested renewed ADB assistance by way of project support to address critical gaps in core capacities. Ministry of Health and Sports (MOHS) and WHO have conducted evaluation of Asia Pacific Strategy for Emerging Diseases (APSED) implementation in 2014. Myanmar has not yet achieved International Health Regulations (IHR) and APSED targets. Core functions owned by MOHS are well in place, but other functions depending more on collaboration with other countries, sectors, partners, community, and the private sector are less advanced. The recent Middle East Respiratory Syndrome and Ebola outbreaks, and the Zika virus scare have put re-emerging infection diseases back in the limelight. While progress in other regional priorities is mixed, there is major progress in the control of malaria and dengue, and less progress in the control of human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS), and tuberculosis and the major emerging concerns of hospital acquired infection or nosocomial infections and multiple drug resistance.

### B. Project Design

6. The impact will be GMS public health security strengthened. The outcome will be GMS health system performance, with regard to health security, improved. The proposed project locations are the provinces along the borders and economic corridors. In these locations, health facilities typically serve not only the local population but also mobile and migrant populations in the region. Selection of project provinces is based on (i) economic status of the province; (ii) health and health services statistics; (iii) regional risks and priority clusters; and (iv) existing support from other partners.

7. The Project is being financed through a project loan between the ADB and the Government of the Republic of the Union of Myanmar. In Myanmar, the proposed project of \$12.8 million is to be financed by an ADB Special Funds loan of \$12 million and \$0.8 million in Government counterpart funds. The Department of Public Health and the Department of Medical Services will represent MOHS as the Executing Agency. In summary, the Government will use the loan primarily to finance hardware (laboratory and Infection Prevention and Control (IPC) equipment, supplies and devices) and use government resources to finance software (training and workshops) and project management.

#### a. Regional cooperation and communicable disease control in border areas improved

8. Regional cooperation is mainly in the form of information exchange and joint outbreak responses. While national level information exchange is affected by lack of leadership, cross-border cooperation is gaining momentum.

9. Sub-groups of MEVs in border areas have unique risk of exposure to particular

diseases. The risks may vary by occupation and location. However, there are particular concerns for cross-border migrant workers returning home with HIV or tuberculosis, who may not have access to care on their return. HIV-infected youths and pregnant mothers also may have limited access to services and care.

**b. National disease surveillance and outbreak response systems strengthened**

10. The project will explore new strategies for reaching MEVs and for timely reporting of patients with certain symptoms from remote communities using syndromic surveillance. Several disease reporting systems in place which are not linked, do not reach communities, and do not provide necessary diagnostics and quality public health information to make meaningful decisions in a timely manner. Computerization of data management would allow linkages with clinical services and e-learning. Competent field epidemiologists at provincial level and assistants at district level are few, thereby also limiting the efforts to improve disease control and community prevention and preparedness. In addition, through workshops and other knowledge management activities, specific strategies for disease control and system strengthening will be developed. Workshops will be comprised of carefully prepared participatory learning and strategic planning events with monitoring of follow up actions by the regional coordination unit. Through bilateral agreements with the neighboring border countries, the Project will explore strategies to reach various MEVs who are more likely to be exposed to different types of diseases.

**c. Laboratory services and hospital infection prevention and control improved.**

11. In Myanmar as in the other GMS countries, much of the efforts in improving laboratory services have gone into strategic planning, provision of equipment and setting up laboratory services in the larger regional hubs often using mentoring, quality control at central level, and, more recently, also multiple initiatives to improve biosafety. However, as laboratory services are complex requiring some 20 subsystems to be in place, the support for the subsystems have received much less attention such as support for: undergraduate education; laboratory management, facilities, registration and inspection/audit; medical-laboratory linkages; and transport and maintenance systems. It is necessary to address these gaps that will ensure better use of past investments in staff and equipment.

12. Township hospitals, rural health centers and health sub-centers are the most likely points of contact for newly emerging diseases, and also pose a major concern in terms of spreading these diseases. In addition, the general hospitals and bigger health facilities are also a source of hospital acquired infection or nosocomial infections and drug resistance. Current equipment and practices in these health facilities for infection prevention and control, and waste disposal are sub-standard and unsafe, and would not meet IHR or APSED obligations. Myanmar needs to launch a new IPC plan and, based on the WHO guidelines, roll out a comprehensive IPC program that requires strong MOHS commitment and more investments in IPC scholarships, infection control management, and hospital equipment and hygiene supplies.

**C. Project Location**

13. This IEE has been prepared based on field surveys of 3 general hospitals (Hpa-an, Mawlamyine and Keng Tung) of the capitals of 3 out of 6 target border states/region (Kayin, Mon and Shan (East) States). The hospitals were chosen because representative of the



hospitals in Myanmar for the number of beds and the type of services provided to the population. Data obtained from interviews with key officials of the Department of Public Health and the Department of Medical Services of the MOHS, and WHO in dealing with environmental impact assessment, the regulation of hazardous substances, air and water pollution control, and health care waste management. MOHS (2014) and WHO data were also obtained and analyzed regarding the status of health care waste management in Myanmar. As planned, the scope of the GMS Health Security Project in Myanmar will cover the border towns accessible from the respective capitals of 5 border states and 1 region along its borders with PR China in the north, Lao PDR and Thailand in the center, and Thailand in the south. In view of the focus on regional concerns, the country's current economic direction and health sector setting, and this project being the first major re-engagement of ADB in the public health sector, it has been proposed to target the major hubs along economic corridors with Thailand. For purposes of this IEE, the general hospitals surveyed, area observations and interviews with key informants will be indicative and representative of the scope of environmental impact assessment and review that shall be performed for the other remaining states/division in accordance with ADB guidelines as the project progresses (See Figure 1).

**Figure 1: GMS Health Security Project – Myanmar Border States and Division**

1	Shan North- Capital: Lashio, Border towns: Namkhan/Muse (PR China)
2	Shan East- Capital: Keng Tung, Border town: Tachileik (Lao PDR and Thailand)
3	Kayah State- Capital: Loakaw, Border town: Mese (Thailand)
4	Kayin State- Capital: Hpa-An, Border town: Myawaddy (Thailand)
5	Mon State- Capital: MawlaMyine, Border town: Ye (Thailand)
6	Tanintharyi Division: Capital: Dawei, Border town: Kawthaung (Thailand)

#### **D. Project Outputs of Environmental Concern**

14. The requirement for an environmental impact assessment is linked to the following Project output 3, namely: provide laboratory equipment and training for equipment for infection prevention and control, including laundry services and waste disposal.

15. The above component will require screening of potential environmental impacts and a discussion of mitigating or enhancement measures as a result of the impacts because the activities involve public health risks and potential accidents, minor repair and improvement works, the installation and commissioning of laboratory equipment and related devices, and the operation of the target state/region hospitals' existing medical waste management and waste water treatment facilities – all of which impact the project's environmental setting and require environmental safeguards.

16. The screening addresses the potential impacts of the relevant project activities under the loan, which are re-defined for purposes of the IEE, namely: (i) minor repair and improvement works; (ii) laboratory equipment commissioning including IPC services; (iii) operation of the existing solid waste management facilities; and (iv) operation of the existing wastewater treatment facilities described as follows:

- (i) **Project Activity 1 – Minor repair and improvement works.** This activity includes the minor repair and improvement works of the hospital facilities specifically affected by the provision of access, accommodation, modification and

- installation of new or upgraded laboratory equipment and auxiliary devices, IPC equipment and devices including laundry equipment, computer systems, etc.
- (ii) **Project Activity 2 – Laboratory equipment commissioning including IPC services.** This activity includes the mobilization, equipment installation, commissioning, demobilization, recurrent maintenance checks by the suppliers/contractors, and the operation from installation and during the life of the equipment. The equipment means the totality of the laboratory equipment, auxiliary equipment, laundry and washing/drying equipment, and relevant IPC devices and supplies, laundry equipment including the transport vehicles for the transport of laboratory specimen procured under the Project.
  - (iii) **Project Activity 3 – Solid Waste Management facilities.** The collective activity assumes existing activities that include: (1) the storage and segregation (as applicable) of medical infectious/hazardous and non-infectious/non-hazardous wastes; (2) collection and transfer for disposal or recycling (as applicable); (3) internal and external transportation of medical waste; recycling or composting of non-hazardous wastes; and (4) disposal at (i) an approved and dedicated disposal facility such as a provincial hospital. The operational activities will vary according to the type of facility but will include receipt of waste, burial of waste, burning of waste, general site maintenance, and odor and vermin control.

17. Since the project does not involve civil works construction, the stages of the project cycle during which screening is to be conducted and into which the temporal boundaries of the activities have been divided are: the pre-procurement stage, the procurement (including the commissioning) stage, and the operation stage from the viewpoint of the hospital facilities.

18. The Project will finance the procurement of laboratory equipment and supplies, transport vehicles, laundry and other infection prevention and control equipment, computer systems and devices for the newly-improved hospitals and other institutions identified by state authorities serving as the target populations. A total of 6 target states/region will comprise the beneficiaries of the project. Equipment purchases will be in accordance with established MOHS standards and will replace old and non-functioning equipment, upgrade technology for existing procedures, or provide new services. The Project will also support the purchase of an initial inventory of reagents and other supplies needed to properly utilize the new equipment. Procurement and supply of equipment will be closely coordinated with the other components of the project implementation.

19. Once completed, the newly improved and renovated laboratory facilities and supplies, IPC equipment and related devices, computers and related systems, and transport vehicles that are part of the Project need to be properly maintained to realize benefits and justify investments. The Project will ensure that hospital personnel are properly trained to use the equipment and operating manuals are supplied in the Myanmar language. The government shall support the preparation of guidelines for preventive maintenance and training of hospital personnel in preventive maintenance procedures.

20. The government has also assured that the supplies needed to operate the equipment, as well as the costs of maintenance will be provided during and beyond the project period through recurrent costs and adequate increases in operation and maintenance budgets.

21. Moreover, while this project does not include civil works and medical waste management and waste water treatment equipment, the investments will be made with the assurance from the government that all facilities included in this Project have adequate safe water, sanitation,

and medical waste management systems, including waste water systems, proper containers to segregate contaminated and hazardous waste, proper collection and storage facilities, and access to modern medical waste incineration and/or non-burn treatment and disposal facilities in compliance with the country's environmental laws and the safeguards policy of the ADB. It is incumbent upon the government that hospital personnel in all facilities covered by the project will be trained in the theory, methodologies, and supervision of modern medical waste and waste water management practices. In addition, the Project will support consulting assistance to work with authorities in each target province to develop a province-wide plan for the management of medical waste.

## **E. Project Category**

22. The project is initially categorized as B for environment based on ADB's *Safeguard Policy Statement* (2009) as the project involves components dealing with laboratory bio-hazards and hospital solid and liquid waste management. This IEE has been prepared based on field surveys of 3 general hospitals (Hpa-an, Mawlamyine and Keng Tung) of the capitals of 3 out of 6 target border states/region (Kayin, Mon and Shan (East) States), and data obtained from interviews with key officials of the Department of Public Health and the Department of Medical Services of the MOHS, and WHO in dealing with environmental impact assessment, the regulation of hazardous substances, air and water pollution control, and health care waste management. MOHS (2014) and WHO data were also obtained and analyzed regarding the status of health care waste management in Myanmar. The findings on the practices in hospital safety and sanitation, medical solid and liquid waste management, infection prevention and control, and risk of accidents and spills during storage, transfer, transport and containment of bio-hazards, and a rapid environmental assessment (REA) confirmed the project to be Category B. Each of the 5 participating states and 1 region (division) will prepare site-specific environmental management plan (SEMPs) covering all project activities during implementation and in accordance with the environmental laws and health regulations of the government.

## **III. DESCRIPTION OF THE ENVIRONMENT**

### **A. Physical Resources**

#### **1. Topography**

23. Myanmar may be divided roughly into five major topographic and climatic zones: the mountainous region, the Shan Plateau, the central dry zone, the delta region, and the coastal region. It is a land of hills and valleys and is rimmed in the north, east and west by mountain ranges forming a giant horseshoe. Enclosed within the mountain barriers are the flat lands of Ayeyarwady, Chindwin and Sittaung River valleys where most of the country's agricultural land and population are concentrated. This central core of the country, which falls within the rain shadow area, is relatively flat and constitutes the Central Dry Zone.

#### **2. Climate**

24. There are three seasons: wet (mid-May to mid-October, cold (November to February), and dry (March to mid-May). There is significant spatial variability in annual rainfall, with levels as high as 5,000 mm in the mountainous coastal and Delta regions, but only about 600mm in the central lowlands (Dry Zone). Temperature also varies across the country, with highs above 43 degrees Celsius (C) in Central Myanmar, around 36°C in Northern Myanmar and only 29°C at the eastern plateau.

### **3. Water Resources**

25. Myanmar has abundant water resources with five major rivers basins. Rainfall amounts vary from one region to another—from highs of 4,000–6,000 mm annually along the coastal reaches and in the mountains of Rakhine and Tanintharyi, to as low as 500–1,000 mm in the dry Central region. Excessive rainfall in other regions of Myanmar, notably in the Delta region, often results in flooding, the loss of standing crops and the displacement of significant portions of the population.

### **B. Ecological Resources**

26. Myanmar is located between three biogeographic regions: in the north – Indochina, Indian sub-continent, and Eurasia; in the south – taninthayi forests which cover the northern section between Indochina and Sundaic ecological Zones. Forests are the dominant ecosystem in Myanmar, with 45% of the country ecologically classified as forest (FAO 2015). Myanmar's forest area was noted to have declined from 39.7 million hectares in 1989 to 30.5 million hectares in 2010, with an average annual loss of 438,000 hectares of forest per year. This is an annual decline of 1.1%, which accelerated to 1.9% between 2006 and 2010. This is the fastest rate among major countries in South and Southeast Asia. The rate of forest degradation has been even faster, as the closed forest area fell 2.5% during 1989 to 2010. This too has worsened, as the rate grew to 3.1% between 2006 and 2010. Not only are Myanmar's forests being rapidly lost, but this loss has been concentrated in the densest and biologically important forest areas.

### **C. Economic Development**

#### **1. Economic Structure**

27. Despite economic sanctions since the late 1980s, Myanmar's economy has maintained relatively steady growth—by an estimated 5.5% in fiscal year 2011 (ended 31 March 2012) and by an average of 4.9% over the previous 3 years. Prior to the devastation wrought by Cyclone Nargis in 2008, the economy had reportedly been growing at more than 10% annually. The economy is predominantly agricultural, with rice being the main crop and staple food. In 2010, the agriculture sector accounted for about 36% of GDP, down from 57% in 2001. In contrast, the share of GDP accounted for by the industry sector more than doubled, to 26%. Liberalization of the economy and opening up to foreign direct investment (FDI) has prompted rapid growth of the industry sector, notably exports of natural gas. Although employment data are unavailable, it appears that the agriculture sector still accounts for about 70% of total employment.<sup>2</sup>

#### **2. Land Use**

28. Myanmar remains well endowed with forests and vegetation cover. About half of the total land area (676,777 square kilometers) is covered with forests. These are public forests and are classified either as Reserved Forests or Unclassed Forests.

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<sup>2</sup> ADB. 2013. *Myanmar: Agriculture, Natural Resources, and Environment Initial Sector Assessment, Strategy, and Road Map*. Manila.

## D. Social and Cultural Resources

### 1. Administrative Areas

29. The country is divided administratively into seven states and seven divisions. These are subdivided into 64 districts, which are further divided into 324 townships. The townships are subdivided into 13,759 village tracts, which form the basic administrative unit in Myanmar. See Table 1 below for administrative profile of project States.

**Table 1: Administrative Units, Population, and Land Area of Project States**

States	State Structure		Population (2014 Census)	Land Area (Km2)	Population Density (2014 Census)
	Districts	Townships			
Shan	12	40	5,815,384	155,801	38
Kayah	2	7	143,461	11,733	24
Kayin	3	7	1,572,657	30,381	52
Mon	2	10	2,050,282	12,297	167
Tanintharyi	3	10	1,406,434	33,748	32

Source: Government of Myanmar.

### 2. Population and Community Structure

30. Myanmar's population is 51.419 million of which 24.8 million are male and 26.5 million are female. Two-thirds of the population lives in rural areas, and are largely dependent on subsistence farming. Some 25% of the population lives below the poverty line. Poverty is heavily concentrated in rural areas (85%), and disparities are pronounced across states.

31. The Union of Myanmar is made up of 135 national races, of which the main national races are Kachin, Kayah, Kayin, Chin, Bamar, Mon, Rakhine and Shan. The Bamar form the largest national race constituting 70% of the whole population. In the religious sector, 89.2% of the population is Buddhist, while Christianity, Islam, Hinduism, Judaism and Animism are also practiced.

### 3. Socio-Economic Conditions

32. Myanmar's HDI value for 2014 is 0.536—which is in the low human development category—positioning the country at 148 out of 188 countries and territories. Between 1980 and 2014, Myanmar's HDI value increased from 0.334 to 0.536, an increase of 60.3% or an average annual increase of about 1.40%.

### 4. Poverty

33. The poverty incidence in Myanmar is at 25% based on the results of the IHLCA-II survey of 2009-2010. Poverty incidence is twice as high in rural than urban areas at 29% and 15% respectively. Most of the poor live in rural areas (85%). The highest incidence of poverty is in the Chin region at 73%. The four major contributing states/regions to national poverty incidence are Ayeyarwady (19%), Mandalay (15%), Rakhine (12%) and Shan State (11%).<sup>3</sup>

<sup>3</sup> IHLCA Project Technical Unit with the Ministry of National Planning & Economic Development (2011). *Integrated Household Living Conditions Survey in Myanmar (2009-2010)*. Retrieved from [http://www.mm.undp.org/content/myanmar/en/home/library/poverty/publication\\_1.html](http://www.mm.undp.org/content/myanmar/en/home/library/poverty/publication_1.html).

**Table 2: Incidence of Poverty in Project States, 2010**

State	Poverty Incidence	National Poverty Share
Kayah	11.4	1
Kayin	17.4	1.9
Mon	16.3	16.3
Shan North	37.4	5.1
Shan East	46.4	1.9
Tanintharyi	32.6	3.5
Union	25.6	100

Source: IHLCA Survey 2009-2010.

## 5. Public Health

### a. Disease Type and Incidence

34. Life expectancy at birth increased for both males and females between 1980 and 2011. The top five causes of disability adjusted life years (DALYs) in 2010 were lower respiratory tract infections, tuberculosis, diarrhoeal diseases, Human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) and stroke. New among the top 10 causes of DALYs in 2010 were HIV/AIDS, ischemic heart disease, road injury and cirrhosis of the liver – these require effective prevention policy. The top five risk factors are diet, tobacco smoking, household air pollution from solid fuels, high blood pressure, and high blood sugar.<sup>4</sup>

35. Non-communicable diseases (NCDs) contribute to approximately 40% of deaths in Myanmar. NCDs and injuries generally rose between 1990 and 2010, while communicable, maternal, neonatal and nutritional causes of DALYs generally declined. Improvements in access to safe water and adequate sanitation have been reported. However, diarrhea remains among the top five causes of death. There has been an increase in the child immunization coverage, a decline in infant mortality rate (IMR), under-five mortality rate (U5MR) and maternal mortality ratio (MMR). Nearly seven decades of internal conflict in Myanmar have harmfully affected the lives of hundreds of thousands of civilians. Myanmar is also prone to natural disasters: coastal regions exposed to cyclones and tropical storms, and the whole country at risk from earthquakes. Cyclone Nargis was the largest natural disaster in Myanmar's recent history.

### b. Health Care Facilities and Access

36. The Ministry of Health is the main service provider and also handles the regulatory functions in protecting the health of the people. The network of hospitals and health centers, expands down to village level, provide curative services ranging from primary to tertiary health care. Township health departments, managing the township health system, are the backbone of PHC and provide comprehensive health services at the local level. At the regional administrative level, Regional and State Health Departments provide supervisory and technical support, while at the same time managing the provision of tertiary care and referral services.

37. The private health sector has also been a major source of service provision since inception of the health system in the country. Services provided are mostly confined to urban settings and were initially limited to primary and ambulatory care. More intensive and institutional care is now available in big cities. Most people are inclined to seek private health

<sup>4</sup> World Health Organization (2014). *The Republic of the Union of Myanmar Health System Review Health Systems in Transition*. Vol. 4 No. 3 2014.

care on becoming aware of their illness. But severe cases requiring specialized care mainly rely on the public facilities.

38. There has been an increase in the number of public hospitals since the early 2000s, in total an additional 140 were added. Ayeyawady Region has received the most, followed by Sagaing Region; however, there was no change in the number of hospitals in Chin State. Co-investment by the local community in building rural health centers and sub-rural health centers is widely practiced. The number of private hospitals increased within this decade, but at a lower rate than public hospitals.

39. Hospital equipment is usually provided by the government budget and MOHS's share of government expenditure was increased four-fold in 2012. In terms of human resources for health, recruitment of doctors, nurses and midwives have been increasing since the early 2000s, but have not yet reached the global standard of 2.28 doctor, nurse and midwife positions per 1,000 populations. There is also underproduction of dental surgeons, pharmacists and technicians as compared to doctors and nurses.

40. See table below for health establishments in the project areas.

**Table 3: Health Facilities in Project States**

By Region and State	Specialist Hospital		General Hospital With Specialist		Other		Station		Total	
	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Kayah State	-	-	1	200	7	200	9	144	17	544
Kayin State	-	-	1	200	8	400	21	336	30	986
Tanintharyi Region	-	-	2	400	10	391	21	336	33	1127
Mon State	-	-	1	300	11	441	21	336	33	1077
Shan State	1	200	4	800	61	2430	84	1344	151	4774

## **E. Reference Baseline Data for Health Care Waste Management in Myanmar**

41. A key component of the project is the improvement of health care waste management practices in the project areas. In Myanmar, the coordination and supervision of health care wastes at all levels in the country is not clearly developed and needs further strengthening while a National Action Plan should be implemented to manage practices at all levels in an integrated health system.<sup>5</sup> The results of a review of existing health care waste management practices in the 3 general hospitals: Hpa-An, Mawlamyine, and Keng Tung (Kyaing Tong) in 3 border states surveyed under the GMS Health Security Project are summarized below.

### **(i) Healthcare Waste Generation**

42. Healthcare waste (HCW) generated from hospitals includes both non-hazardous waste and hazardous waste. No quantification of non-infectious and infectious waste components of HCW has been available in the project areas surveyed. WHO estimates that about 85% of the HCW from developing countries is non-infectious or generally risk-free healthcare waste, which is comparable to domestic waste. The remaining 15% of healthcare waste is regarded as hazardous and may create a variety of health risks. Hazardous healthcare waste can be classified into the following categories: infectious waste, highly infectious waste, sharps,

<sup>5</sup> World Bank. 2014. *Myanmar - Essential Health Services Access Project: environmental management plan*. Myanmar: s.n.

pathological/anatomical waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with high content of heavy metals, pressurized containers, and radioactive waste.

43. The amount of HCW generated depends on the hospital size and its scope of services. To date there has been no research data recorded of HCW generation rates in Myanmar. According to surveys on HCW management conducted by the MOH in Vietnam and WHO, a provincial general hospital typically generates 0.64 kg/bed/day of general HCW and 0.14 kg/bed/day of hazardous HCW, while a district hospital typically generates 0.62 kg/bed/day of general HCW and 0.11 kg/bed/day of hazardous HCW. In terms of the relative proportion of hazardous waste generated, infectious waste and pathological waste represents about 15%, sharps represent about 1%, chemical and pharmaceutical waste represents about 3%, other waste such as waste with high content of heavy metals, and pressurized containers share represent less than 1%.

#### **(ii) Healthcare Waste Minimization**

44. Waste minimization is defined as the prevention of waste production and/or its reduction. This is not regularly practiced by healthcare establishments in the region such as in Myanmar. Minimization measures such as source reduction (modification of purchasing procedures, control of inventory, and production of less toxic materials), good management and control practices applied particularly to the purchase and use of chemicals and pharmaceuticals, and using of recyclable materials are not typically implemented.

45. Healthcare waste contains quantities of valuable and recyclable materials such as plastic, metals, paper and carton. However, waste recycling is not centrally implemented at hospital level despite the fact that it is carried out unofficially by the different offices.

#### **(iii) Healthcare Waste Segregation**

46. Myanmar has not formally implemented segregation of wastes into color-coded bags or containers. Within the hospitals that received support, basic segregation has been introduced but without standard operating procedures or regular training provided. Other countries like Viet Nam, for example have institutionalized the segregation of three separate containers into different colors: general waste in green bags, clinical waste in yellow bags, and toxic wastes in black bags. In other developing countries, sharps are segregated and placed into rigid containers with certain specifications to avoid accidental punctures or spillage during handling. In Myanmar, the general hospitals that were visited have been owing to being generally responsible for the sharps wastes from collection to disposal. However, their treatment and ultimate disposal has not progressed into something environmentally acceptable. The general hospitals that were surveyed collect the hazardous wastes including the sharps wastes, then either incinerate them using low-temperature open incinerators or bury them at unsecured waste pits within their property boundaries. The successful practice of waste segregation and disposal is one of the biggest challenges in HCW management in most developing countries such as Myanmar. There are limitations reported, as follows:

- (i) Knowledge, attitude and practices among waste generators including hospital staff, patients and visitors are unsatisfactory.
- (ii) Supply of equipment for waste segregation, especially sharp containers is insufficient in both the district hospitals and health centers as a consequence of inadequate funding.
- (iii) No system has been generally introduced as a policy by the relevant authorities



for enforcement.

- (iv) Healthcare waste collection.

47. Of the general hospitals surveyed, the staff assigned to be responsible for collecting healthcare waste from the generation point to interim storage points in the departments have been generally on an ad-hoc basis. No institutionalized committees have been formed to take on the function. Some weaknesses in collection have been observed as follows:

- (i) Provision of equipment, waste containers in different sizes are not sufficient
- (ii) There is no budget appropriation for staff nor equipment and materials to meet these recurring needs
- (iii) Design of hazardous waste containers do not meet requirements
- (iv) Codification and labeling, waste bags and containers, especially those for clinical waste and chemical waste are not properly color-coded and labeled

#### **(v) Healthcare Waste Transportation**

48. Some primary health care workers are made responsible for internal collection from the hospitals. All of the hospitals visited lack specialized devices for waste transportation. Hazardous waste is often transported by hand causing spillage and spread of disease throughout the hospital. Internal transportation plans in which the timetable and route of transportation are clearly identified are not available.

49. No private contractors or responsible government agency transports general waste out of the hospitals to a disposal facility. The hospitals themselves manage their HCW internally, except for donor-provided sharps safety boxes and certain anatomical wastes that the districts send to the provincial hospitals for disposal.

#### **(vi) Healthcare Waste Storage**

50. All of the visited hospitals do not have a formally designated place to store healthcare waste except for different cans and bags of different sizes and materials. Most of the storage containers in hospitals, do not meet design and operating regulations because of the following shortcomings:

- (i) The storage areas do not incorporate separate places for different categories of healthcare waste. As a result, general waste and clinical waste that were segregated at sources and separately collected and transported are mixed again at storage places. Chemical waste is not collected and centrally stored. Liquid wastes are disposed of in the sinks although some of the hospitals have separate septic vaults for liquid wastes for wastes are disposed
- (ii) The storages do not have roofs and locks. Unauthorized people, animals, rodents and insects can easily access hazardous waste causing risks of spillage and disease spread.
- (iii) Storage duration often exceeds 24 hours in hot weather.

#### **(vii) Healthcare Waste Treatment**

51. No models for health care waste treatment were observed in the hospitals visited.

52. Healthcare waste treatment technologies applied in the region typically are (i) medium

temperature incineration, (ii) low temperature incineration, (iii) waste burial, (iv) steam autoclave, (v) chemical disinfection;

- (i) Medium temperature incineration: Pyrolytic incinerators that incinerate waste at 800 – 900°C are reported to be used at the provincial hospitals but these have not been confirmed by actual visits. The emissions from incinerators have not been monitored since they were installed, but polluting gas emissions and high operating costs are reported.
- (ii) Low temperature incineration: Drum incinerators, brick incinerator or one-chamber, open incinerators are still common in district hospitals even though their design is out of date. Because of low effectiveness and high environmental impacts, such incinerators are no longer recommended. The gas emissions from these incinerators have reportedly been very pollutive.
- (iii) Waste burial: District hospitals bury healthcare waste on their premises. Safe burial of healthcare waste is recommended by WHO. However, in comparison with requirements of sanitary landfill, the bury pits observed in hospitals often have the following shortcomings: (i) inadequate sealing of base and sides to minimize the movement of wastewater or leachate off site, (ii) no presence of site personnel capable of effective control of daily operations, (iii) no surface water collection, (iv) access to site and working areas difficult for waste delivery and site vehicles, (v) lack of surface water collection trenches around site boundaries, (vi) lack of a final cover to minimize rainwater infiltration when each phase of the landfill is completed.
- (iv) Wet thermal disinfection: Steam autoclaves are commonly used by hospitals to primarily treat highly infectious waste. Although wet thermal disinfection has been introduced in Myanmar at present, application of autoclave for healthcare waste treatment is still limited to microbiological laboratories where highly infectious waste is mostly generated.
- (v) Chemical disinfection: Using disinfectants to treat contaminated materials is very common in provincial and district hospitals. However, application of chemical disinfection for healthcare waste treatment, particularly for highly infectious waste treatment is still limited to microbiological laboratories and in areas of infectious disease outbreaks.

#### **(viii) Wastewater Collection and Treatment**

53. Hospital wastewater includes rainwater, wastewater generated from healthcare activities and wastewater from toilets. The hospitals visited have open collection systems for storm water, a collection system and septic tanks for wastewater from toilets but only a few of those visited have separate collection lines and separate septic tanks for wastewater generated from healthcare activities. In consequence, wastewater from healthcare activities with a high content of pathogens and certain amount of pharmaceuticals and chemicals is discharged into the storm water system line or discharged onto the land without any treatment. Beside these weaknesses in design, there are weaknesses in operation and maintenance in terms of wastewater collection and treatment as follows:

- (i) Hospital staff often discharge chemical and pharmaceutical waste into wastewater collection systems. This practice can harm the wastewater treatment plant, if any.
- (ii) In the hospitals areas visited, staff and patients do not know how to properly maintain toilet and sanitary facilities in the hospitals. This often results in

blockages of the wastewater collection system. Regular and corrective maintenance of wastewater collection system is rarely carried out.

#### **IV. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

##### **A. Rapid Environmental Assessment**

54. In order to identify potential environmental impacts of the project components, the initial environmental screening was first carried out using the ADB rapid environmental assessment forms (REAs) to screen the proposed activities required for the installation of new or improved laboratory facilities/equipment such as minor repair and improvement works on the general hospitals at the border states as the case may be. (Please see Appendix 2 for the form used). While the hospitals are all existing facilities and whatever improvements are introduced bring mostly positive impacts for the environment, the REAs categorized most of the project activities as Category B because the project involves the management of infectious, hazardous, medical solid waste and wastewater and the risks inherent in the handling of laboratory wastes, and the diagnostic activities in managing highly infectious diseases at the border towns of the target border state and regional hospitals.

55. The ADB safeguard policies require that the project's activities need to be carefully considered to avoid and/or to minimize the negative impacts on the natural environment and social environment (including environmental public health and occupational health), and provide the appropriate measures to mitigate such impacts. In accordance with the ADB guidelines, the potential impacts of medical solid and liquid wastes including laboratory wastes, being hazardous along with deficient sanitation and laundry facilities and the lack of effective wastewater equipment and treatment systems categorizes the health facilities as having significant potential negative environmental impacts that need to be mitigated.

##### **B. Environmental Assessment Methodology**

56. Surveys were conducted by the Consultant and the MOHS team in 3 general hospitals: Hpa-An, Mawlamyine and Keng Tung (Kyaing Tong) General Hospitals, and held discussions with the officials of the laboratories, infection control sections and the hospital directors. The general hospitals visited were representative of the other targeted hospitals in the border states. The main objectives of the survey were to:

- (i) Assess the current practices and environmental conditions focused on the medical waste (solid and liquid) management of the health care facilities;
- (ii) Organize meetings with the state agencies of MOHS, the State Health Departments, and hospital heads to consult them about their needs and plans about the environmental management of the sub-components of the health security project to institute environmental safeguards from the impacts of laboratory waste, infectious disease bio-hazards, hospital safety and hygiene for infection prevention and control, and medical solid and liquid waste management; and
- (iii) Collect environmental baseline data of the representative states included in the target border areas.

57. During the time allotted, the site surveys were carried out by a combination of methods i.e. observation, photo-documentation, data/document review and analysis, and interview or

focus group discussions with key informant officials. The survey team earlier developed sets of Rapid Environmental Assessment (REA) checklists for health care facilities. The data and information on environmental issues (focused on medical solid and liquid waste management and hospital safety and hygiene for infection prevention and control) of the selected provinces under the project areas were collected from the general hospitals, MOHS, Ministry of Environmental Conservation and Forestry (MOECAF) and relevant provincial agencies.

58. The Consultant and the hospital and laboratory officials and staff held discussions relevant to the environmental situation in their respective areas focusing on the medical solid and liquid wastes, and laboratory waste management. Similar meetings and consultations at the hospital visited were also held with participation of the hospitals staff to discuss the environmental situation of the hospitals respectively and their views about the project, on the medical waste management and hospital safety and hygiene for infection prevention and control, and on medical solid waste management and wastewater treatment facilities.

### C. Potential Environmental Impacts and Mitigating Measures

59. For the purposes of the assessment, the following categories of impacts have been developed:

- (i) **NO IMPACT:** The potential impact of the project is assessed as NO IMPACT if the project activity is physically removed in space or time from the environmental component, or if the impact is so small as to be un-measurable (i.e. negligible).
- (ii) **MAJOR IMPACT – POSITIVE OR NEGATIVE:** An impact is said to be MAJOR if the project has the potential to affect an environmental component. The following criteria were used to determine whether a given impact is MAJOR:
  - a. spatial scale of the impact (site, local, regional, or national/ international);
  - b. time horizon of the impact (short, medium, or long term);
  - c. magnitude of the change in the environmental component brought about by the project activities (small, moderate, large);
  - d. importance to local human populations;
  - e. compliance with international, national, provincial, or district environmental protection laws, standards, and regulations;
  - f. compliance with ADB guidelines, policies, and regulations.
- (iii) **MINOR IMPACT – POSITIVE OR NEGATIVE:** If an impact occurs but does not meet the criteria for a Major Impact it is assigned the category MINOR. Minor impacts occur along a spectrum ranging from those impacts that are close to being major impacts to those that are close to being negligible impacts. The judgments made in relation to the position of specific impacts along this spectrum are discussed in the text accompanying the environmental screening.
- (iv) **UNKNOWN IMPACT:** The potential impact of the project will be assessed as being UNKNOWN if the magnitude of the effect cannot be predicted for any of the following reasons:
  - a. the nature and location of the project activity is uncertain;
  - b. the occurrence of the environmental component within the study area is uncertain;

- c. the time scale of the effect is unknown; or
- d. the spatial scale over which the effect may occur is unknown.

60. These categories have been applied to other ADB infrastructure projects and have been adapted from ADB, *Safeguard Policy Statement (2009)*.

#### **D. Screening of Environmental Impacts of Project Components**

61. The purpose of this section is to undertake further screening of typical environmental impacts of the project components/sub-components. The screening addresses the potential impacts of the structural processes to be implemented and relevant activities under the loan program, namely: (i) minor repair and improvement works; (ii) laboratory equipment commissioning including infection prevention and control (IPC) services; (iii) operation of the existing solid waste management facilities and (iv) operation of existing wastewater treatment facilities. Since the project does not involve civil works construction, the environmental assessment covers the pre-procurement, procurement (including the commissioning stage), and the operation stage of the project as described fully in Section II-G. Only potential impacts that have direct and relevant significance are listed in the environmental screening in Appendix 1).

62. The following key is used in the environmental screening.

NO impact	O
MINOR NEGATIVE impact	X
MAJOR NEGATIVE impact	XX
MINOR POSITIVE impact	+
MAJOR POSITIVE impact	++
UNKNOWN impact	?

#### **E. Findings of the Environmental Assessment**

63. The TOR initially categorized this project as requiring an Initial Environmental Examination (IEE) Report and an Environmental Management Plan both of which are required for a Category B Project. It is understood that this project was tentatively classified as a Category B from the ADB project documents during an initial screening of anticipated potential environmental impacts based on the concept document. This categorization was examined through the representative visits to the different project sites and the proposed project component descriptions and how the project proponent intends to mitigate the potential negative environmental impacts of the project.

64. In accordance with the ADB's *Safeguards Policy Statement (2009)*, Category B Projects are those judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for Category A projects that require a full-blown Environmental Impact Statement arising from major adverse impacts on the environment. For a Category B project, an IEE is required to determine whether or not significant environmental impacts warranting an Environmental Impact Assessment (EIA) are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

65. In Myanmar, the final list of target hospitals from the border states and region has been finalized by the government through the MOHS, and their respective environmental assessments will be prepared during the first 6 months of the project. The project is expected to have positive environmental impacts based on the level of investments in laboratory equipment to improve diagnostics of emerging diseases in support of communicable diseases control. On the other hand, this project is not supporting civil works construction for waste management. It is expected that the existing State Health Department (SWM) equipment and wastewater treatment facilities will not be able to meet the environmental standards consistently.

66. During the project's life, the environmental assessment will continue particularly for the medical solid waste and the wastewater treatment facilities. If not upgraded or properly maintained, there will be a good chance that the assessment will also continue to have negative environmental impacts. It is very important therefore to have an environmental management plan in place. Within the plan should be a monitoring framework.

67. Separately, the projects will undergo environmental impact assessment in accordance with the relevant Myanmar legislation on environmental pollution laws, medical solid and liquid waste management, wastewater treatment facilities, and environmental health and safety and ADB's SPS.

## V. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

### A. Institutional Arrangements

68. Table 4 summarizes the proposed environmental management responsibilities of key parties involved in the project.

**Table 4: Environmental Management Institutional Arrangements**

<b>Agency</b>	<b>Environmental Management Responsibilities</b>
ADB	<p>Sign grant agreement with Government of the Republic of the Union of Myanmar including environment-related covenants</p> <p>Review of SEMP and environmental monitoring reports</p> <p>Review of EMP implementation</p> <p>Disclosure of monitoring reports in ADB's web site</p>
MOHS	<p>Responsibility for overall project implementation, including environmental management activities and implementation of EARF</p> <p>Coordination of environment-related activities of PIAs including implementation of aspects of EARF</p> <p>Responsibility for project operation including operation stage environmental performance</p> <p>Allocation of staff with responsibility for environmental issues during operation</p> <p>Preparation of monitoring reports on EMP implementation and submission to ADB</p>

<b>Agency</b>	<b>Environmental Management Responsibilities</b>
SHD/RHD	Responsibility for state/division level project implementation Responsibility for implementing EARF including preparation of environmental assessments – and obtaining environmental approvals for works within province Responsibility for pre-construction stage and construction stage environmental management, monitoring and reporting
MOECAF	Provision of advice to PIAs as required on environmental issues
MOECAF and ADB	Approval of EMPs for works within states
Suppliers/contractors	Implementation of environmental management commitments contained in site specific EMPs  Monitoring and reporting of environmental performance

ADB = Asian Development Bank, EARF = environmental assessment and review framework, EMP = environmental management plan, MOECAF = Ministry of Environmental Conservation and Forestry, MOHS = Ministry of Health and Sports, PIA = provincial implementing agency, RHD = regional health department, SEMP = site-specific environmental management plan, SHD = state health department.

69. Responsible personnel assigned by the MOHS would have primary responsibility for environmental issues and activities during project implementation.

## **B. Environmental Management Plan**

70. Table 5 contains the proposed typical environmental management plan (EMP) for the pre-procurement, procurement and operation stages of selected project sub-components as assessed. During project implementation, the EA, through the project management unit and national consultants, will validate the EMPs for the site specific project sub-components as a continuing process. When relevant, EMPs will be included in the bid and contract documents. Reference will be made to new site information obtained to update site specific mitigation measures for inclusion in the EMP.

**Table 5: Environmental Management Plan**

<b>Issue</b>	<b>Performance Objective</b>	<b>Mitigation Measure</b>	<b>Responsibility for Implementation</b>	<b>Budget for implementation</b>
<b>Procurement Stage</b>				
Dust and emissions generation	Minimize emissions of dust and other pollutants	Use wet rags and vacuum cleaners for dust suppression  Contain and minimize of work areas  Ensure construction equipment and vehicles are maintained in good condition  Utilize temporary protective curtains on existing facilities and equipment  Emissions from the labs will be collected and treated to ensure the compliance with relevant environmental standards	Supplier/Contractor	Included in hospital and laboratories recurrent budget. Provided by supplier / contractor

Noise generation	Minimize noise generation	<p>Proper maintenance of tools and equipment</p> <p>Limit noisy construction activities to day time hours</p> <p>Install noise dampers Notify affected rooms of schedule and duration</p> <p>Ensure noise levels are within stipulated (national) requirements for health centers</p>	Supplier/Contractor	Provided by supplier / contractor
Surface water and groundwater quality	Minimize generation of potential water pollutants	<p>Store chemicals in secure area, with concrete floor and weatherproof roof</p> <p>Prepare temporary drain containment or basins</p> <p>Keep left-over scrap materials in locations removed from the drainage ways</p> <p>Use prescribed O&amp;M standards for the labs</p>	Supplier/Contractor	Provided by supplier / contractor
Soil contamination	Avoid adverse impacts from disturbed soils	Installing equipment and minor reparations will not create soil contamination. In any case the supplier and contractor will ensure that an impermeable barrier between the working surfaces and the soil are used to avoid contamination during the works	Supplier/Contractor	Provided by supplier / contractor
Risks to public and worker health and safety	Minimize risk of accidents to public and workers	<p>Adopt and ensure that the hospitals health and safety guidelines are established and practiced</p> <p>Wear and be trained on personal safety equipment</p> <p>Appropriate first aid measures are available on site and emergency contact numbers are clearly displayed on sites including emergency evaluation procedures and maps.</p>	Supplier/Contractor	Provided by supplier / contractor
Increase in illness due to environmental pollution	Avoid illness from environmental pollution	Adopt and ensure that the hospitals health and safety guidelines are established and practiced	MOHS	MOHS recurrent budget
Accidents and Injury	Avoid accidents and injury	Adopt and ensure that the hospitals health and safety guidelines are established and practiced	MOHS	MOHS recurrent budget



<b>Operation Stage</b>				
Dust and emissions generation	Minimize emissions of dust and other pollutants	Ensure compliance with relevant Myanmar air quality emissions standards  Non-incinerator technology should be considered for medical solid waste management facilities (if any) to ensure compliance with relevant the environmental standards of Myanmar on air quality, particulates and odor	MOHS and MOECAAF	MOHS recurrent budget
Odor generation	Minimize odor generation	Develop and implement guidance and action for operation of the labs and training of personnel in proper operation of the labs  Regularly remove of waste from temporary storage areas and train personnel in proper waste management practices.	MOHS	MOHS recurrent budget
Noise generation	Minimize noise generation	Ensure solid waste equipment and vehicles are maintained in good condition  Install noise dampers or erect temporary acoustic shields  Limit noisy operational activities to day time hours  Notify nearby community of schedule and duration of activities	MOHS	MOHS recurrent budget

Surface water and groundwater quality	Minimize generation of potential water pollutants and maintain water quality	<p>Store chemicals in secure area, with concrete floor and weatherproof roof</p> <p>Prepare temporary drain containment or basins and impermeable lining for medical refuse burial pits.</p> <p>Keep left-over scrap materials in locations removed from the drainage ways</p> <p>Use prescribed O&amp;M standards for the labs</p> <p>Maintain storage areas and provide bins for solid waste collection and prevent leaching</p> <p>Train solid waste collectors and hospital staff in proper health care waste management to protect waterways.</p> <p>Ensure that discharge from solid waste and wastewater treatment facilities will comply with criteria contained in the applicable Myanmar and MOECAAF regulations.</p> <p>Ensure that wastewater from the laboratories will be conveyed directly to a wastewater treatment facility or in its absence, will be collected, stored and treated/disposed of by a licensed waste management contractor</p>	MOHS and MOECAAF	MOHS recurrent budget
Soil contamination	Avoid adverse impacts from disturbed soils	<p>Ensure sealing and containment of burial pits or dumping grounds prior to external municipal disposal.</p> <p>Ensure that discharge from solid waste facilities will comply with criteria contained in the applicable Myanmar and MOECAAF regulations.</p> <p>Improve operations of wastewater disposal facilities with discharge that complies with the current applicable MOECAAF standards for medical wastewater.</p>	MOECAAF	MOHS recurrent budget

Risks to public and worker health & safety	Minimize risk of accidents involving public or health care workers  Maximize benefits of project operation	Implement safety measures during removal and disturbance of asbestos, if any  Provide safety equipment to repair workers and train them in its use.  Emergency evacuation procedures to be clearly signposted at appropriate locations  Secure SWM landfill site and restrict access by local community  Ensure that the applicable Viet Nam regulations on SWM and wastewater discharge are complied with.	MOHS and MOECAF	MOHS recurrent budget
Emissions generation	Comply with relevant MOECAF Emission standards	Ensure emissions from incinerator operation comply with relevant standards	MOHS and MOECAF	MOHS recurrent budget
Odor generation	Maximize benefits of project operation	Develop operating procedures for health care waste management systems based on principles contained in Appendix 1  Train personnel in implementation of operating procedures	MOHS	MOHS recurrent budget
Surface water and groundwater quality	Maximize benefits of project operation	Incorporate lining systems in landfill facilities Ensure effluent from wastewater and solid waste facilities complies with relevant Myanmar standards prior to discharge  Develop operating procedures for health care waste management systems and wastewater treatment facilities  Undertake regular maintenance of solid waste and wastewater treatment facilities, if any  Train personnel in implementation of operating procedures	MOHS and MOECAF	
Risks to public & worker health and safety	Maximize benefits of project operation	Secure solid waste and wastewater treatment facilities to avoid public access to facilities  Develop operating procedures for health care waste management systems and wastewater treatment facilities, if any  Undertake regular maintenance of solid	MOHS	

		waste and wastewater treatment facilities  Train personnel in implementation of operating procedures		
Increase in illness due to environmental pollution	Avoid illness from environmental pollution	Ensure that the hospitals health and safety national guidelines are established and practiced  Sustain pollution control measures in operations to avoid/reduce noise, dust, and air emissions  Ensure that all national environmental pollution measures on wastewater and surface water runoff, and soil contamination management are in place.	MOHS	
Accidents and Injury	Avoid and prevent accidents and injuries	Ensure that the applicable laws and regulations on SWM and wastewater treatment particularly on best practices and safety are complied with.  Develop operating procedures for health care waste management systems and wastewater treatment facilities  Undertake regular maintenance of solid waste and wastewater treatment facilities  Train personnel in implementation of operating procedures including first aid and emergency procedures	MOHS and MOECAF  MOHS	MOHS recurrent budget

MOECAF = Ministry of Environmental Conservation and Forestry, MOHS = Ministry of Health and Sports, SWM = solid waste management.

### C. Environmental Monitoring Plan

71. Tables 6 and 7 contain the proposed environmental monitoring plan for the pre-construction, construction and operation stages of the project components. Two types of environmental monitoring are proposed to be implemented:

- (i) Environmental effects monitoring is conducted to estimate the impacts of the sub-project on ambient environmental conditions.
- (ii) Project environmental performance monitoring is conducted to evaluate compliance with environment-related operating procedures, national standards, and/or contractor specifications including the requirements of the EMP.

72. The following plan identifies the relevant site specific monitoring measures for inclusion in the EMP.

**Table 6: Environmental Effects Monitoring Plan**

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility
<b>Pre-Procurement</b>					
<b>No monitoring required</b>					
<b>Procurement</b>					
Dust suppression	Visible dust levels in the laboratory area	In the laboratory and adjoining rooms	Visual observation	During windy conditions	Supplier/MOHS
Noise minimization	Noise levels near sensitive receivers	In the laboratory and adjoining rooms	Observation	During noisy activities	Supplier/MOHS
Water quality protection	Visible sediment, waste or other pollutants in waterways	At surface waterways and wells in vicinity of the hospitals	Observation	Weekly or after rain events	Supplier/MOECAF
<b>Operation</b>					
Biological samples in the laboratories	Adherence to national guidelines for handling,	Ambient conditions at site and around	Observation	Weekly for first 6 months and then monthly thereafter	MOECAF
Water quality protection	Visible sediment, waste or other pollutants in waterways	In waterways and wells in vicinity of effluent discharge from solid waste or wastewater facilities	As specified in Myanmar standards	Weekly for first 6 months and then monthly thereafter	MOECAF

MOECAF = Ministry of Environmental Conservation and Forestry, MOHS = Ministry of Health and Sports.

**Table 7: Environmental Performance Monitoring Plan\***

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility
<b>Pre-Procurement</b>					
<b>No monitoring required</b>					
<b>Procurement</b>					
Dust suppression	Covering of equipment and fixtures & use of dust suppression methods	In the laboratory and adjoining rooms	Visual observation	During windy conditions	Supplier/MOECAF
Water quality protection	Condition of erosion and sediment controls	At surface waterways and wells in vicinity of hospitals	Observation	Weekly or after rain events	Supplier/MOECAF
<b>Operation</b>					
Air emissions control	All criteria in Myanmar - Air quality – odor from solid waste matter - Permitted level.	At solid waste facilities and autoclaves	Observation	Weekly for first 6 months and then monthly thereafter	MOECAF

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility
Water quality protection	Visible sediment, waste or other pollutants in waterways	At effluent discharge from solid waste or wastewater facilities	As specified Myanmar standards	Weekly for first 6 months and then monthly thereafter	MOECAF

MOECAF = Ministry of Environmental Conservation and Forestry.

#### D. Environmental Monitoring and Reporting

73. Table 8 contains the proposed environmental monitoring and reporting system for the pre-construction, construction and operation stages of the project.

**Table 8: Environmental and Monitoring Reporting Requirements**

Project Phase	Type of Monitoring	Description	Responsibility	Reporting Requirements
Procurement	Supplier/ Contractor's Environmental Performance Monitoring	Self-monitoring of environmental effects of minor repair and improvement works in terms of environmental performance monitoring requirements identified in EMP. Undertaken on an ongoing basis throughout the procurement process with regular monitoring frequencies.	Supplier/ contractor	Commissioning reports to MOHS/MOECAF
	EMP Compliance Monitoring	Monitoring of Supplier/Contractor's compliance with EMP requirements. Undertaken during commissioning of equipment. Monitoring based on combination of observation and review of supplier's environmental performance monitoring results.	SHD/RHD	Commissioning reports to MOHS/ ADB
Operation	Operation Environmental Monitoring	Monitoring of performance of project operation. Undertaken on a regular basis over life of project and self-reporting of compliance with EMP operation stage commitments.	MOHS	1st year: 3 monthly reports to ADB and MOECAF  Subsequent years: 6 monthly reports to MOECAF

ADB = Asian Development Bank, EMP = environmental management plan, MOECAF = Ministry of Environmental Conservation and Forestry, MOHS = Ministry of Health and Sports, RHD = regional health department, SHD = state health department.

#### E. Environmental Management Budget

74. Environmental management costs include costs both at the level of individual project sub-components as well as project component-wide environmental management costs. An environmental management budget to cover costs for management and monitoring both at the level of the district hospitals and the health centers will be established and included in the province annual operation plan and budget, to be funded by the project. A certain percentage of the total project costs can be allocated for this fund upon agreement with the MOHS.

75. The EMP budget will include the following components:

- (i) Marginal costs for implementation of environmental mitigation measures during

- (ii) pre-procurement, procurement and operation stages
- (ii) Marginal costs for implementation of environmental monitoring measures during pre-procurement, procurement and operation stages

## **VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE**

### **A. Public Consultation Undertaken to Date**

76. The public consultations were undertaken in October 2015 in the hospitals of Hpa-an, Mawlamyine and Keng Tung (see para. 13). Around 20 participants have attended the consultations at each project site. The consultations included the following:

- (i) Meetings and consultations with State Health Department directors, laboratory and infection control and prevention staff representatives in the sampled project province to inform them about the need for rapid environmental assessments and obtain the current status of the district hospital facilities and health centers and the upgrades or improvements that they are proposing based on their own diagnosis.
- (ii) Meetings and consultations with the Hospital Office Director and/or Hospital Director together with their management and staff, laboratory and infection control and prevention staff representatives in the sampled project province to brief them about the environmental assessments that each hospital has to undertake to identify the current status of environmental conditions in the vicinity of the health facilities and identify the scope of required project interventions.
- (iii) Meetings and consultations with the International non-government organization (INGOs), if any, operating in the border towns.

77. The initial public consultations showed a high level of acceptance of the project as the project will improve the hospitals' and health centers' current state and capability for improved laboratory services and infection prevention and control. Some suggestions were forwarded regarding the laboratory equipment needed, waste management containers, disposal technologies that are non-burn. Representatives of INGOs were concerned about the health effects of medical and liquid waste management as well as laboratory wastes handling which are not clearly addressed by government. Some of the related environmental concerns included the lack of proper management of health care waste, the lack of adequate staff for operations and maintenance of the facilities, and the basic lack of medical and non-medical equipment. Such concerns will be incorporated in the mitigation and monitoring plans during project design and implementation. Public consultation is an on-going process and the consultations will continue with the project affected communities and relevant on-government organizations, if any, during the implementation phases of the project. The IEE will be disclosed on the ADB website before the ADB Board circulation.

### **B. Future Public Consultation and Disclosure**

78. In order to ensure that future project activities are conducted in a participatory sense and that community concerns and opinions about potential environmental impacts are taken into account during subcomponents of procurement and operation, a range of public consultation and disclosure activities will be implemented throughout activity preparation, implementation and operation. These activities, which have been developed to meet the requirements of both the government and ADB safeguards requirements, are summarized in the following sections.

79. The following consultation activities will be implemented during the first year of the implementation of the project activities:

- (i) State/division level workshops in each capital or township involved in the project border state or division to discuss project interventions, potential environmental impacts of project activities and required mitigation measures. Representatives at the workshops will include stakeholder agencies, mass organizations (Women's Union, Youth Union and Farmers Association), other relevant district level organizations such as the District Committee for Ethnic Minorities and CPC and other relevant stakeholder representatives.
- (ii) Meetings with potentially affected households, sensitive receivers (schools, temples etc.) and landowners to discuss specific issues of concern and mitigation measures required particularly for the quarantine and border area outbreak response facilities.

80. The public consultation activities carried out and the subsequent outcomes will be documented in the environmental assessment documents to be prepared for each site and records of the public consultation appended to the document as outlined in the Environmental Assessment and Review Framework for the project.

81. To ensure ongoing community involvement during project procurement and operation, the following activities will be carried out for each project activity.

- (i) Community information on procurement and operational activities and details of any expected impacts and measures to control them by means of newspaper and loudspeaker announcements and direct communication by local authorities to affected households
- (ii) Establishment of a grievance redress mechanism to allow community members to report concerns regarding operational activities including environmental pollution concerns. Such mechanisms will be published in the health facilities premises and included in the project website.

82. The requirements for future consultation activities during procurement and operation will be documented in the site specific environmental assessments to be prepared during project implementation. Results of public consultations during operation phase will be reported in the environmental monitoring reports and submitted for disclosure in ADB's web site.

### **C. Grievance Redress**

75. Grievance redress mechanisms are required under ADB SPS (2009). If any affected person (AP) does not agree with the renovations or any mitigation measures proposed, they will advise the village authorities who will then report to the project owner, the provincial or district level Health Office. Details of each complaint must be officially recorded and signed by the authorities and APs as an accurate record. The issues raised will be reviewed and issues of concern will be incorporated in the mitigation and monitoring plans during project design and implementation. If the AP and project owner cannot resolve the dispute, the issue can be referred to the district or provincial WREA representatives for resolution and compromise. If the environmental management and monitoring agency and the local administration fail to resolve the dispute, the parties may take the matters to a People Court to adjudicate, in compliance with the relevant laws.



## VII. FINDINGS AND RECOMMENDATIONS

### A. Findings

83. The terms of reference initially categorized this project as requiring an Initial Environmental Examination (IEE) report and an Environmental Management Plan (EMP) both of which are required for Category A and B projects. It is understood that this project was tentatively classified as Category B from the ADB project documents during an initial screening of anticipated potential environmental impacts based on the concept document. This categorization was examined through the respective visits to the different project sites and the proposed project component descriptions and how the project component intends to mitigate the potential negative environmental impacts of the project.

84. In accordance with the ADB's *Safeguard Policies Statement (2009)*, Category B Projects are those judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for Category A projects that require a full Environmental Impact Assessment (EIA) arising from major adverse impacts on the environment. For Category B projects, an IEE is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

85. The final list of the project's subcomponents and the project descriptions for their implementation have indicated that the project will be a Category B. The negative impacts expected to occur during operation stages of the project. Namely:

- (i) **During the procurement stage:** Probably some structures of the laboratories and/or other structures of the hospitals need to be repaired and upgraded before assembly of the equipment. However, the negative impacts during this phase will be negligible due to the scale of the activities are limited and these negative impacts will be localized and temporary. Such impacts include generation of noise and dust, deterioration of water quality through sediment laden runoff and will be readily managed to acceptable levels through implementation of standard environmental management practices.
- (ii) **During operation stage:** Liquid and solid waste generated by the operation of the laboratories as well as the hospitals as a whole are likely to be the sources of negative impacts on the environment if they are not managed properly. Such pollution sources will include infectious specimens, chemicals for testing, wastewater and emission of the laboratories. These pollution sources are long-term and consecutive, and therefore, mitigation measures should be considered adequately through both structural measures (the technical systems for collection and treatment the wastewater, hazardous waste, infectious waste and emission generate from the laboratory should be equipped synchronously) and management measures (application procedure of separation of wastes at source, procedure of management, collection and treatment of hazardous/infectious wastes, etc.). During the Operation stage environmental impacts can be mitigated to acceptable levels through appropriate design of subprojects and implementation of basic operation and maintenance (O&M) environmental management practices particularly in relation to solid waste and wastewater treatment facilities.

## B. Recommendations

86. It is recommended that the Project should ensure that for the selected health facilities the laboratories should be well-managed with trained staff. Based on the field assessment and the project proposals, most of laboratories have standardized biosafety level 3<sup>6</sup> for the specialist hospitals, and standardized biosafety level 2<sup>7</sup> for the general hospitals, as per WHO standards. However, most of laboratories in the provinces visited are not equipped with the collection and treatment systems for the waste emissions generated and the wastewater from the laboratories are not treated according to the environmental standards. Therefore, the implementing agencies need to consider the appropriate equipment and structures for further investments to ensure that the operation of the health facilities are sound and will not cause significant impacts to the environment. The mitigation measures will also be managed by the provinces and made part of their operational plans for the health facilities invested.

87. Separately, the project will undergo environmental impact assessment in accordance with Myanmar's laws on environmental impact assessment. The Environmental Impact Assessment is required for all newly improved hospital projects. For the repair, renovation and upgrade of the hospitals, depending on the scale of the improvement activities, an EIA or Environmental Protection Scheme have to be prepared in the next phase of the project in accordance with Government of Myanmar's regulations.

## VIII. CONCLUSIONS

88. The project activities are expected to have a range of benefits on the natural and social environment, and only minor or negligible negative environmental impacts. The majority of minor negative impacts are expected to occur during the procurement phase and operation phase. These will be localized, minor and temporary and will be readily managed to acceptable levels through the implementation of the appropriate solid waste, wastewater, and environmental management practices. Operation stage environmental impacts can be mitigated to acceptable levels through appropriate design of subprojects and implementation of basic operation and maintenance (O&M) environmental management practices.

89. This IEE Report includes an Environmental Management Plan (EMP) defining the types of environmental mitigation and monitoring measures required to offset potential negative environmental impacts. The development of the EMP takes into account the likely level of technical, financial and human resources available for each of the subproject components. The EMPs will be updated as project implementation progresses beginning with the detailed design. Site-specific conditions may change the nature of the assumptions on the EMPs as the details of the upgrades and improvement projects of the hospitals and health centers become more precise and sensitive to the prevailing environmental conditions of the different project locations.

90. Based on the findings of the environmental assessment, it is concluded that that the project will not have a significant effect on the environment which cannot be managed through appropriate mitigation measures. The investments in the health security project, overall, will

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<sup>6</sup> Biosafety Level 3 is applicable to clinical, diagnostic, teaching, research, or production facilities where work is performed with indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure. WHO. 2004. *Laboratory biosafety manual. Third edition*. Geneva.

<sup>7</sup> BIOSAFETY LEVEL 2. (BSL-2) practices and procedures are suitable for work involving agents of moderate potential risk to personnel and the environment. These agents can cause disease in healthy individuals and pose a moderate risk to the environment. WHO. 2004. *Laboratory biosafety manual. Third edition*. Geneva.

bring forth more positive than negative environmental impacts and greater health security particularly in the border provinces. In view of this, an EIA is not required to be prepared for this project. Individual project activities will be assessed following the Environmental Assessment Review Procedure as prescribed by ADB for the other sub-project component activities while site-specific environmental mitigation and monitoring measures will be developed and implemented accordingly as set out in the EMPs.

## **XI. REFERENCES**

- ADB. 2009. *Safeguard Policy Statement*. Manila.
- ADB. 2003. *Environmental Assessment Guidelines*. Manila.
- ADB. 2002. *Environmental Policy and Operations Manual*. Manila.
- ADB. 1997. *Environmental Impact Assessment in Developing Countries*. Manila.

### Appendix 1: Environmental Screening of Project Sub-Components

POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
<b>Impacts on the Natural Environment</b>				
Dust generation and air emissions	O	X	O	<p><b>Minor Repair and Improvement Works</b> During minor repair and improvement work, localized, temporary negative impacts may result from dust generation from removal and installation of existing equipment, frames, cabinets, and supports to clear the way for new laboratory improvements and equipment.</p> <p>Mitigation measures will include use of wet rags and vacuum cleaners for dust suppression, containment and minimization of work areas, and utilizing temporary protective curtains on existing facilities and equipment. No impacts are expected during the operation stage.</p>
	O	X	+	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Negative Impact as above for dust emissions.</p> <p>As a mitigating and control measure, emissions from the labs will be collected and treated to ensure the compliance with relevant the environmental standards of Myanmar as current regulations on air (poison gases and odor)</p> <p>IPC “standard precautions” to be implemented to enhance positive impact during operations. Standard precautions include: use of Personal Protective Equipment and environmental cleaning.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> Negative impact as above for dust emissions.</p> <p>For IPC, autoclaves will be designed and controlled to ensure compliance with relevant Myanmar air quality emissions standards namely criteria contained in MOECAAF regulations on: air (odor and particulates) and water quality – for steam condensate of medical liquid waste from autoclaves permitted level.</p> <p>Non-incinerator technology should be considered for medical solid waste management facilities (if any) to ensure compliance with relevant the environmental standards of Myanmar on air quality, particulates and</p>
	O	O	O	<p><b>Wastewater Treatment Facilities</b> No impact</p>
Odor generation	O	O	O	<p><b>Minor Repair and Improvement Works</b> No impact</p>
	O	O	X	<p><b>Laboratory Equipment Commissioning including IPC Services</b> During operation improper use or maintenance of lab facilities and equipment may result in minor, localized impacts from odor generation. Mitigation measures will include development and implementation of guidance and action for operation of the labs and training of personnel in proper operation of the labs.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> During operation improper use or maintenance of waste storage areas may result in minor, localized impacts from odor generation. Mitigation measures will include development of operational procedures for temporary and permanent waste storage areas, regular removal of waste from temporary storage areas and training of personnel in proper waste management practices.</p>

POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
	O	O	X	<p><b>Wastewater Treatment Facilities</b> During operation improper use or maintenance of wastewater treatment facilities may result in minor, localized impacts from odor generation. Mitigation measures will include development of appropriate operational procedures and training for personnel.</p>
Noise generation	O	X	O	<p><b>Minor Repair and Improvements Works</b> During minor repair and improvement work, minor, localized, temporary impacts may result from noise generation from use of tools and installation equipment.</p> <p>Mitigation measures will include restriction of noisy activities to day time hours, installation of noise dampers, proper maintenance of tools and equipment, erection of temporary acoustic shields in the vicinity of sensitive receivers and notification of the affected rooms of the duration and extent of installation works.</p> <p>No impacts are expected during the operation phase of the works.</p>
	O	X	O	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Minor negative impacts and mitigating measures as above.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> During collection, transport and disposal operations, minor, localized, temporary impacts may result from noise generation from use of containers, vehicles and equipment.</p> <p>Mitigation measures will include restriction of noisy activities to day time hours, installation of noise dampers, proper maintenance of equipment, erection of temporary acoustic shields in the vicinity of sensitive receivers and notification of the affected areas of the duration medical waste management activities.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b> Minor negative impacts and mitigating measures during operations as above</p>
Surface water quality deterioration	O	X	O	<p><b>Minor Repair and Improvement Works</b> Minor negative impacts on surface water quality as a result of dirt and sediment laden drainage water from cleaning during preparation for lab equipment installation. This may include cleaning chemicals, fuels or oils used and disposal of litter and general solid waste.</p> <p>Mitigation measures will include preparation of temporary drain containment or basins, and keeping left-over scrap materials in locations removed from the drainage ways.</p>
	O	X	X	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Minor negative impact and mitigating measures same as above during procurement stage.</p> <p>During operation stage, surface water quality may be adversely affected as a result of spills or leakage of chemicals generated from the laboratory activities including bio-wastes and laundry water emissions.</p> <p>Mitigation measures will include development and operation of the O&amp;M for the labs. Wastewater from the labs will be collected and treated to ensure compliance with the current standards for the medical wastewater before discharging to environment.</p>

POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
	O	O	X	<p><b>Solid Waste Management Facilities</b> During operation stage, surface water quality could be adversely affected by improper disposal of solid waste. Mitigation measures will include maintenance of storage areas and provision of bins for solid waste collection and training of solid waste collectors and hospital staff in proper health care waste management to protect waterways. Discharge from solid waste facilities will comply with criteria contained in the applicable Myanmar and MOECAP regulations.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b> Negative impacts during operations of sub-standard wastewater facilities in existing provincial and district hospitals.  Mitigating measures will include the proper design and improvement in operations of wastewater disposal facilities with discharge that complies with the criteria contained in the current applicable MOECAP standards for medical wastewater.</p>
Ground water quality deterioration	O	X	O	<p><b>Minor Repair and Improvement Works</b> Minor negative impacts on ground water quality as a result of dirt and sediment laden drainage water from cleaning during preparation for lab equipment installation that will seep through ground water sources or wells. This may include cleaning chemicals, fuels or oils used and disposal of litter and general solid waste.  Mitigation measures will include preparation of temporary drain containment or basins, and keeping left-over scrap materials in locations removed from ground water sources.</p>
	O	X	X	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Minor negative impact and mitigating measures same as above during procurement stage.  During operation stage, ground water quality may be adversely affected as a result of spills or leakage of chemicals generated from the laboratory activities including bio-wastes and laundry water emissions.  Mitigation measures will include protecting groundwater sources permanently and the development and operation of the O&amp;M for the labs. Wastewater from the labs will be collected and treated to ensure compliance with the current standards for the medical wastewater before discharging to the environment.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> During operation stage, ground water quality could be adversely affected by improper disposal of solid waste. Mitigation measures will include maintenance of storage areas and provision of bins for solid waste collection and training of solid waste collectors and hospital staff in proper health care waste management to protect ground water sources. Discharge from solid waste facilities will comply with criteria contained in the applicable Myanmar and MOECAP regulations.</p>

POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
	O	O	X	<p><b>Wastewater Treatment Facilities</b> Negative impacts during operations of sub-standard wastewater facilities in existing provincial and district hospitals with emissions that could affect ground water quality.</p> <p>Mitigating measures will include the proper design and improvement in operations of wastewater disposal facilities with discharge that complies with the criteria contained in the current applicable MOECAAF standards for medical wastewater.</p>
Soil Contamination	O	X	O	<p><b>Minor Repair and Improvement Works</b> During operation, minor impacts of cleaning activities resulting in contamination of soils with cleaning chemicals and agents from repair and improvement activities.</p> <p>Mitigation measures will include ensuring that a barrier between the working surfaces and the soil are used to avoid contamination during the works.</p>
	O	O	O	<p><b>Laboratory Equipment Commissioning including IPC Services</b> No impacts.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> During operation stage, soil could be adversely affected by improper disposal of solid waste particularly for hospitals that bury medical wastes into their own grounds. Mitigation measures will include ensuring sealing and containment of burial pits or dumping grounds prior to external municipal disposal Discharge from solid waste facilities will comply with criteria contained in the applicable Myanmar and MOECAAF regulations.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b> Negative impacts during operations of sub-standard wastewater facilities in existing provincial and district hospitals with emissions that could affect surrounding soils.</p> <p>Mitigating measures will include the proper design and improvement in operations of wastewater disposal facilities with discharge that complies with the criteria contained in the current applicable MOECAAF standards for medical wastewater.</p>
<b>Impacts on the socio-economic environment</b>				
Amenity of surrounding land use	O	X	O	<p><b>Minor repair and improvement works</b> During procurement very minor, localized and temporary impacts to amenity of surrounding land use may occur in the form of dust and noise generation. Such impacts will be readily mitigated through the range of measures previously described on dust, odor and noise.</p>
	O	X	O	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Same as above during procurement, the laboratories may generate small amounts of odor; any such impacts will be minor, temporary and localized.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> As above during operations. During operation the facilities may generate small amounts of odor; any such impacts will be minor, temporary and localized.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b> As above during operations. During operation the facilities may generate small amounts of odor; any such impacts will be minor, temporary and localized.</p>

POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
<b>Impacts on Public Health and Safety</b>				
Risks to public health and safety	O	X	O	<p><b>Minor Repair and Improvement Works</b> Some demolition or disassembly of existing fixtures in preparation for laboratory equipment installation may cause risks in public safety for nearby receivers if not properly managed.</p> <p>Mitigating measures include adopting and ensuring that the suppliers comply with safety guidelines established by the provincial and district hospitals.</p>
	O	O	++	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Positive impact from improved laboratory equipment and safer laboratory diagnostic services for hospital staff and the public.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> Deficient or improperly managed solid waste facilities from storage, collection to disposal will increase the risks to public health and safety.</p> <p>Mitigating measures include ensuring that the applicable Viet Nam regulations on SWM are complied with.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b> Deficient or improperly managed wastewater facilities or the lack of it by the hospitals will increase the risks to public health and safety.</p> <p>Mitigating measures include ensuring that the applicable Viet Nam regulations on wastewater discharge are complied with.</p>
Risks to health and safety of workers	O	X	O	<p><b>Minor Repair and Maintenance Work</b> Some demolition or disassembly of existing fixtures in preparation for laboratory equipment installation may cause risks for health workers in the form of dust and noise</p> <p>Mitigating measures include adopting and ensuring that the hospitals health and safety guidelines are established and practiced by the provincial and district hospitals.</p> <p>Workers will be provided with appropriate personal safety equipment and will be trained in its use prior to commencement of work on the site.</p>
	O	O	++	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Positive impact from improved laboratory equipment and safer laboratory diagnostic services for hospital staff, the patients and the public.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> Deficient or improperly managed solid waste facilities from storage, collection to disposal will increase the risks to the hospital workers.</p> <p>Mitigating measures include ensuring that the applicable Myanmar regulations on SWM are complied with.</p>



POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
		O	x	<p><b>Wastewater Treatment Facilities</b> Deficient or improperly managed wastewater facilities or the lack of it by the hospitals will increase the risks to hospital staff.</p> <p>Mitigating measures include ensuring that the applicable Myanmar regulations on wastewater discharge are complied with. Appropriate first aid measures are available on site and emergency contact numbers are clearly displayed on sites including emergency evaluation procedures and maps.</p>
Increase in illness due to environmental pollution such as: dust, air, water supply contaminants, solid and hazardous wastes, untreated sewage surface water runoff, and wastewater	O	X	O	<p><b>Minor Repair and Maintenance Work</b> Some demolition or disassembly of existing fixtures in preparation for laboratory equipment installation may cause risks for health workers in the form of dust and noise</p> <p>Mitigating measures include adopting and ensuring that the hospitals health and safety guidelines are established and practiced by the provincial and district hospitals.</p>
	O	O	++	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Positive impact from improved laboratory equipment and safer laboratory diagnostic services for hospital staff, the patients and the public.</p>
	O	O	X	<p><b>Solid Waste Management Facilities</b> Deficient or improperly managed solid waste facilities from storage, collection to disposal will increase the risks to public health and safety.</p> <p>Mitigating measures include ensuring that the applicable Viet Nam regulations on SWM are complied with. Also sustain pollution control measures in operations to avoid/reduce noise, dust, and air emissions. Implement solid and hazardous waste management plans. Ensure that all international and best practice environmental pollution measures on wastewater and surface water runoff, and soil contamination management are in place.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b> Deficient or improperly managed wastewater facilities or the lack of it by the hospitals will increase the risks to hospital staff and the public.</p> <p>Mitigating measures include ensuring that the applicable Viet Nam regulations on wastewater discharge are complied with.</p>
Accidents and injury	O	X	O	<p><b>Minor Repair and Maintenance Work</b> Some demolition or disassembly of existing fixtures in preparation for laboratory equipment installation may cause risks for accidents and injury</p> <p>Mitigating measures include adopting and ensuring that the hospital's safety guidelines are established and practiced by the provincial and district hospitals.</p> <p>Workers will be provided with appropriate personal safety equipment and will be trained in its use prior to commencement of work on the site.</p>
	O	O	++	<p><b>Laboratory Equipment Commissioning including IPC Services</b> Positive impact from improved laboratory equipment and safer laboratory diagnostic services for hospital staff and the public.</p>

POTENTIAL IMPACT	PRE-PROCUREMENT STAGE	PROCUREMENT STAGE	OPERATION STAGE	DISCUSSION OF IMPACT AND MITIGATION MEASURES
	O	O	X	<p><b>Solid Waste Management Facilities</b>            Deficient or improperly managed solid waste facilities from storage, collection to disposal will increase the risks of accident and injury.</p> <p>Mitigating measures include ensuring that the applicable Myanmar regulations on SWM particularly on best practices and safety are complied with.</p>
	O	O	X	<p><b>Wastewater Treatment Facilities</b>            Deficient or improperly managed wastewater facilities or the lack of it by the hospitals will increase the risks the risks of accident and injury.</p> <p>Mitigating measures include ensuring that the applicable Myanmar regulations on wastewater discharge are complied with and safety practices are always observed,.</p>

## Appendix 2: RAPID ENVIRONMENTAL ASSESSMENT FORM (MODIFIED)

**Instructions:**

This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.

Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

**Project Title:** Greater Mekong Subregion Health Security Project

**Location:** Myanmar

**Proposed Environmental Category:** B

SCREENING QUESTIONS	Yes	No	REMARKS
<b>A. PROJECT SITING</b>			
IS THE PROJECT AREA:			
DENSELY POPULATED?	<input type="checkbox"/>	<b>X</b>	
HEAVY WITH DEVELOPMENT ACTIVITIES?	<input type="checkbox"/>	<b>X</b>	
ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?	<input type="checkbox"/>	<b>X</b>	
CULTURAL HERITAGE SITE	<input type="checkbox"/>	<b>X</b>	
PROTECTED AREA	<input type="checkbox"/>	<b>X</b>	
WETLAND	<input type="checkbox"/>	<b>X</b>	
MANGROVE	<input type="checkbox"/>	<b>X</b>	
ESTUARINE	<input type="checkbox"/>	<b>X</b>	
BUFFER ZONE OF PROTECTED AREA	<input type="checkbox"/>	<b>X</b>	
SPECIAL AREA FOR PROTECTING BIODIVERSITY	<input type="checkbox"/>	<b>X</b>	
BAY	<input type="checkbox"/>	<b>X</b>	
<b>B. POTENTIAL ENVIRONMENTAL IMPACTS</b>			
WILL THE PROJECT CAUSE...			
impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services?	<b>X</b>	<input type="checkbox"/>	
deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelming	<input type="checkbox"/>	<b>X</b>	

<b>SCREENING QUESTIONS</b>	<b>Yes</b>	<b>No</b>	<b>REMARKS</b>
degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?	<input type="checkbox"/>	<b>X</b>	
increase in soil erosion and siltation?	<input type="checkbox"/>	x	
increase in peak and flood flows?	<input type="checkbox"/>	x	
loss of downstream beneficial uses (water supply or fisheries)?	<b>X</b>	<input type="checkbox"/>	Potential impact of untreated wastewater from improvement works and laboratory operations, and medical solid waste washings to stream sources of water. Target hospitals should mitigate by ensuring that they operate existing drainage and wastewater treatment facilities that comply with MOECAAF emission standards
unnecessary loss of ecological value and decreased biodiversity by replacement of natural forest with plantation with limited number of species?	<input type="checkbox"/>	x	
dislocation or involuntary resettlement of people?	<input type="checkbox"/>	<b>X</b>	
displacement of people or reduce their access to forest resources?	<input type="checkbox"/>	<b>X</b>	
degradation of cultural property, and loss of cultural heritage and tourism revenues?	<input type="checkbox"/>	<b>X</b>	
encroachment into precious ecosystem (e.g. sensitive habitats like protected forest areas or terrestrial wildlife habitats)?	<input type="checkbox"/>	x	
occupation of low-lying lands, floodplains and steep hillsides by informal settlers and low-income groups, and their exposure to increased health hazards and risks due to pollutive industry?	<input type="checkbox"/>	<b>X</b>	
water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters)?	<b>X</b>	<input type="checkbox"/>	Potential impact of untreated wastewater from improvement works and laboratory operations, and medical solid waste washings to boreholes/wells used as groundwater source. Target hospitals should mitigate by ensuring that they operate existing drainage and wastewater treatment facilities that comply with MOECAAF emission standards
air pollution from fuel gas discharged into the atmosphere?	<input type="checkbox"/>	<b>X</b>	
social conflicts between construction workers from other areas and local workers?	<input type="checkbox"/>	<b>X</b>	
road blocking and temporary flooding due to land excavation during rainy season?	<input type="checkbox"/>	<b>X</b>	
noise and dust from construction activities?	<b>X</b>	<input type="checkbox"/>	Potential impacts from minor repair and improvement works in laboratories

SCREENING QUESTIONS	Yes	No	REMARKS
traffic disturbances due to construction material transport and wastes?	<input type="checkbox"/>	X	Only minor repair and improvement works for laboratories are anticipated
increased road traffic due to interference of construction activities?	<input type="checkbox"/>	x	
hazardous driving conditions where construction interferes with pre-existing roads?	<input type="checkbox"/>	x	
short-term soil erosion and silt runoff due to construction?	<input type="checkbox"/>	X	
hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?	<input type="checkbox"/>	X	
short-term construction impacts (e.g. soil erosion and silt runoff, deterioration of water and air quality, noise, dust and vibration from construction equipment)?	X	<input type="checkbox"/>	Potential minor impacts from repair and improvement works of laboratories within existing hospital building facilities
overdrawing of ground water, leading to land subsidence, lowered ground water table, and salinization?	<input type="checkbox"/>	X	
contamination of surface and ground waters due to improper waste disposal?	X	<input type="checkbox"/>	Potential impact for hospitals with deficient and substandard medical solid waste management systems especially if the hospital grounds are used as temporary waste transfer stations. Target hospitals should mitigate by ensuring that an operational medical waste management system is in place including treatment facilities that comply with MOECAAF emission standards.
contamination of soil and groundwater from solid wastes from water treatment sludges, cafeteria or lunchroom wastes, ashes and incineration residues, etc.?	X	<input type="checkbox"/>	Same as above
contamination of air quality from incineration (if incinerator is present at the facility)?	X	<input type="checkbox"/>	Potential impact for hospitals with deficient and substandard incinerators that produce emissions that are not compliant with air emission standards. Target hospitals should mitigate by ensuring that an operational medical waste disposal system is in place that complies with MOECAAF air emission standards.
health and safety hazards to workers from toxic gases and hazardous materials present in the facility?	X	<input type="checkbox"/>	Potential impact and mitigating measures as above in dealing with medical solid and liquid waste management
water pollution from discharge of liquid effluents?	X	<input type="checkbox"/>	Potential impact and mitigating measures as above in dealing with medical solid and liquid waste management

SCREENING QUESTIONS	Yes	No	REMARKS
pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems	<input type="checkbox"/>	x	
public health and safety hazards due to solid waste disposal in sanitary landfills?	X	<input type="checkbox"/>	Potential impact by hospitals operating without medical solid waste treatment facilities. Mitigate by ensuring that a compliant disposal system is in place or is worked out with the municipality and no open dumping is allowed at the hospital grounds.
poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	<input type="checkbox"/>	x	Work is within existing premises
increased noise and air pollution resulting from traffic volume?	<input type="checkbox"/>	x	
creation of temporary breeding habitats for mosquito vectors of disease?	X	<input type="checkbox"/>	Potential impact from hospitals that have deficient and substandard drainage facilities. Mitigating measure is to upgrade, maintain and ensure that no ponding from drainage systems occurs.