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THE GAMBIA

MINISTRY OF HEALTH AND SOCIAL WELFARE

NATIONAL HEALTH CARE WASTE MANAGEMENT PLAN

MINISTRY OF HEALTH AND SOCIAL WELFARE

WORLD BANK

THIS REPORT IS AVAILABLE FROM:

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Attention: Chief Public Health Officer
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Banjul
The Gambia

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immuno-Deficiency Syndrome
CBO	Community Based Organization
EHU	Environmental Health Services Department
EmONC	Emergency Obstetric and Neonatal Care
GAVI	Global Alliance for Vaccine Initiatives
GDP	Gross Domestic Product
HCF	Health Care Facility
HCGW	Health Care General Waste
HCRW	healthcare Risk Waste
HCW	Health Care Waste
HCWM	Health Care Waste Management
HCWMP	Health Care Waste Management Plan
HDI	Human Development Index
HepB	Hepatitis B
HepC	Hepatitis C
HIV	Human Immunodeficiency Virus
HSSP	Health Sector Strategic Plan
IMR	Infant Mortality Rate
LG	Local Government
MDG	Millennium Development Goals
MFE	Ministry of Forestry and the Environment
MMR	Maternal Mortality Rate
MoHSW	Ministry of Health and Social Welfare
NEA	National Environmental Agency
NCDs	Non-Communicable Diseases
NGO	Non-Governmental Organization
POA	Plan of Action
STC	Short Term Consultant
SOPs	Standard Operating Procedures
STI	Sexually Transmitted Infections
WB	World Bank
WHO	World Health Organization

EXECUTIVE SUMMARY

Healthcare waste (HCW) is defined as the total waste stream from a healthcare facility (HCF) that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Most of it (**75-90%**) is similar to domestic waste. This fraction referred to as healthcare general waste (HCGW) is made of paper, plastic packaging, food preparation, etc. that haven't been in contact with patients. A smaller proportion (**10-25%**) is infectious/hazardous waste that requires special treatment. This fraction referred to as healthcare risk waste (HCRW) is the one which is of concern at Health Care Facilities (HCF) due to the risks that it poses both to human health and the environment. Poor management of this HCRW exposes healthcare workers, waste handlers and the community to infections, toxic effects and injuries. Exposure to HCRW can result in diseases or injury.

To combat the HCW menace, the Gambian Government developed the National Health Policy (2012 – 2020). And then developed a Health Sector Strategic Plan (HSSP) with various facets for addressing the country's health sector challenges of which HCWM is a part. The policy acknowledged that the health sector is under great pressure due to a number of factors: high population growth rate, increasing morbidity and mortality, insufficient financial and logistic support, deterioration of physical infrastructure, inadequacies of supplies and equipment, shortage of adequately and appropriately trained health personnel, high attrition rate as well as inadequate referral system (**GoTG, 2011**). This pressure is resulting in high prevalence of communicable and non-communicable diseases. **However, the Policy points out that most of these diseases can easily be prevented if appropriate environmental and lifestyle measures are taken, with more attention paid to development of health promotion and prevention actions than merely focusing on curative care alone.**

Both the Health Sector Strategic Plan (HSSP) and the National Health Policy have various facets for addressing the country's health sector challenges. One of the components of this strategy is the Result Based Financing (RBF) approach whose objectives are to accelerate the availability, accessibility and utilization of quality health services. This approach provides financial reward directly to service providers contingent upon undertaking predetermined actions or achieving certain results/health outcomes The RBF program will contribute towards delivering adequate health care services to the Gambian population. As part of this Component, the proper management of all health care waste is of prime importance, hence, the development of the Health Care Waste Management Plan (HCWMP) for The Gambia.

The development of the Health Care Waste Management Plan (HCWMP) for The Gambia serves to complement other World Bank and cooperating partner efforts like the **Expanded Programme for Immunization (EPI),** which is supporting the HCWM in the country by providing incinerators among other things. The current plan then brings in the holistic

approach to HCWM to embrace the legal and institutional aspects and to involve all the appropriate stakeholders in the sector.

The current report elaborates the current status of HCWM in The Gambia, assesses the gaps in technology and information and explores options for solutions. The resultant Health Care Waste Management Plan (HCWMP) sets out the requisite playing field for an effective HCWM programme, starting with a clear legal and institutional framework, appropriate technology, empowered workforce and an enlightened public.

The HCWMP was developed as a result of an assessment of Health Care Waste Management (HCWM) in a sample of the Health Care Facilities of The Gambia. Health care services in The Gambia are provided by three main institutions: (i) Ministry of Health and Social Welfare (MoHSW) Hospitals; (ii) Private for profit Hospitals, (iii) Private non-profit Hospitals. The Health Care Facilities can be divided into several categories;

1. Referral Hospitals
2. Hospitals
3. Reproductive And Child Health (RCH) Clinics
4. Minor Health Centres
5. Major Health Centres
6. Private For Profit
7. Private Non-Profit
8. Primary Health Care (PHC) - Key Villages
9. Primary Health Care (PHC) - Villages

And the other institutions which are related to them and generate similar waste are:

1. Veterinary Hospitals
2. Pharmaceuticals
3. Blood Transfusion Services
4. Local Authorities
5. Analytical Services Providers (Laboratories)
6. Medical Research Council
7. Regional Health Teams

The public health service delivery system is three tier based on the primary health care strategy. Presently services are provided by 6 hospitals, 36 health centres at the secondary level and 492 health posts at the primary level. The public health system is complemented by 34 private and Non-Governmental Organization clinics. The public sector has 1477 beds, 211 Doctors and Dentists, 8 Pharmacists, 261 Registered Nurses, 250 Enrolled Nurses, 144 Community Health Nurses, 122 Public Health Officials and 8 Laboratory Technologists.

In order to come up with a holistic HCWM Plan, the situation at all the health care facility categories, including the associated institutions was assessed and the desired level of

operations determined. This was done by selecting a sample for each category of facility and then carrying out a rapid assessment of the sampled institutions using the Rapid Assessment Tool that was developed by WHO. The rapid field assessment observed the following constraints on the HCWM system:

- Non formalization of HCWM in the institutions
- Absence of specific operational policy about HCW;
- Weak HCWM legislative regime
- Absence of standard HCWM operational procedures
- Inadequate budgetary resource allocations;
- Limited qualified human resources;
- Technological challenges in handling, treatment and disposal facilities.
- Subdued and insufficient knowledge about HCW (staff and public).
- Absence of private sector participationl2

To address these short comings, a HCWMP was then crafted. It was crafted in such a way as to initiate a process and support the national response to the shortcomings. It focuses on preventive measures, mainly the initiatives to be taken in order to reduce the health and environmental risks associated with mismanaged waste. It also focuses on the positive pro-active actions, which, in the long term, will allow a change of behaviour, sustainable HCWM, and protection of actors against risks of infection.

The HCWMP is organized around the following objectives:

1. To reinforce the national legal framework for HCWM.
2. To improve the institutional framework for HCWM.
3. To assess the HCWM situation, propose options for health care facilities and improve the HCWM in health care facilities.
4. To conduct awareness campaigns for the communities and provide training for l2all actors involved in HCWM.
5. To support private initiatives and partnership in HCWM
6. To develop and operationalize specific financial resources to cover the costs of the management of healthcare wastes.

These actions should be accompanied by complementary measures, mainly initiated by governmental programs, in terms of HCWM upgrading in health facilities. **The estimated cost of implementing the HCWMP and initiating this process of proper handling, disposal and management of medical waste is** US $ 955 540.00 **Of this amount,** US $ 407 940.00 **is for institutional, training, and coordination/monitoring activities, and** US $ 547 600.00 **is for investments in equipment and supplies to upgrade HCWM at the health facility level.**

MOHSW does not have a budget for HCWM and has to look for more potential donors as the IDA project will cover the cost of institutional, training, and coordination/monitoring activities **to the tune of $ 430 280.00,** including the policy framework, 50% of the equipment and the training and all of the monitoring and evaluation.

The cornerstone of the management of waste is that it must be **consistent** from the point of generation "cradle" to the point of final disposal "grave", following a defined waste stream which is standard and acceptable. The relative risk approach was used in determining the treatment systems and technologies to be used at each HCF. The criteria for deciding on the system are thl8at it protects in the best way possible, healthcare workers and the community as well as ml2inimize adverse impacts on the environment. The use of a burial pit or a small-scale incinerator, although clearly not the best solution, is much better than uncontrolled dumping. The following recommendations were drawn:

- Modern pyrolitic incinerators at Referral hospitals, Regional hospitals, other Hospitals, and the Local Authorities, because of its fairly low cost and operating skills requirements;
- Local incinerators (built with local material) in Major Health Centres, Minor Health Centres, Private Health Centres and other Public Health Units because of its very low cost and small quantities of HCW produced in these facilities;
- Stabilized concrete lined pits in major Health Centres, Minor Health Centres, Public Health Units and for home based care, because of very low HCW production.

The handling of the final incineration residues is also very important and it was recommended that in big cities this can be disposed of at the public municipal landfills and at Regional and local level, the remaining wastes can be buried within the premises or in lined pits, away from patient treatment areas.

The implementation schedule of the HCWMP is over a five year period and the lead agent, the Environmental Health Unit of the MoHSW will coordinate the implementation and apply a multi-stakeholder approach to embrace all the relevant players that include the Ministry of Forestry and the Environment (MOFE), National Environmental Agency (NEA); Local Authorities, the Veterinary Department, NGOs, and other private players.

Above all, the HCWMP emphasizes on monitoring and evaluation of the system. The monitoring of HCWM is part of the overall quality management system. To measure the efficiency of the HCWMP, as far as the reduction of infections is concerned; activities should be monitored and evaluated, in collaboration with concerned institutions: MoHSW, MOFE, NEA, Local Authorities, NGOs, etc. This can only be possible if it becomes mandatory to keep records of HCWM at all institutions and then maintain a reporting system of the same.

1. INTRODUCTION

1. Healthcare waste (HCW) is defined as the total waste stream from a healthcare facility (HCF) that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Most of it (**75-90%**) is similar to domestic waste. This fraction referred to as healthcare general waste (HCGW) is made of paper, plastic packaging, food preparation, etc. that haven't been in contact with patients.

2. A smaller proportion (**10-25%**) is infectious/hazardous waste that requires special treatment. This fraction referred to as healthcare risk waste (HCRW) is the one which is of concern at Health Care Facilities (HCF) due to the risks that it poses both to human health and the environment. Poor management of this HCRW exposes healthcare workers, waste handlers and the community to infections, toxic effects and injuries. Exposure to HCRW can result in diseases or injury.

3. Furthermore, if these two basic categories of waste aren't segregated (separated) properly, the entire volume of HCW must be considered as being infectious according to the precautionary principle, hence the importance of setting up a safe and integrated waste management system.

4. In 2012, The Gambia Government developed the National Health Policy (2012 – 2020). The policy acknowledged that the health sector is under great pressure due to a number of factors: high population growth rate, increasing morbidity and mortality, insufficient financial and logistic support, deterioration of physical infrastructure, inadequacies of supplies and equipment, shortage of adequately and appropriately trained health personnel, high attrition rate as well as inadequate referral system (**GoTG, 2011**). This pressure is resulting in high prevalence of communicable and non-communicable diseases such as Malaria, Diarrhoea, Upper Respiration Tract Infection, Tuberculosis, Skin Disease, Accidents, Hypertension, Cancers, Eye Infection, Pregnancy-related conditions, Helminthiasis, malnutrition and HIV/AIDS and its spread. **However, the Policy points out that most of these diseases can easily be prevented if appropriate environmental and lifestyle measures are taken, with more attention paid to development of health promotion and prevention actions than merely focusing on curative care alone.**

5. In general the policy update provided an impetus and new direction for the health sector development that serves as the basis for driving the health sector priorities and planning as well as guiding resource allocation processes. To further combat the impact of health care waste, the Gambia Government developed a Health Sector Strategic Plan (HSSP) with various facets for addressing the country's health sector challenges of which HCWM is a part.

6. Furthermore, the mission of the Ministry of Health and Social Welfare is to contribute to socioeconomic development and wealth creation by promoting and

protecting the health of the population through equitable provision of quality health care within the context of Primary Health Care. This mission puts the concept of health beyond the confines of curative care to other socio-economic determinants of health.

7. The Government is cognisant of the effects of the environment on the socioeconomic growth and development including health. Environmental health and safety is an important determinant of health outcomes and still remains a major challenge for the Ministry of Health and partners. Hence one of the policy objectives is to reduce the frequency of environmental health and safety related diseases/conditions by 30% by 2020. And this will be achieved through (i) Enforcement of environmental health related Acts, (ii) Instituting proper management of solid, gaseous and liquid wastes, and (iii) Strengthening the environmental units of key municipalities

8. As part of this main component, the proper management of all health care waste is of prime importance, thus the development of the Health Care Waste Management Plan (HCWMP) for The Gambia. The development of the Health Care Waste Management Plan (HCWMP) for The Gambia serves to complement other World Bank and cooperating partner efforts like the **World Bank support for the Rapid Assessment of HCWM services,** geared towards **generating the baseline data** for improving the HCWM services at all Health Care Facilities.

9. The current plan then brings in the holistic approach to HCWM to embrace the legal and institutional aspects and to involve all the appropriate stakeholders in the sector. Such a plan is necessary in order to prevent and mitigate the environmental and health impacts of Health Care Waste on Health Care Staff and the general public.

10. The objective of this report is to elaborate a Health Care Waste Management Plan (HCWMP) appropriately assessed, with clear institutional arrangements for proper implementation. The plan of action was developed as a result of an assessment of Health Care Waste Management (HCWM) in a sample of the Health Facilities in The Gambia. The Health Care Facilities can be divided into several categories;

1. Referral Hospitals
2. Hospitals
3. Reproductive and Child Health (RCH) Clinics
4. Minor Health Centres
5. Major Health Centres
6. Private For Profit
7. Private Non-Profit
8. Primary Health Care (PHC) - Key Villages
9. Primary Health Care (PHC) - Villages

11. And the other institutions which are related to them and generate similar waste are:

1. Veterinary Hospitals
2. Pharmaceuticals

3. Blood Transfusion Services
4. Local Authorities
5. Analytical Services Providers (Laboratories)
6. Medical Research Council
7. Regional Health Teams

12. The public health service delivery system is three tier based on the primary health care strategy. Presently services are provided by 6 hospitals, 36 health facilities at the secondary level and 492 health posts at the primary level. The public health system is complemented by 34 private and Non-Governmental Organization clinics. The public sector has 1477 beds, 211 doctors and dentists, 8 Pharmacists, 261 Registered nurses, 250 Enrolled nurses, 144 Community Nurses, 122 Public Health Officials and 8 Laboratory Technologist.

13. In order to come up with a holistic HCWM plan, the situation at all the health care facility categories, including the associated institutions was assessed and the desired level of operations determined. The following is an outline of the situation and the final plan of action that was derived from the exercise.

2. CONTEXT OF THE HCWM PLAN

2.0 INTRODUCTION

14. This chapter describes the context of the Health Care Waste Management Plan for The Gambia. It highlights the contrast betweel2n the relatively developed curative side of the Health Care System as opposed to the poorly developed preventive side suffering from inequitable and unsustainable resource allocation.

Area and Topography

15. The Gambia is located on the West African Coast and extends about 400 km inland, with a population density of 97 persons per square kilometres. The width of the country varies from 24 to 28 kilometres and has a land area of 10,689 square kilometres. It is bordered in the North, South and East by the Republic of Senegal and on the West by the Atlantic Ocean.

16. The topography is flat, broken only by numerous creeks, with the highest points being between 40 and 45 meters above sea level near the eastern end of the country. About 20% of the land is mangrove swamp bordering the river. Over the remainder, the natural vegetation type is semi-arid savannah but this has been extensively modified by human influence.

Climate

17. The climate is sub-tropical with two distinct seasons. From July to September, south westerly winds bring rain totalling between 575 and 800 millimetres and the rest of the year is noted for dry (sometimes dusty) winds called Harmattan from the Sahara to the north east. The rainfall during October to June is less than 1 millimetre. The average temperature varies between 25 degrees Centigrade near the Atlantic coast to 32 degrees at the eastern end of the country.

18. Bush fires are common during the dry season and it has been quoted that 80% of the land area is burnt each year.

Demography

19. According to the Demographic profile – July 2013, the population is estimated at 1,883,051 (July 2013 est.) with a population growth rate of 2.29% (2013 est.). Women constitute 51% of the total population. The urban population constitutes 57.3% of total population, with an annual rate of urbanization of 3.63%. The birth rate is 32.59 births/1,000 population (2013 est.) while the total fertility rate is 3.98 children born/woman (2013 est.). The moderately high fertility level has resulted in a relatively youthful population structure. L2

20. According to the 2013 estimates, nearly 39.2% of the population is below 15 years, 21% between the ages 15 to 24, 32.5% between the ages 25 to 54, 4% between the ages 55 to 64 and 3.2% above the age 65. Average life expectancy at birth is 64.09 years overall, with 61.78 and 66.47 for male and female respectively (2013 est.).

21. Other Health related demographics are summarised in table 2-1 below:

Table 2-1 The Gambia Demography

No.	PARAMETER	PROFILE
1.0	Drinking water source	**improved:** urban: 92% of population rural: 85% of population total: 89% of population **unimproved:** urban: 8% of population rural: 15% of population total: 11% of population (2010 est.)
2.0	Sanitation facility access	**improved:** urban: 70% of population rural: 65% of population total: 68% of population **unimproved:** urban: 30% of population rural: 35% of population total: 32% of population (2010 est.)
3.0	Major infectious diseases	**degree of risk:** very high **food or waterborne diseases:** bacterial and protozoal diarrhoea, hepatitis A, and typhoid fever **vector-borne diseases:** malaria and dengue fever **water contact disease:** schistosomiasis **respiratory disease:** meningococcal meningitis **animal contact disease:** rabies (2013)
4.0	Ethnic groups	African 99% (Mandinka 42%, Fula 18%, Wolof 16%, Jola 10%, Serahuli 9%, other 4%), non-African 1% (2003 census)
5.0	Religions	Muslim 90%, Christian 8%, indigenous beliefs 2%
6.0	Languages	English (official), Mandinka, Wolof, Fula, other indigenous vernaculars
7.0	Literacy	**definition:** age 15 and over can read and write **total population:** 51.1% **male:** 60.9% **female:** 41.9% (2011 est.)
8.0	School life expectancy (primary to tertiary education)	**total:** 8.6 years (2008)
9.0	Education expenditures	3.9% of GDP (2011)
10.0	Maternal mortality rate	360 deaths/100,000 live births (2010)
11.0	Children under the age of 5 years underweight	15.8% (2006)
12.0	Health expenditures	4.4% of GDP (2011)
13.0	Physicians density	0.107 physicians/1,000 population (2008)
14.0	Hospital bed density	1.1 beds/1,000 population (2011)

2.1 THE POLICY FRAMEWORK

2.1.1 The National Health Policy

22. The National Health Policy embodies the vision and mission of the Ministry of Health and Social Welfare essentially as to promote and protect the health of the population of The Gambia through the equitable provision of quality health care, by providing quality health care services within an enabling environment, delivered by appropriately and adequately trained, skilled and motivated personnel at all levels of care with the involvement of all stakeholders.

23. The Primary Health Care (PHC) approach has been the guiding strategy for healthcare delivery since the 1970s. The Health Policy (2011 – 2015), "Health is Wealth" seeks to promote, maintain and protect the health of the population, thus strengthening the linkage between health and economic productivity. The means to achieving this is to improve the delivery of health services, with a specific focus on the attainment of the health-related objectives of the vision 2020 of The Gambia and those of the MDGs.

24. The key guiding principles of the health Policy are equity (including gender equity); ethics and quality; client satisfaction; cultural identity; health systems reforms; skilled staff retention and circulation; partnership; evidence based health care and patient bill of right. The Policy defines areas of intervention, and aims at bringing about significant improvement in the following areas:

- **Public Health Programmes and clinical care delivery;** the existing minimum package will be delivered through implementing environmental health and safety packages, health education and promotion, Expanded Programme on Immunization, Disease Control, reproductive and child health and, basic health care.
- **Health systems strengthening and capacity building**: this will be delivered through organization and management of health care services, human resources development, infrastructure and logistics, health information management using Health Management Information Systems (HMIS), health financing and partnerships;
- **Legislations governing health practices**: Acts such as the Public Health Act (1990), the Lunatic Act (1914), Medical and Dental Professions Act (1976) as well as the **Nurses** and Midwives **Act** No 31 of 1997 are outdated and not responsive to new developments;
- **Technical support services** for essential drugs, vaccines and other medical supplies, blood transfusion services, laboratory services, radiology services and referral systems; and
- **Community participation and traditional medicine.**

25. The policy also outlines the importance of establishing an effective, efficient and transparent health care tourism mechanism and support system that is equitably applied.

The policy emphasizes the provision of preventive, promotive, curative and rehabilitative services (MOHSW, 2011). Although the Policy spells out the preventive services, somehow HCWM does not come out as a specific priority in the national health policy.

2.1.2 The Environmental Action Plan Phase II (2009 – 2018)

26. The Gambia Environmental Action Plan (GEAP) Phase II Programme is a five year plan in the form of advisory services, technical assistance, support grants, training, and ancillary equipment and supplies necessary for the effective implementation of the programme.

27. The goal of the GEAP Phase II Programme is to ensure sustainable development. To accomplish this goal, the Programme's purpose is to develop an effective and financially self-sustaining environmental management system for The Gambia. While increased action is needed in all sectors of the economy, GEAP Phase II efforts will be geared primarily towards sustainable natural resource management, energy and environmental health. Areas of particular interest to the GEAP Phase II Programme include agriculture and livestock, natural resources, trade and investment, tourism and infrastructure, waste management and coastal zone management.

28. Successful implementation of GEAP Phase II will be indicated by the following end of programme conditions:

- Improved and strengthened institutional framework for environmental management in place at all levels by 2018
- Environmental considerations included in policy and planning processes at all levels by 2018
- Strengthened regulatory framework and enforcement of the regulatory codes, and environmental regulations fully enforceable and respected by all sectors
- Pathways towards sustainable financing mechanisms for environmental management in The Gambia clearly identified
- Functioning institutional and legal framework in place for sustainable management and protection of the coastal zone and its resources
- Strengthened advocacy and sensitization for sustainable development
- Private sector and parastatals engaged in dialogue for sustainable resource use

2.1.3 Environmental Health Policy

29. To achieve the goals of the National Health Policy (2011 – 2015) and the Public Health Act (1990) an Environmental Health Policy (2004 – 2014) has been crafted. The policy provides a framework and appropriate guidelines for examining and solving the

national environmental health problems in a coherent and realistic manner and highlights HCW as one of the constituents of environmental Health issues. To put into effect the provisions of the policy, Health Care Waste Management Regulations have also been crafted.

2.1.4 National Solid Waste Management Strategy (1997)

30. The objective of the National Solid Waste Management Strategy is to control pollution, improve waste management to prevent environmental degradation and ensure that waste is managed sustainably.

31. The target wastes covered by this strategy are domestic wastes including garden wastes, commercial wastes, institutional wastes (markets, schools, hospitals, public offices, etc.), street sweeping and grass cutting wastes, wastes collected from drains, industrial solid wastes which are or can be accepted in municipal landfills (toxic and hazardous wastes are excluded).

32. The Strategy covers the whole country. However, priority target areas can be established covering only urban areas and settlements like mines and farms for practical purposes.

33. According to the National Environment Agency's solid waste management strategy, most waste reduction initiatives that affect municipal waste are, to a large extent, industry led, with the consumer exerting some influence. "The consumer can express a preference for goods which are more durable." In The Gambia, money available to the average consumer is limited so there is always a tendency to purchase the cheapest articles available irrespective of how long they are expected to last. This is exacerbating the solid waste menace in the country.

2.2 LEGAL FRAMEWORK

34. MOHSW has several pieces of legislation it applies in its quest to improve Environmental Health which includes the Public Health Act (1990), Environment Management Act (1994), and the Waste Management and anti-littering Regulations (2007) among others.

2.2.1 Acts and Statutes

2.2.1.1 The Public Health Act Chapter 40:03 of 1990

35. The National Health Policy forms the basis for the Public Health Act of 1990, upon which the provision of both health care and Environmental Health services are derived.

36. The Public Health Act 1990 provides for the Director of Health Services to undertake a range of functions to preserve health. The collection and disposal of solid waste was originally included within these, but this responsibility was subsequently transferred to the

local authorities, with the Director of Health Services retaining a monitoring and regulatory role. This function is exercised through the Public Health Inspectorate. The Act provides powers for Health Officers to enter premises for inspection and take possession of dangerous premises for the purposes of executing remedial works.

37. The Act majors on both the preventive and curative sides of medicine, though it is not explicit on the preventive side especially the management of hazardous wastes which have great potential of causing diseases. It states that the Director of Health Services is responsible for the promotion and preservation of health, especially the (i) prevention, treatment, limitation and suppression of diseases and the conduct of investigations and enquiries into such disease, (ii) abatement of nuisances and the removal or correction of any condition that may be injurious to public health.

38. Generally the Act deals with the prevention, treatment, limitation and suppression of diseases, abatement of nuisances, control of food quality, maintenance of sanitary conditions, ensuring the purity of water supply, birth and deaths registration and the control of medical institutions.

2.2.1.2 The National Environment Management Act, 1994.

39. The principal instrument of environmental legislation in The Gambia is the National Environmental Management Act 1994 (NEMA). This Act establishes the National Environmental Management Council (NEMC) and the National Environment Agency (NEA), together with technical working groups and local Environment Committees. It provides for the introduction of environmental impact assessment and auditing as part of the environmental planning process. The main sections relevant to the Environmental Quality Monitoring and Enforcement Project are contained in Part VI (Environmental Standards), Part VII (Environmental Management), Part VIII (Pollution Control) and Part IX (Inspection, Analysis and Records), and are as follows:

(i) Section 28 empowers NEA to establish standards and monitoring procedures for twelve specified environmental media, including air quality, water quality and solid waste.

(ii) Section 38 provides for an industrial discharge permitting system to be set up by regulations. Discharge of "any dangerous material or substance" into water or other environmental media is prohibited, except in accordance with the regulations. In addition to criminal penalties, provision is made for restitution and compensation.

(iii) Section 39 prohibits pollution of the environment in excess of the standards set under section 28. In addition to criminal penalties, provision is made for restitution and compensation.

40. The NEMA therefore provides the framework for environmental quality standards, monitoring and enforcement covering waste management activities. It is understood that the

implementation of the standards, monitoring and discharge permitting will require the issue of Regulations by the National Environmental Management Council.

2.2.2 Subsidiary Legislation

a) Public Health Regulations (CAP. 40:03 Subsidiary)

41. The subsidiary legislation concentrates on bake houses and sale of fresh food, water supply and quality issues, sanitation issues, keeping of sheep and goats in certain places and slaughter houses. It does not cover much on the preventive side of medicine and anything in terms of hazardous waste management.

b) Environmental Discharge Permit Regulations, 2001

42. The Regulations were developed as an outcome of the recommendations from the National Environment Agency and in line with the powers conferred on the NEMC by sections 38(1) and 63 (1) of the National Environment Management Act, 1994. The Regulations cover the emissions of particulate and gaseous pollutants into the air, the discharge of liquid effluents and pollutants into the water and general environment. It states that any such discharges should be done only under a license (discharge permit) issued by the Agency and in accordance with these Regulations. The Regulations in Category I cited incinerators, hospitals and medical clinics as some of the processes with the most serious potential for pollution.

c) Environmental Quality Standards Regulations 1999

43. The Environmental Quality Standards Regulations were developed as an outcome of the recommendations from the National Environment Agency and in line with the powers conferred on the NEMC by sections 38(1) and 63 (1) of the National Environment Management Act, 1994. The Regulations establishes the Environment Quality Standards Board, whose functions are (i) to propose environmental quality standards to the Council and to review the same periodically; and (ii) to carry out any other functions that may be delegated to it by the Council. The Regulations sets out the environmental quality standards in respect of ambient air, saline waters, surface fresh waters and groundwater. The Regulations state that the Agency is responsible for ensuring that the standards are maintained and must take appropriate measures to ensure the same.

2.2.3 Other Acts

44. Other legislations which are of relevance to waste management include the following:

General Environmental Legislation/Institutional Issues

- L2Local Government (City of Banjul), Chapter 33:02, Act 1 of 1946
- Local Government, Chapter 33:01, Act 26 of 1963
- Territorial Sea and Contiguous Zone, Chapter 26:02, Act 4 of 1968
- Continental Shelf, Chapter 26:01, Act 11 of 1965

Public Health and Pollution Control

- National Water Resources Council, Chapter 66:02, Act 22 of 1979
- Hazardous Chemicals and Pesticides Control and Management Act, 1994
- Plant Importation and Regulation, Chapter 58, Act 2 of 1936
- Prevention of Damage by Pests, Chapter 60:02, Act 5 of 1962
- Environmental Protection (Prevention of Dumping), Chapter 72:02, Act 15 of 1988

2.2.4 General Legal Framework Issues

45. The legal framework does not ensure sustainable HCWM, as it does not define in a clear and precise way the roles, responsibilities and field competencies of actors involved in HCWM, nor does it provide internal regulations at the level of the health facility. The present laws and regulations don't provide for standardization of HCW collection, transportation, storage and treatment procedures. To make these legal documents more operational, they must reinforce the technical guidelines about HCWM, implement a specific regulation for each health facility and settle procedures of control. In addition, the laws and regulations, elaborated at the central level, should allow the Local Authorities to legislate locally about HCWM.

2.3 THE INSTITUTIONAL FRAMEWORK

46. There are various Acts, Bills and Regulations defining shared responsibilities of the management of hazardous waste in general and Health Care Waste in particular. These institutions include the Ministry of Health and Social Welfare (MoHSW), the Ministry of Forestry and the Environment (MFE), the National Environment Agency (NEA) and other line Agencies or Stakeholders. The institutional framework as provided for in The Gambia Environmental Action plan (GEAP) Phase II Programme provides for other players to get involved in the waste management sector.

2.3.1 Ministry of Health and Social Welfare

47. The day to day management of the health care waste sector is the responsibility of the MoHSW. The mandate of the Ministry is to; promote and protect the health of the population by providing a comprehensive healthcare package in partnership with all relevant stakeholders; ensure high coverage of basic healthcare services; achieve staff training and retention; ensure a reduction of maternal and infant mortality and morbidity; ensure reduction of communicable and non-communicable diseases; strengthen and support Health Communication Programmes; ensure reduction in the frequency of environmental health and safety related problems and diseases; and establish a mechanism for health services financing risk protection for all.

2.3.2 Ministry of Forestry and Environment

48. The Ministry of Forestry and the Environment (MFE) has the overall mandate in terms of the management of all waste as spelt out by the Environmental Management Act (2002) and its subsidiary legislation. Through its Agent, the National Environment Agency (NEA), the MENRM has gazetted various subsidiary legislations which deal with health care waste and these includes the National Solid Waste Management strategy (2009) the Solid Waste Regulations (2000) and the Hazardous Substances Regulation (year).

2.3.3 National Environmental Agency (NEA)

49. The ultimate goal of the National Environment Agency is to achieve the essential policy objectives of the Gambia Environmental Action Plan as indicated below is: (i) To ensure an environmentally sustainable economic and social development in The Gambia; and (ii) To have a legal recognition of the fundamental right to a sound environment, ensuring the health and well-being of all those living in The Gambia. The aims and objectives are:

- To make sure that the economic and social development of The Gambia is done in an environmentally sustainable manner.
- To develop and maintain a National Environmental Planning Framework for The Gambia.
- To have a Legal recognition of the fundamental right to a sound environment, ensuring the health and well-being of all those living in The Gambia.
- To educate about the environment, increasing environmental awareness and empowering communities to take action to identify and solve environmental problems.
- To provide reliable and relevant information for sound environmental management.
- To conserve and promote the sound and rational use of natural resources.

2.3.4 Local Authorities

50. In Greater Banjul and the Western Region, the Banjul City Council, Kanifing Municipal Council and Brikama Area Council are responsible for collection and disposal of waste. They are also responsible for providing a range of other services including street sweeping and, in Banjul, the cleaning of drains. Monitoring waste management activities in these areas is carried out by the Public Health Department although the National Environment Act places responsibility for this with the National Environment Agency.

51. In the other Regions, waste collection and disposal are the responsibility of the Area Councils and the Public Health Department. There is confusion and inconsistency in the distribution of responsibilities between the two but, in general, it appears that the former provides financial and material resources while the latter provides management and technical supervision. The workforce appears to be provided partly by the Area Councils and partly by the Public Health Department. Monitoring is the responsibility of the Public Health Department but, as they are managing the work, no independent monitoring is being

undertaken. Although the Area Councils and Public Health Department have to liaise to provide services, it was noted that their organizational structures were different as described in Table 2-2.

Table 2-2 Management Centres

DIVISION	MUNICIPALITY	PUBLIC HEALTH DEPARTMENT
Banjul City	Banjul City Council	Central Office in Banjul
Kanifing	Kanifing Municipal Council	Kanifing
Western Region	Brikama Area Council	Brikama
Lower River Region	Mansa Konko Area Council	Mansa Konko
North Bank Region	Kerewan Area Council	Farafenni and Essau
Central River Region	Kuntaur Area Council	Bansang
	Janjangbureh Area Council	
Upper River Region	Basse Area Council	Basse

2.4 HANDLING AND TREATMENT OF HCW

52. The basic setup for HCWM is in place in most of the Health Care Facilities. It is characterized by a number of deficiencies which include the following:

- Lack of formalization of HCWM issues;
- Non-inclusion in budgets;
- Lack of plan or internal procedures;
- No responsible person/team designated to follow up on HCW management;
- Absence of data about HCW production and classification;
- Insufficiency of appropriate collection containers and protective equipment;
- Ageing equipment and infrastructure;
- Lack of systematic segregation of HCW and mixing with household wastes;

2.5 LEVEL OF AWARENESS OF GOOD HCWM PRACTICES

53. Generally, staff responsible for handling waste throughout the whole chain, i.e. the Administrators, Head Nurses, the Waste Collectors, the Orderlies, the grounds men, are not adequately trained and do not have sufficient knowledge of good HCWM behaviour and practices.

54. This is aggravated by the thrust which was on curative medicine, completely side-lining the preventive side. HCWM systems are thus not well known or followed, quite often making it a source of accidents, causing wounds and infection. There is a poor level of

knowledge and appreciation of the risks associated with HCW; causing staff to deal with HCW casually, store it inappropriately, mix it with general waste and dispose it anyhow.

55. As for the public in general (scavengers, children, and people at landfill sites) the knowledge on risks linked with the handling of HCW is very weak. For these actors, it is necessary to develop information and public awareness programmes on risks linked with HCW.

2.6 PRIVATE SECTOR PARTICIPATION

56. A few private companies are involved in HCWM in The Gambia, but on the main it is basically the responsibility of hospital staff and the local authorities. Some local authorities though tasked to handle HCW do not have the requisite capacities and end up mixing all wastes at the landfill. This poses a limitation to managing health care wastes in a professional manner, as the management skills and financial resources of the private sector are not being tapped.

57. The proposed action plan for HCWM supports initiatives to develop a partnership between public and private sector with civil society. To accomplish this, it will be necessary to ensure sustainable financial resources for HCWM.

58. As an innovative activity, the project could promote a PPP with the private sector to improve national health-care waste management practices and create a sustainable health-care waste management system.

59. To design and develop a public-private partnership (PPP) for testing the HCWM system at facilities in a district that is in close proximity to Banjul. The main idea is to create a pilot system to collect, treat and dispose of hazardous medical waste, by procuring a local contractor that will move around with a trolley once a week between 3 or 4 health facilities in a pilot selected area, and would be responsible for collecting, providing appropriate bags, bagging, treating and transporting the health-care waste materials to the disposal/incinerating area. There should be a proposed disposal/incinerating area where there should be a macro-burn incinerator with high capacity (e.g. 500 kg). Hopefully, this will be a good opportunity not only to improve disposal of the HCW of peri-urban areas, but also to maximize the use of the facility that has high capacity incinerator. The project would provide funding for this activity (paying the contractor for the bags and gasoline) and as an incentive, it would pay the contractor on a results base, i.e. pay per number of deliveries. This activity could even be expanded to create extra shifts at the facility, creating thus opportunities to increase staff's earnings.

60. The minimum requirements for the contractor will be: (i) experience in providing health-care waste management services for a period of at least two years; and (ii) be compliance with local and international norms and standards, including licensing, certification, and approval or accreditation by health-care organizations.

2.7 FINANCIAL RESOURCES ALLOCATION

61. Solid waste management suffers from inadequate financing from the state and local planning authorities. The financial resource allocation at all Health Care Facilities is skewed towards curative services to the detriment of HCWM. This is the reason why major constraints are encountered at all stages of the HCWM cycle; Collectors are not motivated, equipment is hardly replaced and collection is irregular.

62. It is nearly impossible to improve management without a regular budget allocated to HCWM (mainly in health facilities). Without a sustainable financing mechanism for waste disposal in general, it will not be possible to attract the private sector into playing a greater role for HCWM.

2.8 HEALTH CHALLENGES IN THE GAMBIA

63. The Gambia has an Infant Mortality Rate of 67.63 deaths/1,000 live births (**male:** 73.15 deaths/1,000 live births **female:** 61.94 deaths/1,000 live births (2013 est.)), 60% of which is attributable to malaria, diarrheal diseases, acute respiratory tract infections and malnutrition. The main causes of mortality in infants (0-12 months) are neonatal sepsis, premature deliveries, malaria, respiratory infections, diarrheal diseases and malnutrition. For child mortality, main causes are: malaria, pneumonia, malnutrition, and diarrheal diseases. The Maternal Mortality Ratio is estimated at 10.5/1000 live births, with regional variation of 9/1000 in the urban areas and 16/1000 live births in the rural areas, the majority of which are due to sepsis, haemorrhage and eclampsia (GBS, 2013).

64. On average, 40% of total outpatient consultations are due to malaria, while diarrheal diseases and acute respiratory tract infections constitute about 25%.

65. The HIV/AIDS - adult prevalence rate is 2%. The number of people living with HIV/AIDS is estimated at 18,000 (2009 est) and the number of HIV/AIDS related deaths are fewer than 1,000 (2009 est.) annually.

66. There has been a decline in national coverage for fully immunized children to a present level of 68.6% for under 1 year and 76.0% for the under 2 year in 2000.

67. Malnutrition continues to be a major public health problem in The Gambia. The 2012 National Nutrition Survey has shown that Wasting was at 9.9%, Stunting was 21.2% and Underweight was 18.0% amongst children under 5 years. The study found that for non-pregnant adult women 15.1% are overweight, 6.9% obese, and 18.7 underweight.

68. Safe water is an essential pillar of sustainable health for rural and urban population. Use of improved drinking water sources (2010 MICS) is 85.8% of the overall households. The

use of improved sanitation facilities was also encouraging with 76.3% (2010 MICS) of the entire country utilizing improved sanitation facilities.

69. Considerable progress has been made in the areas of EPI Coverage, expansion of health facilities and in recruitment of trained health personnel. Success has been registered in the implementation of the Baby Friendly Community Initiative and the Bamako Initiative. Also, relevant policy documents were developed including: the National Nutrition Policy (2010 - 2020) and the National Drug Policy (1994).

70. As we highlight the progress made in health, it is worth mentioning the significant support and contributions made in the health sector by the NGOs and by both Bilateral and Multilateral partners.

71. Although considerable progress has been made, a lot more remains to be done. The implementation of the Health Action Plan is constrained by several factors including:

- All the major health centres are not fully functional; the main supporting units of the major health centres, i.e. laboratory, radiological services and operating theatres are still not equipped and staffed.
- Acute shortage of medical, nursing and other health staff at all health facilities.
- Inadequate staffing of all Regional Health Management Teams
- Poor conditions of services including inadequate staff houses have made it extremely difficult to retain staff particularly in rural areas.
- Supervisory schedules for both Regional Health Management Teams and Health Centre Teams are seriously compromised due to inadequate transport, fuel and spare parts.
- Communication difficulties between the Village Health Services and Basic Health Services and between the later and the divisional and central levels prevent the relaying of information for timely interventions.
- Inadequate capacity at all levels to select and process relevant data in a timely manner has hindered planning and management of health care delivery.
- Centralization of responsibilities and resources has seriously affected implementation of activities at the operational level.
- Central level supervision is generally inadequate

3. DESCRIPTION OF THE HCWMP PROJECT

3.0 INTRODUCTION

72. The Government of The Gambia has secured a grant amounting to Eight Hundred and Fifty Thousand US Dollars (US$850,000) from the World Bank to implement a Pilot Project and prepare an investment operation using the Results Based Financing for Health approach. These operations will be jointly implemented by the Ministry of Health and Social Welfare and the National Nutrition Agency and aims at improving the utilization of a minimum package of health and nutrition services.

73. The Project Implementing Committee intends to apply part of the proceeds of this grant to payments under the Contract to develop a National Health Care Waste Management Plan (HCWMP). The HCWMP is a major component of the main Results Based Financing (RBF) program. The main project focuses on building capacity in the health sector which will contribute to delivering adequate health care services to the Gambian population. It has been designed to accelerate the availability, accessibility and utilization of quality health and nutrition. This approach provides financial reward directly to service providers contingent upon undertaking predetermined actions or achieving certain results or health outcomes.

74. The objective for the development of the Health Care Waste Management Plan (HCWMP) is to identify the level of Health Care Waste Management that will be relevant to help implement and enforce proper health and environmentally sound, technically feasible, economically viable, and socially acceptable systems for management of health care waste during and beyond the implementation of the Project.

3.1 THE HCWMP GOAL

75. The goal of the HCWMP is to prevent, reduce and mitigate the environmental and health impacts on health care staff and the general public caused by poor health care waste management (HCWM), through the promotion of best practices and the development of safety standards.

3.2 THE HCWMP OBJECTIVES

76. The HCWMP Goal may be further broken down into the following broad objectives:

- To prevent or reduce infections that may arise from poor HCWM
- To mitigate the impacts of HCW on health care staff and the general public;
- To create an enabling legal environment for conducive and effective HCWM

- To establish a sustainable multi-sectoral institutional framework for a concerted effort in HCWM.
- Improve services in HCWM by mobilizing requisite resources

3.3 THE HCWMP STRATEGIC OBJECTIVES

77. The rapid field assessment observed the following constraints on the HCWM system:

- Non formalization of HCWM in the institutions
- Absence of specific operational policy about HCW;
- Weak HCWM legislative regime
- Absence of standard HCWM operational procedures
- Inadequate budgetary resource allocations;
- Limited qualified human resources;
- Technological challenges in handling, treatment and disposal facilities.
- Subdued and insufficient knowledge about HCW (staff and Public).
- Absence of private sector participation

78. To improve HCWM in a sustainable way, the HCWMP should address these main constraints. It should initiate a process and support the national response to these questions. It must focus on preventive measures, mainly the initiatives to be taken in order to reduce the health and environmental risks associated with mismanaged waste. It should also focus on the positive pro-active actions, which, in the long term, will allow a change of behaviour, sustainable HCWM, and protection of actors against risks of infection.

79. To achieve this, the intervention strategy should be organized around the following measures:

- Organize training activities for actors concerned (health staff, HCW handlers, municipal collectors of wastes, managers of public landfills, etc.);
- implement information and education campaigns about HCW for the general public;
- Reinforce institutional and technical capacities and improve existing regulations;
- Support partnership initiatives between public, private and civil society in HCWM.

80. These actions should be accompanied by complementary measures, mainly initiated by governmental programs, in terms of HCWM upgrading in health facilities.

4. ASSESSMENT OF HCWM IN THE COUNTRY

4.0 INTRODUCTION

81. The basic assumption is that it is possible - in a short period of time (usually 10-15 days), by questioning main stakeholders and by selecting a number of health care facilities, representative of the country - to gather the essential data necessary to have a sufficient understanding of the situation regarding HCWM at a national level.

82. By analysing the role of each stakeholder along the HCWM stream it should be possible to identify where problems remain and what simple, practical actions should be undertaken to solve them.

4.1 THE ASSESSMENT PROCESS

83. The assessment process that was utilized followed four steps to ensure that the procedure is useful, feasible, ethical and accurate:

1) Engaging all relevant stakeholders,
2) Describing the situation at each facility as observed during visits,
3) Gathering credible evidence of defined quality and quantity of operational parameters at each facility in a systematic manner,
4) Availing all field data collected as Justification of conclusions drawn.

84. The HCWM information was collected in a logical and chronological manner by starting; at *national* (organisations, ministries…) level down to the *local* (the health facilities) and from the *start* of the HCWM stream (waste generation) to the *end* (final disposal).

4.2 THE RAPID ASSESSMENT OF THE INSTITUTIONS

85. The Rapid Assessment Tool developed by WHO was applied and administered to the representative sample of the institutions that deal with HCW, starting with the responsible Government Ministries to the Clinics.

86. So as to be able to extrapolate collected data, a sufficient number of health care facilities representative of the country were visited. To keep things simple, between one and two health care facilities per size and category of structure (private, public, and NGO), type of area (urban, rural) and by Region were selected. This resulted in thirty six (36) institutions being visited (Table 4-1).

4.3 SELECTION OF HEALTH CARE FACILITIES

87. The following institutions were identified as essential stakeholders in the HCWM sector:

Table 4-1 Visited health Related Institutions

REGION	INSTITUTIONS VISITED	CATEGORY OF INSTITUTION
	MINISTRY OF HEALTH AND SOCIAL WELFARE	
	MINISTRY OF FORESTRY AND THE ENVIRONMENT	
	NATIONAL ENVIRONMENT AGENCY (NEA)	
	LOCAL AUTHORITIES	
	ANALYTICAL SERVICES PROVIDERS (LABORATORIES)	
	MEDICAL RESEARCH COUNCIL	
	REGIONAL HEALTH TEAM	
Western Region 1	Banjul Referral Hospital	RH
	Banjul Poly Clinic	Public non profit
	SOS Children's Village	NGO non profit
	Serrekunda Hospital	Public non profit
	Kotu – National Public Health Reference Laboratory	Public non profit
	MRC	International Research Centre
	Kanifing Municipal Council	Local authority
	Banjul City Council	Local authority
	Kololi Clinic	PFP
	Senela Clinic	PFP
	Pakala Clinic	PFP
	Blood Transfusion Services	Public non profit
	Animal Health & Production Centre	Public non profit
West Coast Region	Brikama Health Centre	Public non profit
	Hands on Care Clinic (Brikama)	NGO non profit
	Sibanorr Health Centre	NGO non profit
Lower River Region	Mansa Konko RHT	Public non profit
	Kwinella Health centre	Public non profit
	Soma Major Health Centre	Public non profit
Central River Region	Bansang RHT	Public non profit
	Bansang Referral Hospital	Public non profit
	Kudang Minor Health Centre	Public non profit
	Kuntaur Major Health Centre	Public non profit
		Public non profit
Upper River Region	Basse RHT	Public non profit
	Basse Major Health Centre	Public non profit
	Gambisara Minor Health Centre	Public non profit
North Bank Region	Ferafenni RHT	Public non profit
	Ngayen Sanjal	Public non profit
	Ferafenni Referral Hospital	Public non profit

4.4 ASSESSMENTS

88. At the health care facilities the following was observed:

4.4.1 Waste segregation:

89. Health care waste can generally be classified into four fractions; (i) sharps, (ii) infectious or contaminated non-sharps (healthcare risk waste – (HCRW)), (iii) non-infectious or healthcare general waste (HCGW) and (iv) medical devices and radioactive materials.

90. In all health care facilities that were assessed, the waste that is religiously separated from the rest are needles (sharps) which are placed in designated card board safety boxes, plastic yellow safety boxes or two litre plastic medicine bottles (Figure 4-1). The most generally used sharps container is the card board safety boxes, which is supplied by the Regional Health Teams to all the health facilities. The plastic yellow safety boxes were seen at very few health facilities and are used mainly by the Medical Research Council at all its research centres. Some private health centres like the Sibanorr Health Centre use two litre plastic medicine bottles.

Figure 4-1 Sharps Containers in common use

91. The non-infectious or healthcare general waste (HCGW) is similar to domestic waste and constituted **75-90%** of the waste generated at the facilities. This fraction (HCGW) is made of paper, plastic packaging, food preparation, etc. that have not been in contact with patients.

92. The infectious or healthcare risk waste (HCRW) constituted **10-25%** of the waste generated at the facilities. This fraction (HCRW) is the infectious/hazardous waste, which is of concern at Health Care Facilities (HCF) due to the risks that it poses both to human health and the environment. It consists of blood, body parts, contaminated swabs/cotton wool/bandages, contaminated non-sharps, chemicals, and pharmaceuticals.

93. In most instances the infectious and non-infectious waste was not segregated and its handling posed serious challenges as it was not labelled, either on the bin or the plastic lining. The mixed waste was being placed in different kinds of bins ranging from metal, small plastic to large wheeled bins (Figure 4-2). At times the bins were lined with black polythene bags.

Figure 4-2 General Waste Containers in common use

94. At institutions where the two fractions were segregated, the two fractions were placed in separate bins, at times with different coloured lining, but generally the black plastic lining was used for both. At the MRC the infectious waste was placed in yellow bags whilst the non-infectious waste was placed in black bags (Figure 4-3).

Figure 4-3 Yellow infectious Waste Bags at MRC

95. Medical devices and radioactive materials are an emerging health care waste stream. Most of the medical devices posing problems emanate from donated obsolete equipment being dumped by the developing nations in the less developed nations. This includes all sorts of used equipment and computers which never get to work when they arrive in the recipient country and just find their way straight to the dumps. A lot of this equipment is piling at the health facilities (Figure 4-4).

Figure 4-4 Obsolete equipment piling up at a Health Facility.

4.4.2 Temporary storage

96. Before treatment, waste is supposed to be stored under secured conditions. In most health centres there are no appropriate temporary storage facilities and where they are available they are not secured or appropriate.

97. In most of the health facilities, the waste is being stored in inappropriate places. The sharp boxes are being stored under staircases, next to incinerators, in store rooms or in offices, until transport is found (Figure 4-5).

Figure 4-5 Temporary storage for sharps; under staircase, next to incinerator, in store room, and in Public Health Officer's office.

98. The non-sharps and general waste is also being inappropriately stored. At some health facilities, waste is being heaped at the back yard awaiting collection by the local authority (Figure 4-6). In smaller facilities, it is piled in the pit until there is enough material for burning. In yet other facilities, the waste is piled in a trailer awaiting the Local Authority tractor to come and pull it to the landfill. In all cases, the storage areas are open, not secured and pose high risk to both humans and animals.

Figure 4-6 Temporary storage for infectious and non-infectious waste

4.4.3 Transportation

99. The sharps were found to be transported by hand if the treatment was on site, but if it was off-site either a truck or an ambulance was used. At times the truck would be an open truck.

100. The infectious and non-infectious waste is transported using various means which include manually by hands, open trucks, wheels chairs, donkey drawn trailers, and tractor drawn trailers (Figure 4-7).

Figure 4-7 Means of transporting infectious and non-infectious waste

4.4.4 Treatment and Disposal of Waste.

(i) Infectious and non-infectious waste

101. In the urban areas, general waste is land filled (Figure 4-8) and in the Regions it is burnt in open pit (Figure 4-9). The large local Authorities like Banjul and Kanifang have landfills. The challenge they are facing is the proper running of the landfills as resources are scarce and the proper maintenance procedures are being left undone. There are no official disposal sites in the regions and each centre has to manage its own waste.

102. Operational challenges of landfills include the following:

- The infectious and non-infectious wastes are mixed and dumped at the landfills, exposing the scavengers and recyclers to contamination.
- The dumps are poorly managed and are a haven for rodents and flies and due to their proximity to residential housing and even medical facilities like the SOS Children's Clinic, they pose serious health risks.
- The waste is ultimately being burnt and a lot of toxic smoke is released into the environment, affecting the nearby residents.

Figure 4-8 Municipal Landfill - infectious and non-infectious waste

103. Most of the Health centres in the Regions, where there is no formal collection of general wastes by a Local Authority practice open burning of the infectious and non-infectious wastes. This practice is posing some challenges which include the following:

- Air pollution from burning of the mixed wastes
- Potential hazard to humans and animals especially if the pit is not secured, and scavengers have access.

- Most institutions were not even digging a pit. So the waste was just being heaped on the surface and then later burned.
- Littering of the environment with contaminated waste as the institutions tend to pile the waste for some time before burning it. In some cases the institutions were just discarding this waste at any open space, causing pollution.

Figure 4-9 Open pit burning

(ii) Sharps

104. Sharps are incinerated (Figure 4-10) or disposed of in lined pits (Figure 4-11). Most of the Hospitals have incinerators which in the majority were not working due to lack of maintenance and age. All Government Hospital incinerators could not operate to the recommended minimum temperature of 1 200^{o}C.

105. In Hospitals and clinics with incinerators, sharps are incinerated (Figure 4-10), but in smaller Health Care Facilities, they are disposed of in lined pits (Figure 4-11, Annex 4) as at Sibanorr. The pits should be secured and their base must be above the water table. In some instances the pits were not lined.

106. Also the ash from the incinerators is generally disposed of in concrete lined pits dug next to the incinerator.

Figure 4-10 Various types of incinerators

Figure 4-11 Concrete lined pit for sharps disposal at a Clinic

107. Most of the government institutions are equipped with incinerators which, however, are in a serious state of disrepair. The major challenges facing the incinerators include the following:

- The firebricks have been burnt out and the institutions do not have a budget to refurbish the incinerators (Figure 4-12). With worn out firebricks, the incinerator cannot reach the recommended temperatures.
- For the single heath types like the one at Serrekunda Hospital, the control panels have been packed and the institution does not have a budget to repair the electrics. This has resulted in the incinerator being ignored and it is now covered with an overgrowth of vegetation (Figure 4-12).
- The operators are not well trained in operating the incinerators and at times they overload incinerators, causing them to malfunction (Figure 4-12), and generate partially burnt waste.
- Other sites are having problems with the design of the incinerators, which fail to rise to the required temperatures, like the newly constructed incinerator at Sibanorr (Figure 4-12).
- A standard stock type incinerator was supplied to most Health centres and RHT offices without due considerations of the appropriate capacities for the regions. Thus the incinerators which can handle at most five sharp boxes at a time cannot match the amount of waste being generated in the region.
- The size, capacity and types of incinerators in the institutions are causing the operators to accept sharps only and ignore the rest of the infectious waste since they can't handle large volumes.

Figure 4-12 Operational Problems with Incinerators

4.4.5 Accumulation of waste

108. Treatment facilities (incinerators) were found not to be working leading to further accumulation of health care waste. This was evident in the majority of facilities visited where there were inadequate waste management systems i.e. incinerators not working. Sharp boxes and plastic bags stored next to incinerators were found to be piling up becoming affected by the weather and beginning to tear apart thereby releasing the sharps into the environment (Figure 4-13). Similarly, drug vials have been found to be accumulating in store rooms.

Figure 4-13 Sharp boxesand vials accumulating in temporary storage areas.

4.4.6 Sanitation

109. Sanitation is either by Pit latrines (Figure 4-13), septic tank system or water borne sewage reticulation as in large urban areas. All the Health Care Facilities have separate sanitation facilities for males and females. However the facilities are not adequate for the patients and visitors that come to the institutions. The available facilities were either old and dilapidated or broken down altogether. The main problem was lack of maintenance. The existing infrastructure is old and needs replacement in most cases.

Figure 4-14 Pit latrines at a Minor Health facility

4.4.7 Home-based Care

110. Home based care waste is disposed of in lined pits in Rural Areas (Figure 4-14, Annex 3).

Figure 4-15 Concrete lined pit for Home based Health Care Waste

4.4.8 General observations

111. Generally the assessments revealed that:

- There are inadequacies in Health Care Waste management and the responsible ministries and agencies currently do not have adequate financial and human resources to respond to it. It is not even budgeted for.
- Majority of the incinerators within health facilities (public and private) and other equipment and treatment facilities are in a serious state of disrepair and thus operating inefficiently and not treating the waste adequately.
- Most incinerators are also poorly located, too close to the health facility and in between residential housing.
- Although the MOHSW has an Occupational Health and Safety Unit and an Environmental Health Unit, these are not adequately functional in the area of HCWM.
- HCWM has not been institutionalised in the Health Care delivery system and thus it has been side-lined. Besides such institutions as the EFSTH, MRC and Sibanorr Clinics, most institutions do not have departments or staff designated to this function

- Most institutions do not have a functioning system of reporting accidents or even a procedure to follow, in case of one. Theoretically they refer to the Post Exposure Prophylaxis (PEP) Guidelines, but it is often not adhered to.

- Majority of health facilities do not have any policies related to HCWM in place and thus have not formalized it.

- The facility operators are in most cases not trained and do not have proper protective gear in addition to the consumables like the plastic liners which are always out of stock. HCWM related training has been minimal and the Ministry of Health hopes to embark on this drive and not only train staff but also to raise the awareness of the general public.

- Generally the final disposal facilities leave much to be desired. The pits are not lined, mostly they are open pits and not secured, exposing the scavenging communities to infections.

- No institution weighs its waste, thus the amount of waste being generated in the country is difficult even to estimate.

- The sanitary facilities at most health care facilities are generally not sufficient and not in good working condition.

- The private sector is totally excluded from HCWM at all institutions. It is also the aim of the Ministry to rope in the private sector in the HCWM arena so that the nation can benefit from the resulting Public – Private Partnership.

- Currently most of the HCWM facilities are old and broken down and the first step would be to bring them to some working condition. The next major step would be to update and streamline the legislative side of things to be supportive of HCWM issues. This will then be followed by bringing together all the major players and clearly define each other's roles in the HCWM field and then finally develop some sustainable financing mechanism to drive the process forward.

4.5 SUMMARY OF THE ANALYSIS

112. At all the Health Care Facilities issues of concern were noted and the following is a summary of the issues:

Table 4-2 Summary of issues found at institutions

ISSUE	CATEGORY OF HEALTH CARE FACILITY												
	Referral Hospitals	Hospitals	RCH	Minor Health Centres	Major Health Centres	Private For Profit	Private Non-Profit	Research Centre	veterinary	RHT	Local Authorities	Analytical Services Providers	Blood Transfusion Services
HCWM not formalised	X	X	X	X	X	X	X		X	X	X	X	X
No policies or procedures	X	X	X	X	X	X	X		X	X	X	X	X
HCWM not included in budgets	X	X	X	X	X	X	X		X	X	X	X	X
No department or staff responsible for HCWM					X	X	X		X		X	X	X
Staff not trained in HCWM	X	X	X	X	X	X	X		X	X	X	X	X
Accident reporting not happening	X	X	X	X	X	X	X		X	X	X	X	X
Waste not being weighed	X	X	X	X	X	X	X	X	X	X	X	X	X
HCW handling is not proper	X	X	X	X	X	X	X		X	X	X	X	X
Consumables like plastic liners always out of stack	X	X	X	X	X	X	X		X	X	X	X	X
temporary storage of waste not suitable	X	X	X	X	X	X	X		X		X	X	X
Incinerator not functioning properly	X	X	X	X	X		X		X		X	X	X
Incinerator not secured from public													
Incinerator poorly located	X	X	X			X							
Incinerator operators not trained	X	X	X	X	X	X	X	X	X	X	X	X	X
Incinerator operators not protected	X	X	X	X	X	X	X			X	X		
Pit not lined or sealed	X	X	X	X	X				X	X		X	
Final disposal not suitable	X	X	X	X	X	X	X		X	X	X	X	X
Final disposal not secured from public	X	X	X	X	X	X	X	X	X	X	X	X	X
External players not in place	X	X	X	X	X	X	X	X	X	X	X	X	X
Sanitary facilities not sufficient	X	X	X	X	X	X	X						
Sanitary facilities not functioning properly	X	X	X	X	X	X	X						

KEY

X	Issue affects the facility
	Issue does not affect facility
RCH	Reproductive And Child Health Clinics
RHT	Regional Health Team

4.6 GENERAL RECOMMENDATIONS

113. To alleviate the current low level of Health Care Waste Management in the country, the following recommendations can be made:

1. It is recommended that the following legal instruments be developed:
   a. HCWM Policy;
   b. HCWM Regulations;
   c. HCWM technical guidelines;
   d. Standard operating procedures.

2. HCWM be institutionalized and formalized in all Health Care facilities by making it mandatory that:
   - HCWM be included in Budgets;
   - Staff be assigned to this function;
   - Records be kept of this activity;
   - Control flow of HCW in institutions;
   - Regular reporting on HCWM issues at all institutions;
   - Accident reporting protocols be adhered to strictly.

3. The health care facilities must be provided with adequate HCW handling equipment
   a. Colour-coded bins and liners;
   b. Correct sharp boxes;
   c. Full protective gear.

4. The Health Care Facilities be provided with the appropriate treatment facilities that matches the status of the facility. The allocation of treatment facilities can be as follows:

Table 4-3 Types of Treatment Facilities for each Category of Health Care facility

No.	Treatment facility	Institutions	Quantity
I	Modern Pyrolitic Incinerator	• Referral Hospitals • Hospitals • Major Health centres • RHT • Local Authorities	25
Ii	Local Material Incinerators	• Minor health centres, • RCH Clinics • Private Clinics	370
iii	Stabilized Concrete Lined Pits	• RHT • Minor health centres, • RCH Clinics • Private Clinics • PHC Key Village • home based care	1000

5. The treatment facilities to be located/relocated at appropriate places that minimise affecting communities. If there is no space at the health facility, consideration should be given to establishing the facility off site and may be allow private players to run it.
6. Before the allocation suggested in table 4-3, the capacities of the individual treatment facilities must be correctly assessed and the correct treatment facility be provided for the different Health Care facilities.
7. Particular attention must be taken to ensure that the final disposal method being employed completely eliminate the possibilities of infections or poisoning.
8. HCWM Training programmes for trainers, medical staff, General staff, supplies staff and any other staff of related fields should be embarked on and pursued vigorously.
9. HCWM awareness raising campaigns should be developed and utilize the following:
    a. Televised messages
    b. Radio messages
    - Posters in Health centres
    - Public animation sessions
10. Private players are encouraged to take part in the HCWM programmes to tap into the Public-private partnership programmes.
11. A system to be put in place to monitor and evaluate the progress of implementation of the HCWMP.

5. TRAINING NEEDS ASSESSMENT

5.0 INTRODUCTION

114. From the general assessment of the Health Care Facilities conducted with the rapid assessmL2ent tool critical training requirements were noted.

115. Correct attitudes for effective HCWM result from knowledge and awareness regarding the potential risk of healthcare and administrative procedures for handling the waste. Apart from a general understanding of the requirements of waste management, each category of actors (doctors, nurses, caretakers, ward attendants, ground workers, administrative staff, environmental health practitioners etc.) working within the health care facility has to acquire his or her own individual waste management skills. Staff must be taught and trained in HCWM approaches. For the training to be successful and to lead to changed behaviour, participants must become aware of the risks linked to HCWM.

116. The training needs were assessed taking into consideration the two broad groupings, Health Care Facility staff and General Public or non-Health Care staff. Both groups displayed certain levels of ignorance which may be solved by training and awareness raising:

5.1 TRAINING NEEDS FOR HEALTH CARE STAFF

117. This group includes:

(i) Management and administrative staff;
(ii) Medical and laboratory staff;
(iii) Environmental Health Staff;
(iv) ward attendants, caretakers, ground workers and
(v) other support staff;

i) Management and administrative staff

It is the task of the management to build up the awareness of waste management in each type of health facility. The survey revealed that at times the management itself was not totally aware of all the risks resulting from HCW, and in many cases did not know much about appropriate waste management technologies and procedures.

ii) Medical and laboratory staff

Due to their professional training, doctors, nurses and the other medical staff have the broadest knowledge about health risks resulting from HCW. They, in turn, should create awareness among the other members of health facility staff. Although, they may be aware of the health risks, doctors, nurses and other medical staff displayed a need for training in proper waste management and handling technologies and procedures as these are not their speciality.

iii) Ward attendants, ground workers, caretakers and other support staff

Ward attendants, ground workers, caretakers, cleaners, kitchen and laundry personnel constitute the group of people having the greatest daily contact with HCW and the least knowledge about health risks or waste management practices. The assessment revealed a serious lack of appreciation of risks associated with their tasks. Therefore, they need extensive training and regular supervision to ensure the desired improvement in waste management practices actually occurs.

iv) Environmental Health Staff

These include Environmental Health Officers, Environmental Health Technicians, Health Orderlies and Field Orderlies. They inspect, licence, monitor and evaluate; advise and educate staff and communities.

118. The following are the needs which were identified for the Health Care Facility staff:

Table 5-1 Topics of training and public awareness -Health Staff

TRAINING SUBJECT	**CATEGORY OF TARGET GROUP**			
	A	**B**	**C**	**D**
Basic knowledge about HCW				
Waste categories	X	X	X	X
Hazardous potential of certain waste categories	X	X	X	X
Transmission of nosocomial (hospital acquired) infection	X	X		X
Health risk for health care personnel	X	X	X	X
Proper behaviour of waste generators				
Environmentally sound handling of residues	X	X	X	X
Waste avoidance and reduction possibilities	X	X		X
Identification of waste categories	X	X		X
Separation of waste categories	X	X		X
Knowledge about appropriate waste containers	X	X	X	X
Proper handling of waste				
Adequate waste removal frequency	X		X	
Safe transport containers and procedures	X	X	X	X
Recycling and re-use of waste components	X		X	
Safe storage of waste	X		X	
Cleaning and maintenance of collection, transportation and storage facilities	X		X	
Cleaning and maintenance of sanitation facilities, drains and piping	X		X	
Handling of infectious laundry	X		X	
Handling of chemical and radioactive waste, outdated drugs	X	X	X	X
Maintenance of septic tanks and other sewage treatment facilities	X		X	
Maintenance and operation of incinerator for infectious waste	X		X	
Maintenance and operation of waste pit and landfill site	X		X	
Safety regulation in waste management, protective clothing	X	X	X	X
Emergency regulations in waste management	X	X	X	X

TRAINING SUBJECT	CATEGORY OF TARGET GROUP			
	A	**B**	**C**	**D**
Establishment of a waste management system				
Establishment and implementation of a waste management plan	X			
Sampling of waste quantities, monitoring and data collection	X	X		X
Monitoring and supervision of waste management practices	X	X	X	X
Cost monitoring of waste management	X			
Establishment of a chain of responsibilities	X	X	X	X
Set-up of occupational safety and emergency regulations	X	X	X	X
Interaction with Local Authorities or private sector waste handling structures	X			
Public relation and interaction with local community	X			

A : Management and administrative staff
B : Medical and laboratory staff
C : Ward attendants, caretakers, ground workers and other support staff;
D : Environmental Health Staff

5.2 TRAINING NEEDS - GENERAL PUBLIC/NON HEALTH CARE STAFF

119. This group includes:
   (i) Patients and visitors
   (ii) Contracted workers
   (iii) Private players
   (iv) Suppliers

i) Patients and visitors

Due to the permanent fluctuation of patients and visitors, it is virtually impossible to teach this group of people systematically about the principles of HCWM. One possibility may be to offer advice on basic HCWM subjects during the waiting periods. Patients and visitors should be made aware of the proper use of waste containers to dispose of their waste. Attentive hospital staff might guide patients and visitors from time to time regarding their waste management practices. Relevant posters may often provide the public with additional information.

ii) Waste Management Operators

The waste operators have a daily and direct contact with HCW because they are mainly responsible for waste handling. They seemed to be so used to HCW that the risks associated with it were being disregarded. For this reason, they need to be informed on risks and advised about infection prevention and security protection.

vi) Waste Transportation Staff

Waste transportation staff (mainly off-site transportation) was noticed to be very casual about HCW and treated it like general waste. They need to be trained because HCW should be collected in specific containers and specific vehicles. In addition, procedures for HCW handling (loading and unloading) with respect to the special characteristics of HCW need to be known. Handling and transportation require specific protection equipment to prevent infection by HCW.

vii) Treatment Systems Operators

HCW treatment systems operators require specific capacities. In all facilities visited this was seriously lacking and the operators were just picked at random. The operators in charge need to be trained in order to master the operating process, to know health and security related to the operating system (mainly the procedures in emergency cases), to learn how to care for the equipment.

viii) Disposal Managers

Staffs (municipal staff) who manage landfill disposal need to be informed about health and security linked to HCW. At the visited sites the managers were handling HCW like any other waste. They must be aware of the necessity of protection equipment and personal hygiene and they must control scavenging activities and recycling of used instruments inside these specific sites.

120 The following are the needs which were identified for the non-Health Care Facility staff:

Table 5-2 Topics of training and public awareness guide (Non-Health Facility Staff)

TRAINING SUBJECT	**CATEGORY OF TARGET GROUP**				
	E	**F**	**G**	**H**	**I**
Basic knowledge about HCW					
Waste categories		X	X	X	X
Hazardous potential of certain waste categories	X	X	X	X	X
Transmission of nosocomial (hospital acquired) infection		X	X	X	X
Health risk for health care personnel		X	X	X	X
Proper behaviour of waste generators					
Environmentally sound handling of residues	X	X	X	X	X
Waste avoidance and reduction possibilities	X	X	X	X	X
Identification of waste categories		X	X	X	X
Separation of waste categories		X	X	X	X
Knowledge about appropriate waste containers		X	X	X	X
Proper handling of waste					
Adequate waste removal frequency		X	X		
Safe transport containers and procedures		X	X		
Recycling and re-use of waste components		X	X	X	X
Safe storage of waste		X	X	X	X
Cleaning and maintenance of collection, transportation and storage		X	X	X	X

TRAINING SUBJECT	CATEGORY OF TARGET GROUP				
facilities					
Cleaning and maintenance of sanitation facilities, drains and piping		X			
Handling of infectious laundry		X	X		
Handling of chemical and radioactive waste, outdated drugs		X	X		
Maintenance of septic tanks and other sewage treatment facilities		X			
Maintenance and operation of incinerator for infectious waste		X		X	
Maintenance and operation of waste pit and landfill site		X		X	X
Safety regulation in waste management, protective clothing		X	X	X	X
Emergency regulations in waste management		X	X	X	X
Establishment of a waste management system					
Establishment and implementation of a waste management plan		X			
Sampling of waste quantities, monitoring and data collection		X			
Monitoring and supervision of waste management practices		X	X	X	X
Cost monitoring of waste management		X			
Establishment of a chain of responsibilities		X	X	X	X
Set-up of occupational safety and emergency regulations		X			
Interaction with Local Authority or private sector waste handling structures		X			X
Public relation and interaction with local community		X			X

E : Patients and visitors
F : **Waste management operators**
G : **Waste transportation staff**
H : **Treatment systems operators**
I : **Disposal managers**

5.3 TRAINING STRATEGY

121. The training program should aim to operationalize the HCWMP by: promoting the emergence of experts and professionals in HCWM; raising the sense of responsibility of people involved with HCWM; and safeguarding health and security of health staff and waste handlers. The training strategy will be articulated around the following principles:

1. **Training of Trainers:**
   This involves training the senior officers in health centres (doctors, EHO, and technical services' supervising staff in Local Authorities). The training sessions will be held in each Region, (20 trainers per Region, during 5 days, and approximately 600 persons a day);

2. **Training health care staffs in health centres (medical staff, nurses),**
   This should be done by the already trained senior staff members. (80 participants for each Region, during 3 days, nearly 3000 person/days);

3. **Training HCWM supporting staffs**
   All support staff (ward attendants', ground workers, cleaners) will need this training. These training sessions will be held in each health centre and will be performed by already trained key staff (3000 person/days, with 3 agents during 2 days, for nearly 200 health facilities).

122. The training modules will deal with risks in the handling of HCW: sustainable management process (collection, storage, transportation, treatment, and disposal); good behaviours and practices; caring for installations; protection measures. The training of medical and paramedical staff remains a priority if the program is to have a major impact on HCWM. The recommended content of these training modules is presented below:

1. **Training module for waste management operators**
   a) Information on the risks; advice about health and security
   b) Basic knowledge about procedures of wastes handling, including the management of risks.
   c) The use of protection and security equipment.

2. **Training module for waste transportation staff**
   a) Risks linked with waste transportation;
   b) Procedures for waste handling: loading and unloading;
   c) Equipment such as vehicles for waste transportation;
   d) Protection equipment.

3. **Training module for treatment systems operators**
   a) treatment and operating process guidelines;
   b) health and security related to the operating system;
   c) procedures in emergency cases and help;
   d) technical procedures;
   e) caring for equipment.
   f) control of waste production;
   g) watching over the process and the residues.

4. **Training module for disposal managers**
   a) Information about health and security
   b) Control of scavenging activities and recycling of used instruments;
   c) Protection equipment and personal hygiene ;
   d) Secure procedures for the management of wastes at the disposal site ;
   e) Measures concerning emergency cases and help.

5. **Training modules for HF staff**

   a. **Administrative staff**

      1) Information on the risks
      2) Advice about health and security
      3) Basic knowledge about procedures of HCWM; collection, storage, transportation
         - Treatment and final disposal including the management of risks.
         - The use of protection and security equipment
         - Health care waste management guidelines
         - Financial resources to be allocated to HCWM.

   b. **Doctors, clinicians, nurses, midwives, etc.**

      1) Information on the risks; advice about health and security
      2) Basic knowledge about procedures of HCWM waste collection, storage, transportation, treatment and final disposal including the management of risks.
      3) The use of protection and security equipment (protective clothes)
      4) Strategies to control and ensure that used disposable equipment/materials are placed in appropriate disposal and collection facilities and to ensure that all patients are safe from injury or hazards resulting from HCW
      5) HCW segregation at source
      6) How to orient the staff on the guidelines for waste management
      7) GL2ood practices on HCWM

   c. **Cleaners, ward attendants, grounds attendants, other personnel in touch with waste, etc.**

      1) Information on the risks; advice about health and security
      2) Basic knowledge about procedures of HCWM waste collection, storage, transportation, treatment and final disposal including the management of risks.
      3) The collection and transportation of HCW containers
      4) The use of protection and security equipment (protective clothes)
      5) Good practices on HCWM

5.4 PUBLIC AWARENESS STRATEGY

123. The awareness raising strategy will aim at the general public and scavengers. They must be informed about dangers associated with HCW handling. This objective can be achieved through information and awareness campaigns on local radio (120 messages, 2 message per month, during the 5 years period) and television (30 messages, 6 messages per year, during the 5 years period), but mostly, by animation sessions organized by NGOs and CBOs active in health and environment management (nearly 120 animations, 20 per Region x 6 Regions). These actions can be reinforced by education campaigns (1000 posters, 20 units for 500 health facilities) in health facilities in other highly frequented places.

124. Another concern is to ensure that HCW from home care are well-managed. In fact, advances in medicine now allow monitoring family health and treating some sickness at home. Such activities have the effect of introducing infectious wastes closer to households. These health care wastes include: used razor blades, needles, syringes and lancets, medicine unused or outdated, broken thermometers, etc. These must be managed at home where health care is practiced, to avoid their mingling with household wastes and increasing hazardous risks. It is therefore necessary to elaborate information and awareness programs through most forms of media (newspapers, flyers, radio, television, etc.) towards the health agents (professionals, traditional, and family members) who exercise in the home. The targeted actors must be advised to have specific containers for needles, sharp objects (box, empty bottles, etc.) and other HCW (cotton, gloves, bandages, etc.) and not to mix the HCW with the general household or office wastes.

125. Used needles, syringes, lancets and other sharps may be safely disposed with other home solid wastes, provided that special care is taken while packaging them. The safe packaging of these wastes may be done very simply at home : one can use rigid plastic bottles (with a tight fitting lid), such as empty laundry detergent bottle; and one must not put sharp objects in any container to be recycled or returned to a store; needles and syringes don't need to be recapped. The rigid bottle will minimize possible needle pricks and when they are full, the lid should be tightly fixed and the bottle placed with other solid waste for disposal.

126. Unused and expired medicines stored at home are considerable risks for children and careless people. These medicines may be safely disposed of by throwing them into a flushing toilet or Pit latrine. A thorough cleansing of empty medicine containers with warm water should then be done. After that, close the lid tightly and dispose with other home solid waste. Medicines should be out of reach of children who should not play with unclean empty medicine containers.

127. Contaminated bandages, pads, gloves, etc., may be double bagged in plastic waste bags and securely fastened. This material should be taken back to the Health Care Facility or be thrown into a Pit latrine. Condoms are not considered as Health Care Waste (they are protective materials against HIV/AIDS infection). It is possible, in the programs for public awareness raising, to draw people's attention to the necessity of managing these wastes well: condoms should not be dropped anywhere; after use, they should be disposed of by throwing them into flushing toilets or throw in a pit toilet

128. Health agents (both formal and informal) who exercise at home must have collection containers, which they should carry to the nearest health centre for treatment and disposal. They should also have sterilizing products in order to sterilize all the HCW before disposal. The needles must be buried if there is a place for this inside one's premises; if not, they must be put into bottles or other closed boxes, and then evacuated to the public landfill (or health care facility). Other HCW (cotton, gloves, bandages, etc.) could be disposed in the

public landfill after sterilization. Gloves should be torn to prevent people from re-using them and risking infection.

6. THE HEALTH CARE WASTE MANAGEMENT PLAN (HCWMP)

129. The following is an outline of the major objectives of the HCWMP:

OBJECTIVE 1: REINFORCE THE NATIONAL LEGAL FRAMEWORK FOR HCWM.

130. The legal framework needs to be improved. In particular, it is necessary to set up a legal regime that spells out the illegality of mismanaging HCW, legal requirements for all persons in the HCW field, including codes of practices and methods of enforcement of the requirements.

Strategy:

a) **Developing a national policy for HCWM**

Several Policy documents have been formulated by The Gambia Government and in particular by the Ministry of Health and the Ministry of Environment, with positive impacts towards health care waste management but without specifically tackling the subject matter. These include the National Health Policy, the Environmental Action Plan Phase II (2009 – 2018), National Solid Waste Management Strategy and the Environmental Health Policy. Although the Environmental Health Policy provides a framework and appropriate guidelines for examining and solving the national environmental health problems, HCW is not exhaustively dealt with. It is therefore necessary to develop a policy specifically for HCW.

b) **Creating, consolidating, reviewing and updating laws, bylaws and regulations related to HCWM**

HCWM is currently weakly dealt with in various pieces of legislation and a thorough reviewing and consolidation is necessary to bring the whole legal basis for HCWM up to speed with the current developments in the country. The legal update should result in a law that includes the following: a clear definition of roles and responsibilities of such institutions as the MFE, NEA, and MoHSW and the Municipalities, a clear and properly categorized definition of hazardous waste; detailed legal requirements for all persons who are producers, carriers, or who are engaged in the treatment and disposal of hazardous HCW so as to prevent harm to human health or pollution of the environment; the methodologies for record keeping and reporting; a regulatory system for enforcing the law; the penalties applicable to offenders; and the designation of the law courts where cases will be tried.

The legal system must be laid out in such a way that at each Health Care Facility, the HCWM will be regulated as follows:

- The roles and responsibilities for HCWM will be defined;

- An internal HCW management plan is established and implemented;
- An office responsible for monitoring the HCWM plan is designated;
- The treatment system for the Facility is defined and known;
- Financial provision for HCWM in the health centres budget is scheduled and assured;
- Procedures of positive and negative sanctions for staff, according to their involvement in HCW management are adopted and implemented.

c) Development of technical guidelines for HCWM

The MOHSW must undertake to develop Health Care Waste Management Guidelines. This should be possible using the information gathered from the rapid assessment programme. The technical guidelines should be practical and directly applicable, and include the following specifications, with a sufficient degree of detail such as:

i. legal framework covering safe health-care waste management; hospital hygiene and occupational safety and health;
ii. Limits on emissions of atmospheric, land and water resources pollutants and releases into water resources;
iii. responsibilities of health-care facilities, health-care waste producers, and public waste disposal agencies;
iv. safe practices for waste minimization;
v. Segregation, handling, storage and transport practices of health-care waste; recommended treatment and disposal methods for each health-care waste category.

d) Establishing control procedures for HCW management within all institutions generating and handling HCW

Information about any activities at the Health Care Facilities is hard to come by due to lack of standard operating procedures (SOPs). This makes planning a very difficult process as no baseline data can be availed. The following can assist to bring about control and maintenance of records:

- Elaborate specific EIA guidelines for waste management, including HCW;
- Implement clear directives for health control agents;
- Set up a waste generation register for HCW quantities produced by health centres;
- Define the mechanisms of control in needles and sharps collection and disposal process;
- Organize regular monitoring by technical staff in Regional Health Offices.

OBJECTIVE 2: TO IMPROVE THE INSTITUTIONAL FRAMEWORK FOR HCWM

131. The institutional framework needs to be carefully worked on and improved. In particular, it is necessary to set up a structure to coordinate and to follow up the Plan of Action (POA) and to develop specific technical guidelines for the health centers in terms of definition of responsibilities and setting standards and norms for good HCWM practices (e.g., reduction, selection and separation at source), and procedures for storage, handling, transformation, treatment and disposal.

Strategy:

a) **Defining and harmonizing the duties and responsibilities of each actor involved in HCWM process at all levels.**
The various actors in HCWM are not sure of their parameters and limits to the extent that functions tend to overlap, causing confusion to the clients and at times leaving gaps as people will be unsure whose responsibility it would be. A roundtable of all the players is thus needed firstly to **sensitize them on the Rapid Assessment findings** and then agree on the roles and responsibilities of each player.

b) **Establishing of Taskforces/Working Groups (coordination structures) on health care waste management at national level**
This structure would include all the actors involved in HCWM (MoHSW, MFE, NGOs, Local Authorities, Health facilities, etc.)

c) **Facilitating the establishment of inter-sectoral taskforces/working groups and focal points at all operational levels**
A similar structure to the national level structure must also be established at operational levels, i.e. a structure which includes all the actors involved in HCWM (MoHSW, MFE, NGOs, Local Authorities, Health facilities, etc.)

d) **Creating awareness and lobbying for support for the HCWM program**
Generally HCW is treated as general waste and the risks associated with it are not taken into consideration. It is thus imperative that awareness levels be raised to acceptable levels and that support be garnered at all possible levels for this program to the extent of being included in national budgets

e) **Conducting operational research and development related to HCWM**
There are a lot of grey areas in the field of HCWM especially in the area of disposal. It would be worthwhile to at least support one operational research every year. This would go a long way in opening up a once dark and stigmatized field.

f) **Developing of Monitoring and Evaluation plan**

Implementation of HCWM plans needs to be monitored and evaluated in order to assess success of the program. **Monitoring and Evaluation** tools need to be developed and surveillance undertaken.

OBJECTIVE 3: TO ASSESS THE HCWM SITUATION, PROPOSE OPTIONS FOR HEALTH CARE FACILITIES AND IMPROVE THE HCWM IN HEALTH CARE FACILITIES.

132. The Health care waste management system in the country is generally at its lowest ebb, but the extent of deterioration **needs to be more thoroughly assessed (beyond what the rapid assessment did)** using a well stratified sample of all the Health Care facilities in the country and then derive the best technical options for HCW segregation, collection, containment, storage, transportation, and disposal according to type of HCW and size and location of Health Care Facility.

133. The provision of infrastructure and equipment must be attached to strict directives and guidelines that must be adhered to in implementing the programme. A centralized approach, in which major equipment is centralized at Municipalities or RHTs, will help reduce the equipment requirements as the surrounding facilities can all use one set of treatment facility.

Strategy:

a) **Carrying out a National Inventory of Health Care Facilities {HCFs} to help establish the HCWM situation in the country.**
   A well stratified sample of all the health care facilities in the country must be taken and assessed to ascertain the true picture of current status of HCWM.

b) **Choosing the best technical options for HCW segregation, collection, containment, storage, transportation and disposal according to (a) type of HCW (b) the size and location of the HCF.**

c) **Implementing pilot projects.**
   Before full scale implementation of the HCWMP is developed, it is advisable to carry out pilot programmes to test the feasibility of the proposed plans of action.

d) **Providing infrastructure, materials and equipment to HCFs based on conditions on site.**
   Each Health care Facility requires a different approach to handling HCW. This must be assessed correctly and the best practicable option determined. This will be cost effective and will provide each institution with exactly what it needs:
   i. Supply the health facilities with collection and storage materials;
   ii. Implement an efficient HCW treatment system (for example modern incinerators for Municipalities, RHTs, Central and Regional Hospitals; local incinerators in minor and major health centres);

iii. Install liquid waste treatment systems in health facilities (septic pits/tanks with a chemical disinfection system for the Regional hospitals, major health centres; as for central and general hospitals, a physical and chemical treatment is recommended);
iv. Operate systematic HCW segregation procedures.

Note: The health centres should be supplied with specific boxes for needles and other sharp objects. Already used empty bottles (flacons, mineral water bottles, etc.) could replace these boxes. Plastic containers for temporary storage should be supplied to health care rooms.

e) Ensure appropriate protection equipment to health staff

HCW handling is risky business and those involved in it must be properly protected. All necessary protective gears must be availed to them to protect them as they carry out their duties.

OBJECTIVE 4: TO CONDUCT AWARENESS CAMPAIGNS FOR THE COMMUNITIES AND PROVIDE TRAINING FOR ALL ACTORS INVOLVED IN HCWM

134. The general public is unaware of the risks associated with HCW and worse still when it is mixed with general waste which they target for scavenging. A serious awareness drive must be targeted at the general public to raise their awareness as they are in danger of handling infectious and toxic wastes unawares.

135. Awareness programs for the general public should mainly be aimed at scavengers, children playing on the landfills, population performing or receiving home health care, those using recycled objects, and people living near the landfills. NGOs and Community Based Organizations (CBOs) enjoying a large experience in community communication and health activities would be best suited to conduct them.

136. The staff members of Health Care Institutions also require training so that they can handle HCW appropriately in order not to expose themselves and the general public to infections.

Strategy:

a) Inform population of dangers linked with bad HCW management practices

a. messages on television (about dangers related to the handling of HCW);
b. radio messages (mainly in local languages);
c. National awareness raising campaign (posters in health facilities, billboards, monthly public animation sessions in the Regions).

b) Inform population of dangers linked to scavenged HCW materials

a. messages on television (about dangers related to the handling of HCW);

b. radio messages (mainly in local languages);
c. national awareness raising campaign (posters in health facilities, billboards, and fliers)

c) Inform home-based care givers / traditional healers of risks linked to improper HCW handling

For more detailed information on the target groups and content of the proposed public awareness programs, please see **Chapter 5 on Training needs analysis**.

d) Conducting awareness campaigns on proper handling of HCW

Properly structured and planned, targeted awareness campaigns need to be carried out to raise the level of awareness about risks associated with HCW, of all sections of the society to acceptable levels

e) Elaborate training programs and Train trainers

a. Identify the training needs and the groups to be trained in the health facilities;
b. Train trainers.

- **Organising training programmes for all stakeholders involved in HCWM with special emphasis on medical and non-medical staff**

a. Train health staff in health facilities, Municipal Technical Services providers and other stakeholders;
b. Train waste handlers in health facilities (ward attendants, ground workers, cleaners, etc.).
c. It is recommended to update pedagogical references of training institutions in medicine, midwives, nurses and other health care training institutions by integrating HCWM issues in their pre-service training programs.

f) Evaluate training program implementation

HCW monitoring in health facilities should be carried out regularly, in order to improve waste management and to ensure that good practices are performed after training. Measures should be adopted to ensure that problems and risks involved are identified to enhance safety and preventing the development of future problems. Supervision should be in the following areas:

i. segregation,
ii. collection routines and labelling,
iii. internal treatment system,
iv. internal storage of HCW,
v. transportation,
vi. worker safety measures,
vii. disposal at sanitary landfill,

OBJECTIVE 5: SUPPORT PRIVATE INITIATIVES AND PARTNERSHIP IN HCWM

137. The private sector and other private individuals are currently not involved either in solid waste management or HCWM. Supporting the private sector to participate will be beneficial to the system as this will ensure injection of private sector funds into the system and introduce some business sense in the HCW arena.

Strategy:

a) **Inform private companies of the business opportunities in solid waste management**
   Business is not aware of the potential that awaits it in this sector, which is currently clouded by none funding of the programmes. Once funding start flowing in that direction, private players will be attracted. Government must support and promote this side of things.

b) **Develop sustainable financing mechanism for HCWM activities**
   Innovative means of developing sustainable financing mechanism for the sector must be sought, including attracting the banking sector and NGOs.

c) **Set up framework and partnership between public sector and private sector in HCWM**
   Such a partnership will be beneficial to the sector as financing will become more available and the private sector will have the assurance of the support of the public sector in its endeavours.

OBJECTIVE 6: DEVELOP AND OPERATIONALISE SPECIFIC FINANCIAL RESOURCES TO COVER THE COSTS OF THE MANAGEMENT OF HEALTH-CARE WASTES

138. It is absolutely necessary to develop and operationalize specific financial resources to cover the cost of HCWM for the purposes of sustainability. This means having specific budget lines for health care waste management issues from national to local level as a mandatory requirement.

139. The execution of the plan then needs regular and sustained monitoring and evaluation. This will be done by establishing a reporting structure that has to be adhered to.

Strategy:

1. **Developing specific budget lines for HCWM at all levels of the accountancy (from national to local).**

2. **Lobby for prioritization and mandatory budgeting for HCWM.**

3. **Mobilising financial resources for HCWM capital and running costs.**
   Resources can be mobilized nationally by using such instruments as the polluter pays and the user pay principles

4. **Identifying the appropriate institutions through which the recovery mechanism can be implemented.**
   If business sense is brought into the field of HCWM and acceptable segregation practices are adhered to, appropriate institutions can be attracted to engage in recovery programmes.

5. **Monthly operational control reports**
   Regular reporting has to be institutionalized and formalized in all Health Care Institutions. This will assist in the regular monitoring and evaluation of the execution of the programme.

6. **Mid-term evaluation (end of year 2)**
   Regular evaluation will assist in the regular monitoring and assessment of the execution of the programme.

7. **Final Evaluation (end of year 5)**
   There will be a final evaluation at the end of the 5 years.

6.1 LOGICAL FRAMEWORK OF THE HCWMP

Table 6-1 HCWMP Logical Framework - LEGAL

OBJECTIVE 1: TO REINFORCE THE NATIONAL LEGAL FRAMEWORK FOR HCWM.										
Result 1: Enabling legal environment for HCWM available.										
Strategies	• Developing a national policy for HCWM									
	• Creating, consolidating, reviewing and updating laws, bylaws and regulations related to HCWM									
	• Development of technical guidelines for HCWM									
	• Establishing control procedures for HCW management within all institutions generating and handling HCW						Procedures in place			
Activities	**Indicators**	**Responsible Person**	**Time frame**					**Cost $US**		
			2014	**2015**	**2016**	**2017**	**2018**	**UNIT**	**QNTY**	**UNIT COST USD**	**TOTAL COST USD**
Analyse all existing laws, bylaws and regulations	-Number of review meetings held. -Number of HCW legal documents analysed.	Working Group	X	X	X	X					20600
Develop a national policy for HCWM	-Number of stakeholder consultative meetings -Availability of a national HCWM policy	Steering Committee	X	X	X						29200
Develop regulations and bylaws clearly highlighting the different responsibilities at all levels	-Availability of gazetted regulations and bylaws	Director Environmental Health	X	X	X						16300

relating to HCWM											
Establishing procedures and roles for controlling the flow/s of HCW and increasing the responsibilities of all stakeholders	-Standard Operating Procedures which define roles and responsibilities in place	Director Environmental Health	X	X	X						22300
Develop the National Healthcare waste Management guidelines.	Final draft for the National guidelines.	Working Group	X	X							12900
SUB - TOTAL											101300

Table 6-2 HCWMP Logical Framework - INSTITUTIONAL ARRANGEMENTS

OBJECTIVE 2: TO IMPROVE THE INSTITUTIONAL FRAMEWORK FOR HCWM											
Result 2: Responsibilities, standards, and sanctions are clearly defined											
Strategies	• Defining and harmonising the duties and responsibilities of each actor involved in HCWM process at all levels										
	• Establishing of Taskforces/Working Groups (coordination structures) on health care waste management at National level										
	• Facilitating the establishment of inter-sectoral taskforces/working groups and focal points at all operational levels										
	• Creating awareness and lobbying for support for the HCWM program										
	• Conducting operational research and development related to HCWM										
	• Developing of Monitoring and Evaluation plan										
Activities	**Indicators**	**Responsible Person**	**Time frame**					**Cost $US**			
			2014	**2015**	**2016**	**2017**	**2018**	**UNIT**	**QNTY**	**UNIT COST USD**	**TOTAL COST USD**
Organise a national workshop and give	-National workshop held	Director Environmental	X								4000

feedback on findings of the Rapid Assessment Survey and expected roles and responsibilities of different players	- Workshop report produced	Health									
Cascade sensitization and formation of taskforces at operational levels	-Number workshops held -Number of taskforce committees formed	Director Environmental Health	X	X							2800
Facilitating conduction of at least one operational research per year on HCWM	-Number of research proposals submitted and funded -Number of researches conducted	All Focal Persons	X	X	X	X	X				32000
Development of Monitoring and Evaluation tools for HCWM including establishment of a surveillance programme on accidents related to HCWM	-Availability of a surveillance system and baseline database on HCWM -Availability of M&E checklists	Working groups	X	X	X						7600
Ensure ongoing and final evaluation and updating of the HCWMP as necessary.	-Updated HCWMP - M & E biannual reports	Director Environmental Health	X	X	X	X	X				10000
SUB-TOTAL											56400

Table 6-3 HCWMP Logical Framework - SITUATION ANALYSIS AND IMPROVEMENT

OBJECTIVE 3: TO ASSESS THE HCWM SITUATION, PROPOSE OPTIONS AND IMPROVE THE HCWM IN HEALTH CARE FACILITIES.											
Result 3:	**Appropriate options available for the different categories of Health care facilities and HCW collected and treated in a safe and secure way**										
Strategies	• Carrying out a National Inventory of Health Care Facilities {HCFs} to help establish the HCWM situation in the country.										
	• Choosing the best technical options for HCW segregation, collection, containment, storage, transportation and disposal according to (a) type of HCW (b) the size and location of the HCF.										
	• Implementing pilot projects before setting up the HCWMP.										
	• Providing infrastructure, materials and equipment to HCFs based on conditions on site.						Number of equipment				
	• Ensure appropriate protection equipment to health staff						Number of equipment				
Activities	**Indicators**	**Responsible Person**	**Time frame**					**Cost $US**			
			2014	**2015**	**2016**	**2017**	**2018**	**UNIT**	**QNTY**	**UNIT COST USD**	**TOTAL COST USD**
Conduct a National Inventory of HCWM in Health Care Facilities (HCFs.)	Inventory document	Director DEH	X								27100
Analyse the inventory data and develop options	Report	Working group	X								5000
Establish National Standard Procedures for the deferent options selected defining the processes of segregation, packaging, collection, containment, transportation, treatment and final disposal accordingly, including the	National standard procedures in place.	Working group	X	X							1800

provision of adequate sanitation and proper disposal of wastewater.											
Select and size the HCW treatment facilities accordingly including site visits to pilot projects in RSA and Botswana.	Treatment facilities selected	Working group	X	X	X	X					12200
Provide the health care facilities with adequate infrastructure and equipment for HCWM.	Infrastructure and equipment availed	Steering committe e	X	X	X	X	X				501500
SUB-TOTAL											547600

Table 6-4 HCWMP Logical Framework - TRAINING AND GENERAL PUBLIC AWARENESS.

OBJECTIVE 4: TO CONDUCT AWARENESS CAMPAIGNS FOR THE COMMUNITIES AND PROVIDE TRAINING FOR ALL ACTORS INVOLVED IN HCWM		
Result 4: All HCWM actors are conscious of risks and demonstrate good HCWM practices		
Strategies	• Inform population of dangers linked with bad HCW management practices	Posters, radio and televised messages, public animations sessions, etc.
	• Inform population of dangers linked to scavenged HCW materials	
	• Inform home-based care givers / traditional healers of risks linked to improper HCW handling	
	• Conducting awareness campaigns on proper handling of HCW	
	• Elaborate training programs and Train trainers	Programs elaborated and Number of trained trainers
	• Organising training programmes for all actors involved in HCWM with special emphasis on medical and non-medical staff	% of trained staff
	• Evaluate training program implementation	Appraisal reports

Activities	Indicators	Responsible Person	Time frame					Cost $US			
			2014	2015	2016	2017	2018	UNIT	QNTY	UNIT COST USD	TOTAL COST USD
Develop specific HCWM Information Education and Communication (IEC) materials	-Availability of specific IEC materials	Working Group/ Health Promotion Directorate	X	X	X	X	X				60400
Initiate a national awareness campaign through various media e.g. posters, print media, electronic media, and group discussions.	-Number of awareness campaigns held	Working Group/ Health Promotion Directorate	X	X	X	X	X				54100
Conduct a training needs analysis for actors involved in HCWM.	-Number of training needs identified -Training program developed	Working Group/ Health Promotion Directorate	X	X	X	X	X				21700
Lobby to include HCWM in the training curricula for health personnel	-Number of meetings held -Availability of reports	Head of Environmental Health	X	X	X	X	X				18700
Conduct on the job training of trainers (TOT) on HCWM and cascade training to operational levels	-Number of TOT sessions held -Number of trainers trained -Number of trainings cascaded	Working group	X	X	X	X	X				43580
SUB-TOTAL											198480

Table 6-5 HCWMP Logical Framework - PRIVATE SECTOR PARTICIPATION

OBJECTIVE 5: TO SUPPORT PRIVATE INITIATIVES AND PARTNERSHIP IN HCWM											
Result 5. : Private players involved in HCWM											
Strategies	Inform private companies of the business opportunities in solid waste management							Awareness programs			
	Develop sustainable financing mechanism for HCWM activities							Annual financial Flows			
	Set up partnership framework between public sector and private sector in HCWM							Number of Partnership Agreements			
Activities	**Indicators**	**Responsible Person**	**Time frame**					**Cost $US**			
			2014	**2015**	**2016**	**2017**	**2018**	**UNIT**	**QNTY**	**UNIT COST USD**	**TOTAL COST USD**
Organise a workshop for potential Private players and appraise them on the potential role they can play	-National workshop held - Workshop report produced	Director Environmental Health	X								13400
Establish Private – Public sector partnership forum.	-Number consultations made. -Number of taskforce committees formed	Director Environmental Health	X	X	X	X					9000
Establish financing mechanisms to attract business community to participate in HCWM.	-Banking sector involvement secured -Donor community sensitized. -Waste generators budgeting for its management.	Director Environmental Health	X	X	X	X					11200
SUB-TOTAL											33600

Table 6-6 HCWMP Logical Framework - FINANCIAL AND OPERATIONAL ISSUES

OBJECTIVE 6: TO DEVELOP AND OPERATIONALISE SPECIFIC FINANCIAL RESOURCES TO COVER THE COSTS OF THE MANAGEMENT OF HEALTH-CARE WASTES.											
Result 6: HCWM activities are budgeted for, monitored, evaluated and documented											
Strategies	• Developing specific budget lines for HCWM at all levels of the accountancy (from national to local).										
	• Mobilising financial resources for HCWM capital and running costs.										
	• Identifying the appropriate institutions through which the recovery mechanism can be implemented.										
	• Monthly operational control reports						Monthly reports				
	• Mid-term evaluation (end yr. 2)						Evaluation report				
	• Final Evaluation (end yr. 5)						Evaluation report				
Activities	**Indicators**	**Responsible Person**	**Time frame**					**Cost $US**			
			2014	**2015**	**2016**	**2017**	**2018**				
Lobby for the establishment of a specific budget line for HCWM	HCWM budget line item established	Steering Committee		X							3500
Mobilize resources utilizing instruments such as the 'Polluter Pays Principle'	Resources mobilised	Steering Committee	X	X	X	X	X				7380
Raising financial resources through User Fees charges for private HCW generators	Funds raised	Working group	X	X	X	X	X				7280
SUB-TOTAL											18160

6.2 SUMMARY OF COSTS

Table 6-7 Summary of costs

OBJECTIVE	TOTAL COST $US
1. TO REINFORCE THE NATIONAL LEGAL FRAMEWORK FOR HCWM.	101300
2. TO IMPROVE THE INSTITUTIONAL FRAMEWORK FOR HCWM.	56400
3. TO ASSESS THE HCWM SITUATION, PROPOSE OPTIONS FOR HEALTH CARE FACILITIES AND IMPROVE THE HCWM IN HEALTH CARE FACILITIES.	547600
4. TO CONDUCT AWARENESS CAMPAIGNS FOR THE COMMUNITIES AND PROVIDE TRAINING FOR ALL ACTORS INVOLVED IN HCWM.	198480
5. TO SUPPORT PRIVATE INITIATIVES AND PARTNERSHIP IN HCWM	33600
6. TO DEVELOP AND OPERATIONALISE SPECIFIC FINANCIAL RESOURCES TO COVER THE COSTS OF THE MANAGEMENT OF HEALTH-CARE WASTES.	18160
GRAND TOTAL	955540

Due dates and source of financing are indicated in table 7-6.

7. BUDGET FOR THE HCWMP

7.0 INTRODUCTION

140. The estimated cost of implementing the HCWMP and initiating this process of proper handling, disposal and management of medical waste is **US $ 955 540.00 (**out of which**,** the IDA project will finance US $ 430,280; please refer to table 7-1 below**).** Of this amount, **US $ 407 940.00** is for institutional, training, and coordination/monitoring activities, and **US $ 547 600.00** is for investments in equipment and supplies to upgrade HCWM at the health facility level (see table 7-1).

141. **MOHSW will have to develop a budget line for HCWM but also has to look for more potential donors as the IDA project will cover the cost of** institutional, training, and coordination/monitoring activities as well as equipment and supplies **to the tune of $ 430 280.00.** Of this, $ 262 800 will go to equipment and supplies and $ 167 780 to training, coordination and monitoring activities (see table 7-1, 7-2 and 7-3). The Bank's contribution includes most of the policy and legal framework, approximately 50% of the equipment and the training and all of the monitoring and evaluation.

7.1 ESTIMATED COST OF IMPLEMENTING THE HCWMP

142. Table 7-1 below provides details of the implementation costs per component of the HCWMP, and Table 7-2 provides estimated yearly costs of the HCWMP implementation.

Table 7-1 Implementation costs of the HCWMP

OBJECTIVES	STRATEGIES	UNIT	QTY	UNIT COST USD	TOTAL USD	FUNDING BY SOURCE		
						IDA USD	GOVT USD	OTHER DONORS USD
Reinforce the National legal framework for HCWM.	Development of HCW Policy, Regulations and finalization of technical guidelines and standard operational procedures	Man/ day	480	160	76800	48000	4400	24400
	Printing the documents for circulation	U	3500	7	24500	0	0	24500
	Sub-total				**101300**	**48000**	**14400**	**48900**
Improvement of institutional Arrangements	Workshops		0	0	4000	2000	1000	1000
	Taskforce business		0	0	2800	1400	0	1400
	Awareness and lobbying		0	0	25200	0	9200	16000
	Operational research		0	0	24400	8000	0	16400
	Sub-total				**56400**	**11400**	**10200**	**34800**
Improvement of HCWM in the health facilities	Piloting the various technologies in the various categories		0	0	72000	36000	9000	27000
	Supply the health services with adequate HCW collection equipment		0	0	72000	36000	9000	27000

OBJECTIVES	STRATEGIES	UNIT	QTY	UNIT COST USD	TOTAL USD	FUNDING BY SOURCE		
						IDA USD	GOVT USD	OTHER DONORS USD
	Acquire modern incinerators for the Referral Hospital, 3 Regional Hospitals, 4 Health Centres, 10 clinics, The Central Store, and 7 Local Authorities	U	26	11000	286000	132000	44000	110000
	Build local material incinerators in health centres, clinics and Public Health Units.	U	200	500	100000	50000	25000	25000
	Build stabilized concrete lined pits in rural health centres, Clinics, Public Health Units and for home based care	U	80	220	17600	8800	4400	4400
	Sub-total				**547600**	**262800**	**91400**	**193400**
Training programs	formulation of comprehensive training manuals relevant to the target groups	Man/ day	280	160	44800	32000	6400	6400
	Printing the documents for circulation	U	2800	6	16800	0	0	16800
	Training of trainers	Man/ day	280	48	13440	6720	0	6720
	Training of medical staff	Man/ day	975	48	46800	22800	9600	14400
	Training of supplies staff	Man/ day	1200	40	48000	24000	12000	12000
	Sub-total				**169840**	**85520**	**28000**	**56320**
Public awareness	Televised messages	**U**	12	360	4320	0	1750	2570
	Radio messages	**U**	48	160	7680	0	2680	5000
	Posters in Health centres	**U**	4000	2.4	9600	4800	0	4800
	Public animation sessions	**U**	44	160	7040	0	3520	3520
	Sub-total				**28640**	**4800**	**7950**	**15890**
Supporting Private Initiatives	Advocacy and lobbying at different fora	Man/ day	640	40	25600	0	4500	21100
	Public-Private partnership Forum business		0	0	8000	2000	2000	4000
	Sub-total				**33600**	**2000**	**6500**	**25100**
Support for the execution of HCWM Plan (Management Of Health-Care Wastes)	Plan starting activities and institutionalizing HCWM	Man/ day	60	40	2400	2400	0	0
	Establishing the User Pays and the Polluter Pays Systems	Man/ day	60	40	2400	0	1200	1200
	Monitoring at national and local level	Man/ day	50	80	4000	4000	0	0
	Halfway evaluation	Man/ day	24	180	4320	4320	0	0
	Final evaluation	Man/ day	28	180	5040	5040	0	0
	Sub-total				**18160**	**15760**	**1200**	**1200**
TOTAL					**955540**	**430280**	**159650**	**365610**

Table 7-2 Annual costs of the HCWMP implementation

HCWM Plan Activities	YR 1	YR 2	YR 3	YR 4	YR 5	TOTAL
Reinforce the National legal framework for HCWM.	40000	40000	21300	0	0	101300
Improvement of institutional Arrangements	20000	16000	6800	6800	6800	56400
Improvement of HCWM in health facilities	235000	80000	80000	77500	75100	547600
Training for health staff and others actors active in HCWM	82250	47540	40050	0	0	169840
Public awareness (general public)	5730	5730	5730	5730	5720	28640
Supporting Private Initiatives	13200	10200	10200	0	0	33600
Support for the execution of HCWM Plan (Management Of Health-Care Wastes)	4000	3200	3760	3500	3700	18160
TOTAL	400180	202670	167840	93530	91320	955540

7.2 SOURCES OF FUNDING FOR THE IMPLEMENTATION OF THE HCWMP

Table 7-3 MHSW Contribution to the Implementation of the HCWMP

Source of contribution	Value of contributions US$	%-age
MoHSW	159650	17%
IDA	430280	45%
WHO	11010	1%
UNICEF	32100	3%
UNFPA	25800	4%
GAVI	148000	16%
GFATM	130000	14%
TOTAL	955540	100%

8. HCWMP IMPLEMENTATION MODALITIES

8.1 INSTITUTIONAL FRAMEWORK

144. The HCWMP falls directly under the responsibility of the Environmental Health Department of MoHSW. The Department will coordinate the implementation and apply a multi-stakeholder approach to embrace all the relevant players to include MFE, NEA, Local Authorities, NGOs, and other private players.

8.2 RESPONSIBILITIES

144. Part of improving HCWM involves clarifying who is responsible for what functions and identifying the fields of competencies of each institutional actor involved in this process. The following roles and responsibilities are suggested:

At the central level:

145. The MoHSW is responsible for the national health policy and ensures the guardianship of the health facilities. The Environmental Health Services Department will take the lead in coordinating the implementation of the HCWMP because:

i. it is part of its mission,
ii. it has competent staff in this field,
iii. it has decentralized services down to Village level and
iv. it has capacity to offer Health Education Service, public information and awareness raising.

146. The Environmental Health Department will be heavily involved in the following HCWM activities:

a) Procurement of consumables (sharp containers, colour coded bin liners)
b) Procurement of re-usable waste receptacles
c) Running maintenance of existing incinerators
d) Ensuring availability of land for new sites for installation of new waste treatment and disposal facilities
e) Organising /facilitating capacity building on HCWM amongst Health Care Workers
f) Providing human resources (waste handlers, incinerator attendants etc.)

147. MoHSW has no direct budget for Healthcare waste management activities but to implement such a programme MoHSW has been spending around US$ 74 750.00 annually (See table 8-1 below).

Table 8-1 MOHSW Estimated Annual Expenditure on HCWM

No.	EXPENDITURE CATEGORY	TOTAL (US$)
1.	Personnel/Labour	15 000.00
2.	Equipment/materials	10 000.00
3.	Training/seminar/workshops	15 000.00
4.	Contracts	15 000.00
5.	Other costs (Transport and allowances)	8 000.00
6.	Incidentals	2 000.00
7.	Admin (10%)	6 500.00
8.	Contingency (5%)	3 250.00
	TOTAL	74 750.00

(Source: derived estimates from The Gambia Health Profile and interviews with MoHSW)

148. The Environmental Health Services Department is the lead agent for this programme and its work plan is as outlined in table 8-2 where it will be guiding the whole process.

149. The National Environmental Agency (NEA) will be responsible for monitoring of the implementation of the HCWMP. It has the overall responsibility of protecting the environment and thus ultimately the activities of the Environmental Health Department must conform to the requirements of the Environmental Management Act. It will watch over the whole chain of HCW from generation to final disposal.

150. NEA is also responsible for developing norms and standards for soil, water and air protection, mainly as they relate to the use of landfill sites for HCW disposal. This function is very important as this assures an independent control and monitoring mechanism for the system to bring about safe handling of HCW throughout the system.

At the District / Local Authority level:

151. The **Districts and Local Authorities** will need to put in place arrangements to make sure that HCW are not mixed with general wastes in their public landfills. This is becoming a challenge, with the advent of home based care in urban areas and innovative ways of convincing the public to separate at source have to be found.

152. The **Districts and Local Authorities** must ensure, either by themselves or through partnerships, that facilities capable of handling all the HCW generated in their areas of jurisdiction are in place. They should be responsible for a centralized HCWM regime within their areas of jurisdiction. They should also give their opinion about the HCWMP activities proposed for health facilities in their jurisdiction, in case some may have negative impacts on the local population's health. Coordination of the HCWM activities will be exercised by their respective Environmental Health Departments.

153. The **Districts and Local Authorities** should design their landfills according to the norms and standards defined by NEA, in order to avoid soil, water and air pollution in case

of reception of HCW. To accomplish safe disposal of HCW, specific areas should be reserved for that purpose. In addition, local governments should enact regulations to: refuse to receive mixed HCW with non-infectious wastes at local landfills; forbid uncontrolled HCW disposal; and set up strong waste management controls in their landfills (materials for covering, restriction for non-authorized public access, equipment protection, etc.).

At the health care facility level:

154. The manager of each health care facility shall be responsible for HCWM in his/her establishment. The manager must ensure that a HCWM plan is prepared and then institute all the requirements of the national policy, regulations and standard operating procedures. S/he must designate the officers/teams charged with HCW segregation, collection, transportation and treatment and be overly responsible.

8.3 INSTITUTIONAL ARRANGEMENTS FOR HCWM IMPLEMENTATION

155. Effective implementation of the HCWMP components requires that institutional arrangements and responsibilities be clearly defined. The following institutional arrangements are proposed:

i) Improvement of institutional and legal framework

The co-ordination structure should be set up by the Environmental Health Unit (EHU). This Unit should take the lead in developing the HCW regulations and technical guidelines.

ii) HCWM improvement at health facilities

The improvement of HCWM at health care facilities should be managed by the Environmental Health Unit (EHU) and Health facility managers working together. For example, EHU should regulate the HCWM in health facilities, in line with their own regulations and NEA requirements. MoHSW should supply the health facility managers with HCWM equipment and materials, but actual execution of HCWM improvement programs should be conducted by health care facility managers and their staff. Health care facility managers should promote use of recyclable materials and set up control procedures in HCW management, under the supervision of EHU.

iii) Training

Training activities should be led by the EHU of the MoHSW. This structure has competence in HCWM and could be supported by training institutions like the Medical Research Centre (MRC), University, the Polytechnic, and other institutions.

At Regional level, management of training activities should be assigned to the Regional Health Teams (RHT). The specific training activities will be done in the first two years of the programme. National Consultants will train key staff as trainers in health facilities and other institutions like the Municipalities. The trained key staff should then train the other employees.

The EHU may not have the human resources to prepare and diffuse the training courses about HCWM. The EHU could prepare the TOR, and do the control and supervision at national level while Regional Health Teams (RHT) would assume the monitoring at local level. In other words:

i. The EHU prepares the Terms of Reference for developing the training programs, and does the control and supervision at national level ;
ii. Health Training Institutes or National Consultants having acquired a large experience in HCWM will prepare the training courses;
iii. In each Region, a training-of-trainers workshop will be held and will be conducted by Training institutions or national consultants, under the supervision of the RHTs. The latter must prepare periodic reports to be sent to the central level (EHU/MoHSW);
iv. In each health care facility, the supervising staff trained in the Regional workshops will ensure the training of all medical staff, orderlies, cleaners, etc., under their supervision. The heads of the health establishments must supervise this work and prepare periodic evaluation reports.

iv) Public Awareness

The Health Education/Environmental Health Department of the MoHSW will lead the activities intended to increase the awareness of the general public about the risks associated with HCW. At local level, RHTs will do the supervision. These activities will cover the 5 years of the program, through Public animations, radio and television messages, posters, etc., and will be done as follows:

b. The Health Education/Environmental Health Department of the MoHSW will elaborate the content of these messages, of posters and public animation;
c. The televised messages will be diffused by the National Station;
d. The radio messages will be diffused by the local radio stations, in English and local languages, under the supervision of Regional Health Teams
e. Private companies (printing enterprises) will make posters to be used in the health centers;
f. Public animation sessions will be led by NGOs acting in the health and the environmental field, under the supervision of Provincial Management Teams.

v) Strategy for private sector involvement and partnership

The elaboration of measures to involve private companies more directly in HCWM will be coordinated by the MoHSW, in collaboration with other stakeholders.

vi) Baseline Survey and Activity Planning

National Consultants, supervised by RHTs and EHU, will carry out a baseline survey at the beginning of the investment phase. During this task, the consultants will

indicate the situation prevailing presently in the health facilities, elaborate evaluation criteria, and prepare the execution plan.

vii) Monitoring of the HCWMP

At the local level, it is recommended that the RHTs ensure regular program oversight and provide monthly monitoring reports, while the six-monthly follow up will be realized by EHU.

viii) Evaluation of the HCWM Plan

It is recommended to assign this evaluation to international consultants (under the supervision of EHU), to ensure its neutrality. This evaluation must be done halfway through (at the end of the 2nd year) and at the end of the first phase of the program (year 4).

156. The following table shows the implementation responsibilities for the HCWMP.

Table 8-2 Implementation Responsibilities by Component

COMPONENTS AND ACTIVITIES		**EXECUTION**	**CONTROL AND SUPERVISION**
Improvement of HCWM institutional and legal framework	Set up a structure for coordination and follow up the POA	EHU	MoHSW/MENRM
	Develop regulations for HCWM	Consultants	EHU/ MoHSW
	Develop technical guidelines for HCWM	Consultants	EHU/ MoHSW
Improve HCWM in health facilities	Regulate the HCW management in health facilities.	EHU	EHU/ MoHSW and NEA/MFE
	Supply HF with HCWM equipment's and materials.	Health facilities	EHU/ MoHSW
	Ensure appropriate protection equipment for health staff.	Health facilities	EHU/ MoHSW
	Promote use of recyclable materials.	Health facilities	EHU/ MoHSW
	Set up procedures of control in HCW management.	Health facilities	EHU/ MoHSW
Training	Elaborate training programs and train trainers.	Consultants/training Institutes.	EHU/ MoHSW
	Train all health staff active in HCWM	Supervising staff/ Training Institutes.	EHU/ MoHSW
	Evaluate the training program implementation	Heads of Health centers Health Districts	EHU/ MoHSW
Public awareness	Televised messages	National Television	Health Education /EHU
	Messages radio	local Radios	Health Education /EHU
	Posters in health facilities	Printers societies	Health Education /EHU
	Public animation sessions	NGO and CBO	Health Education /EHU
Support the private initiatives and partnership in HCWM	Diffuse information about business opportunities in solid waste management	EHU	MoHSW
	Develop partnership	EHU /Health Facilities	MoHSW / Ministry of

COMPONENTS AND ACTIVITIES		EXECUTION	CONTROL AND SUPERVISION
	arrangements between public sector and private sector for HCWM	Region and Local Authorities	Local Government
Support the execution of HCWM Plan	Plan HCWM activities	National Consultants	EHU/ MoHSW
	Monitor the execution (national and local level)	Health District	EHU/ MoHSW
	Evaluation of the HCWM POA (halfway and final)	International Consultants	EHU/ MoHSW, NEA/MFE and Local Authorities

8.4 IMPLEMENTATION TIMEFRAME

157. The following timetable shows the proposed implementation schedule of the HCWM Plan over a five year period.

Table 8-3 Implementation Timetable

HCWM Plan Activities	YR 1	YR 2	YR 3	YR 4
Development of HCWM policy				
Regulation of HCW management				
Development of technical guidelines and standard operation procedures for HCWM				
Institutional arrangements - Set up a structure for coordination and follow up of the POA				
Improvement of HCWM in health facilities				
Elaboration of training programs and training of trainers				
Training for health staff active in HCWM				
Public awareness (general public)				
Supporting private initiatives and partnership in HCWM				
Monitoring and evaluation of the HCWM plan				

158. Before such an elaborate plan is implemented, certain activities can be started immediately, and others may be realized over the medium/long term.

The following actions could be realized immediately:

b) set up a structure for coordination and follow up of the POA
c) elaboration and dissemination of Policy, regulations, technical basic guidelines and standard operational procedures in HCWM
d) elaboration of HCWM training program
e) elaboration of public awareness training modules and supports
f) set up HCWM procedures in health facilities, including health staff responsibilities

In the short term:

g) training of trainers
h) training all the stakeholders involved in the HCWM

i) dissemination of public awareness programmes
j) assessment of training program implementation
k) halfway appraisal

In the medium/longer term:

l) improvement of the HCWM in the health facilities
m) Supporting of the private initiatives and partnership in HCWM
n) Monitoring and evaluation of the HCWM plan

8.5 POTENTIAL PARTNERS AND FIELD OF INTERVENTION

159. Delivery of essential health services relies on the involvement of a wide range of actors -- public and private sectors, NGOs, and civil society. So it is necessary to establish a partnership framework to identify the roles and responsibilities of each category of actor.

Table 8-4 Potential field of intervention

ACTORS	POTENTIAL FIELD OF INTERVENTION
Technical services of the State (MoHSW / MFE / NEA)	- inform the local and national authorities - facilitate co-ordination of HCWM plan activities - supply technical expertise - execute control and monitoring activities - train the health staff - supervise the training process, monitoring and evaluation
Local Authorities / Districts	- participate in the mobilization of populations - ensure HCW are properly disposed in their landfill - participate in training, monitoring and evaluation
Public health facilities / Private health facilities	- participate in training activities - supply staff with security equipment - elaborate internal plans and guidelines about HCWM - allocate financial resources for HCWM - ensure HCW management plan is implemented
Private operators	- invest in HCWM (e.g., treatment, transport, disposal) - operate as sub-contractors (Local Authorities / Districts / Health Facilities)
NGOs and CBOs	- inform, educate and make population aware - participate in / offer training activities
Training Institution	- provide health staff training

8.6 INVOLVEMENT OF PRIVATE COMPANIES IN HCWM

160. HCW collection is a major concern for public and private health facilities. According to environmental regulations, health facilities must ensure sustainable management of their wastes. However, in practice health care facilities have very limited financial resources, and no public health establishment has funds to pay for collection or disposal services for wastes. For health care facilities having incinerators, waste collection is less of a concern. For private facilities, the major constraints are the absence of alternative solutions to their

present practices: HCW co-mingled with general wastes and crude disposal. Most of them can't afford appropriate equipment for treatment.

161. Both public and private facility managers and staff express a willingness to participate in an institutional arrangement whereby costs of treating their HCW could be shared under a common agreement. Such a public-private partnership arrangement could be put in place on the basis of the following principles:

- selected public health care facilities would be equipped with incinerators to serve a defined geographic radius;
- health centres equipped with incinerators would agree to accept and treat HCW from private facilities and smaller health centres within their service area;
- private health facilities receiving such HCW treatment services would agree to pay a collection / treatment fee as per the terms of the cost sharing agreement.

162. Long-term private sector involvement in the HCWM business will depend on whether national, local, and municipal authorities are able to put in place self-sustaining sources of financing to cover investment and operating costs for this critical environmental and public health service. If the financial equation is solved, then private sector operators can be expected to identify their individual comparative advantage and explore contractual arrangements to provide a range of services for health care facilities and landfill sites (e.g., transport, treatment, and disposal).

9. HANDLING HEALTH CARE WASTE STREAMS

9.1 RECOMMENDED SYSTEM FOR HANDLING WASTE

163. The management of waste must be **consistent** from the point of generation ("cradle") to the point of final disposal ("grave"). The path between these two points can be segmented schematically into eight steps. The following is an outline of the recommended system for handling waste streams in The Gambia:

Step 1: waste minimization

164. This first step comes prior to the production of waste and aims at reducing as much as possible the amount of HCW that will be produced by setting up an efficient purchasing policy and having a good stock management, for example.

Step 2: HCW generation

165. This is the point at which waste is produced.

Step 3: segregation and containerization

166. The correct segregation of waste at the point of generation relies on a clear identification of the different categories of waste and the separate disposal of the waste in accordance with the categorization chosen. Health care waste can generally be classified into four fractions; (i) sharps, (ii) infectious or contaminated non-sharps (healthcare risk waste – (HCRW)), (iii) non-infectious or healthcare general waste (HCGW) and (iv) medical devices and radioactive materials.

167. **Segregation must be done at the point of generation** of the waste. To encourage segregation at source, (reusable) containers or baskets with liners of the correct size and thickness are placed as close to the point of generation as possible. They should be properly **colour-coded** (yellow or red for infectious waste) and have the international infectious waste symbol clearly marked.

168. When they are 3/4 full, the liners are closed with plastic cable ties or string and placed into larger containers or liners at the intermediate storage areas. Suitable latex gloves must always be used when handling infectious waste.

Table 9-1 Categories, Labelling And Containers For Health Care Waste

No,.	Waste Category		Labelling	Type of Container	Colour code		
1.	Sharps	Needles, infusion sets, scalpels, knives, blades, lancets and broken glass.	Sharps	Purpose – made puncture proof container	----------		
2.	infectious or contaminated non-sharps (healthcare risk waste – (HCRW))	Contaminated non-sharps e.g. Gauze, Cotton wool, dressings, blood, swabs, sample vials.	Infectious	Strong, leak proof plastic bag or container	Yellow or red		
		Pathological waste	Pathological	Leak proof plastic bag or container lined with leak proof material			
		Pharmaceutical waste	Pharmaceutical waste	Plastic bag or plastic lined container			
		Genotoxic waste	Genotoxic	Plastic bag or plastic lined container			
		Chemical waste	Chemical	Plastic lined container that is leak proof			
3.	non-infectious or healthcare general waste (HCGW)	Paper, packaging materials, office supplies, drink containers, hand towels, cartons, unbroken glass, plastic bottles and food remains.	General Waste	Black Plastic Bag or black plastic lined container	black		
4.	Radioactive waste		Radioactive	Lead box labelled with radioactive symbol			
5.	Pressurized containers		Pressurized containers	Plastic bag (if small)			
6.	Medical devices		e- waste				

NB: Liquid pharmaceutical waste shall be put in plastic lined containers in their original bottles.

Step 4: intermediate storage (in the HCF)

169. In order to avoid both the accumulation and decomposition of the waste, it must be collected on a **regular** daily basis.

170. This area, where the larger containers are kept before removal to the central storage area, should both be close to the wards and not accessible to unauthorized people such as patients and visitors (Figure 9-1).

Figure 9-1 Temporary storage for waste

Step 5: internal transport (in the HCF)

171. Transport to the central storage area is usually performed using a wheelie bin or trolley. Wheelie bins or trolley should be easy to load and unload, have no sharp edges that could damage waste bags or containers and be easy to clean. Ideally, they should be marked with the corresponding coding colour.

172. The transport of general waste must be carried out separately from the collection of healthcare risk waste (HCRW) to avoid potential cross contamination or mixing of these two main categories of waste. The collection should follow specific routes through the HCF to reduce the passage of loaded carts through wards and other clean areas.

Step 6: centralized storage (in the HCF)

173. The central storage area should be sized according to the volume of waste generated as well as the frequency of collection. The facility should not be situated near to food stores or food preparation areas and its access should always be limited to authorized personnel. It should also be easy to clean, have good lighting and ventilation, and be designed to prevent rodents, insects or birds from entering. It should also be clearly separated from the central storage area used for Health Care General Waste (HCGW) in order to avoid cross-contamination. Storage time should not exceed 24-48 hours especially in countries that have a warm and humid climate.

Figure 9-2 Poor example of a centralized storage.

Step 7: external transport

174. External transport should be done using dedicated vehicles. They shall be free of sharp edges, easy to load and unload by hand, easy to clean/disinfect, and fully enclosed to prevent any spillage in the hospital premises or on the road during transportation.

175. The transportation should always be properly documented and all vehicles should carry a consignment note from the point of collection to the treatment facility.

Figure 9-3 Example of a hazardous waste transportation vehicle.

Step 8: treatment and final disposal

176. There are a number of different treatment options to deal with infectious waste. These are listed in table 9-2.below and then detailed under the "Determination of Treatment Systems and Technologies" chapter.

Table 9-2 Treatment And Disposal Methods Suitable For Different Categories of Health Care Waste

Waste Category	Treatment	Disposal Method
a) Sharps	- Incineration	- Safe burial - Land filling
b) Infectious waste	- Incineration - Chemical disinfection - Autoclaving - Biological	- Land filling - Safe burial - Sewage - Ottoway pit
c) Pathological waste	- Incineration - Biological	- Safe burial - Land filling - Ottoway pit *
d) Pharmaceutical waste	- Incineration - Encapsulation - Dilution - Inertization - Dissolution	- Land filling (small quantities) - Safe burial (small quantities) - Discharge to a sewer
e) Genotoxic waste	- Rotary kiln incineration - Inertization - Encapsulation (small quantities)	- Return to supplier

	- Neutralization	
f) Chemical waste	- Rotary kiln incineration - Treatment lagoons - Pyrolytic incineration - Neutralization - Encapsulation - Dilution	- Safe burial (small quantities) - Return to supplier
g) Radioactive waste	- Decay by storage	- Storage
h) Pressurized containers	- Crushing (damaged containers)	- Recycling - Reuse - Return to supplier - Land filling - Controlled explosion (usually done by military specialized units)

- Sewage disposal needs approval from the local authority.

9.2 SUMMARY OF THE WASTE HANDLING SYSTEM

177. For effective HCWM segregation, handling and disposal/transportation the following practices should be followed:

- The medical waste should continue to be segregated by (i) sharp waste; (ii) infectious or non-contaminated non sharps; (iii) non-infectious or healthcare General waste; and (iv) medical or radioactive devices and hazardous materials.
- Segregation should be done as close to the point of generation as possible. (i.e. in all clinical areas, traditional health practices and home based care environments);
- HCW receptacles shall be readily available at the point of generation, located away from patient areas to avoid cross infections; should be safe; utilization of the receptacles should be well understood by the medical and other health staff dealing with medical waste; and should be monitored regularly to ensure that the procedures are respected;
- Receptacles of appropriate colour, size and number should be used, to accommodate and label the different waste types being generated. Labels have to be firmly attached to containers so that they do not become detached during transportation and handling. If general and hazardous waste are accidentally mixed, the mixture should be treated as hazardous HCW. The bags or containers should be resistant to their content (puncture-proof for sharps, resistance to chemicals reaction) and to normal conditions of handling and transportation such as vibration and changes in temperature, humidity or pressure;
- Staff involved in HCW management must ensure that the waste bags are properly labelled and sealed to prevent spilling during handling and transportation, and properly removed and should also ensure that for storage purposes, the waste is kept separate, and that the central storage receptacles for each colour-coded bags be placed in similarly colour-coded receptacles;

- All loading and unloading of waste shall take place within the designated collection area around the storage point;
- There should be separate schedules and separate collection times for different colour-coded containers. Separate vehicles should be used for different types of waste. This is to avoid increased possibilities of wastes becoming mixed and being transported to the wrong disposal routes and sites;
- Transportation must be done only by accredited Waste Management Contractors and certified by the local authority, ENA and other relevant departments;
- HCW must be transported directly to the disposal or treatment site within the shortest possible time; treatment and disposal of HCW should focus in minimizing negative impacts on health and on the environment;
- Capacity building of health facilities workers in the all the areas related to health-care waste management should be performed at all levels;
- Segregation system should be uniformly applied throughout the country and should be maintained throughout the entire waste cycle up to disposal.
- Domestic waste should be dealt separately from health waste.

10. DETERMINATION OF TREATMENT SYSTEMS AND TECHNOLOGIES

10.0 INTRODUCTION

178. The relative risk approach will be used in determining the treatment system and technology to be used at each HCF. The criteria for deciding on the system are that it protects in the best way possible, healthcare workers and the community as well as minimize adverse impacts on the environment.

179. Environmental-friendly and safe options used in high income countries may not always be affordable or possible to implement e.g. due to lack of electrical supply, etc. Health risks from environmental exposures should be weighed against the risks posed by accidental infection from poorly managed infectious waste (sharps in particular). The use of a burial pit or a small-scale incinerator, although clearly not the best solution, is much better than uncontrolled dumping.

180. The main criteria for the selection of a technical option should be that their implementation will offer a level of health protection which eliminates as many risks as possible. The HCWM systems can subsequently be upgraded to reach higher safety standards.

10.1 SOLID WASTES TREATMENT

181. HCW treatment systems should be efficient, environmentally sound, and permit access controls, so as to protect persons from voluntary or accidental exposure to waste during the treatment process. Technology choices should be made according to the following criteria:

a) Performance and efficiency of treatment
b) Environmental viability.
c) Easiness and simplicity in the setting up, the operating and maintenance.
d) The spare parts should be available, easy to get.
e) Costs of investments and operating.
f) Social acceptability

182. In addition to this, the waste treatment system should be close to the waste generating point. The following is an outline of available technologies for treating HCW:

a. Microwave disinfection

This method is used to disinfect bio-medical waste in stationary or mobile plants. The waste is heated by means of microwave energy. This method needs high investment and operating costs.

b. Autoclave sterilization

This type of treatment is used in health facilities (medical analysis laboratories) for the sterilization of reusable medical equipment. In this process, a dry heat sterilizer is used and heat of 180° C is generated for 30 minutes or longer, for activating vegetative micro-organisms and most bacterial spores. This process is able to handle only limited quantities of waste and therefore is commonly used only for highly infectious waste such as microbial cultures from clinical or research laboratories. Autoclaving is environmentally sound, requires fairly high investment and moderate operating costs, and ensures good disinfection efficiency under appropriate operating conditions. However, it cannot be used for all type of waste and generates contaminated wastewater. In addition, operation requires qualified technicians and its shredders are subject to frequent breakdown.

c. Incineration

Waste incineration is a thermal treatment, which aims at destroying organic waste parts by oxidation. Various types of equipment are in use:

- Pyrolitic incinerator: This has a treatment capacity ranging from 500 to 3,000 kg wastes daily, at a combustion temperature of 1200° or 1600° C; its initial cost is very high. It also needs highly qualified staff. The remnants of wastes are sent to landfill disposal sites or ash-pits.
- Pyrolitic incinerator (modern incinerator): its treatment capacity is from 200 to 10,000 kg/daily, with a combustion temperature ranging from 800 to 900° C; its requirements in terms of investment and care taking are somewhat high; it needs qualified staff; the remnants of wastes are sent to the landfill disposal sites or ash-pits.
- Incinerator with combustion room (artisanal construction, with local materials): Its investment and care taking costs are relatively low; it can work effectively, even with low-qualification staff.

Incineration provides very high disinfection efficiency and drastic reduction of weight and volume of waste. It is relatively low in cost and does not need qualified staff for operating. But it generates significant pollutant emissions.

d. Chemical disinfection

Chemical disinfection, frequently used in health facilities to destroy micro-organisms on medical equipment, floors and walls, is now being extended to the treatment of biomedical wastes. Chemicals are put in the waste to destroy or inactivate the pathogens. This treatment usually is more efficient as in disinfection than in sterilization. Chemical disinfection is most suitable for treating liquid waste such as blood, urine, stools or hospital sewage. Solid (and even highly hazardous) biomedical wastes, including microbiological cultures, sharps, etc., may also be disinfected chemically. Chemical products such as hypo-chlorine and other acids are used to

destroy pathogens, before wastes are burned or transported to disposal sites. The most frequent chemical disinfectants are:

- Chlorine - This is a universal disinfectant, very active against micro-organisms. In case of possible HIV/AIDS infectious materials, concentration of 5 g/litre (5000ppm) of chlorine is recommended.
- Formaldehyde - which is an active gas against all micro-organisms except at low temperature (<20°C); the relative humidity must be near 7 %. It is also sold in the form of gas dissolved in water at concentrations of 370 g/litre. This disinfecting product is recommended for Hepatitis and Ebola virus (but not for HIV/AIDS). The risk associated with formaldehyde is that it can cause cancer.

The drawback of this system is that the disinfected wastes are still there and other methods of final elimination must be devised. This method gives highly efficient disinfection in good operating conditions, and some chemical disinfectants are relatively inexpensive. But it requires highly qualified technicians for operating the process.

e. Burial in municipal landfills

This practice consists of disposing of HCW directly in municipal landfills. In fact, this is not a treatment system: the wastes are stored with household wastes. This system requires very low investments, but it presents huge health and environmental risks, in view of scavenging practices at public landfills. However, land filling is better than leaving hazardous wastes accumulated at hospitals or other publicly accessible places. More suitable treatment methods should immediately be envisaged.

f. Burial inside health facilities

Burial at the origin of HCW production – the health facility - is another form of elimination, mainly used where there is no treatment system or means of waste transportation to public landfills. The risk in this case is that the destruction of infected wastes is not sure, according to the burial place. Also, there is always the risk of digging out wastes, most of all, the sharp objects.

g. Concrete Lined Pits

Disposal at the origin of HCW production in concrete lined pits at the health care facility - is another form of elimination, mainly used where there is no treatment system or means of waste transportation to public landfills. The risk in this case is reduced by the lining and the pit must be above the water table. However the destruction of infected wastes is not sure, according to the burial place. Also, there is always the risk of digging out wastes, most of all, the sharp objects. (See Annex 4 for designs)

h. Open air burning

When done in open air, the burning of HCW constitutes a factor of pollution and harm to the environment. Since HCW is generally burned in a hole, the destruction is never complete: often the quantity of unburned residue constitutes 70 % of the original wastes. This encourages children and scavengers to look for toys and reusable objects.

i. Encapsulation

This method consists of disposing of wastes by filling metal or plastic containers ¾ full with waste materials and topping the container up with plastic foam, bituminous sand, and cement mortar or clay material. The process is cheap, safe and very appropriate for health centres that cannot envisage other methods to treat sharps, chemical and pharmaceutical waste. Encapsulation is not recommended for non-sharps infectious waste. The main advantage is to prevent the risk of scavengers getting access to these wastes in landfills and to reduce mobilization of toxic substances.

10.1.1 Comparative analysis of solid HCW treatment systems

183. Table 10-1 demonstrates the advantages and drawbacks of each treatment system, along with its fitness in the economic and socio-cultural context of The Gambia.

Table 10-1 Comparative analysis of solid HCW treatment systems

System	Technical Feasibility	Investment Cost	Operating Cost	Easiness/simplicity	Availability of spare parts in The Gambia	Environmental Viability	General Social acceptance
Autoclave	Very efficient but cannot be used for all types of waste	Fairly high	Average	Very qualified staff	Not available locally	Ecological, but generates contaminated wastewater	Very good
Microwave irradiation	Very efficient	Very high	Very high	Very qualified staff	Not available locally	Very ecological	Very good
Pyrolyse	Very efficient	Very high	Average	Qualified staff	Possible	Very ecological	Very good
Pyrolitic incinerator (modern incinerator)	Very efficient	Fairly high	Average	Limited skills	Possible	Little pollution	Very good
Local material incinerator	Fairly efficient	Low	Low	Limited skills	Available	Polluting	Very good
Chemical disinfection	Fairly efficient	Low	Low	Qualified staff	Available	Polluting	Fairly good
Burial in municipal public landfills	Inefficient	Low	Low	Qualified staff	Available	Very polluting and risky	Bad
Burial inside health facilities	Inefficient	Low	Low	Limited skills	Available	Polluting and risky	Bad
Use of Concrete lined Pits	Efficient	Low	Low	Limited skill	Available	Non polluting	Fairly good
Incineration at open air	Inefficient	Low	Low	Limited skills	Available	Polluting and risky	Very bad
Encapsulation	Very efficient for sharps, drugs but not recommended for non-sharps	Low	Low	Limited skills	available	Non polluting	Good

10.1.2 Recommendations for Solid Wastes Treatment

184. The comparative analysis, based on the above mentioned economic and technical criteria, leads to the following recommendations:

- Modern pyrolitic incinerators at Referral hospitals, Regional hospitals, other Hospitals, and the Local Authorities, because of its fairly low cost and operating skills requirements;
- Local incinerators (built with local material) in major Health Centres, minor Health Centres, Private Health Centres and other Public Health Units because of its very low cost and small quantities of HCW produced in these facilities;
- Stabilized concrete lined pits in major Health Centres, minor Health Centres, and Public Health Units and for home-based care, because of very low HCW production.

185. Inadequate incineration, or incineration of non-incinerable (halogenated plastic, radioactive waste, reactive chemical waste, silver salts or radiographic waste, mercury or cadmium, heavy metals, etc.) waste can release pollutants into the air. The incineration of materials containing chlorine can generate dioxins and furans, which are classified as possible human carcinogens and can have other adverse effects. Incineration of heavy metals or materials with high metal contents (in particular: lead, mercury and cadmium) can increase the spread of heavy metals in the environment. Dioxins, furans and metals are persistent and remain in the environment. Materials containing chlorine or metal should therefore not be incinerated.

186. To ensure that inappropriate materials are not incinerated, the waste incineration system must be based on a strategy of segregation at source, to reduce as much as possible the infectious waste stream and to prevent the contamination of other wastes (papers, plastic objects, etc.). All types of wastes must not be incinerated, mainly the non-incinerable ones mentioned above. Waste segregation will allow the non-contaminated, non-infectious and non-incinerable wastes to be disposed at municipal landfills. Only the contaminated wastes (needles, sharp objects, blood stained cottons, etc.) are reserved for incineration. The latter don't produce (or produce very little) toxic elements. In addition, this system of treatment allows a complete melting of needles, which are the main vectors of accidental transmission of HIV/AIDS.

187. Modern incinerators, with special emission-treating equipment, are able to work at 800-1000° C, and can ensure that no dioxins and furans, or only insignificant quantities are produced. Smaller models, built with local materials and able to operate at these high temperatures are currently being field-tested and implemented in some countries.

188. In the health centres, the quantities of HCW produced are insignificant. If waste segregation is performed well, the quantities to be incinerated will be reduced and negative

impacts on the environment will be insignificant. In addition, promotion of the use of non-chlorine plastic containers can reduce polluting by-products in solid waste incineration.

189. Although incineration has its critics, it is difficult to choose another system for developing countries such as The Gambia, given the economic and technical conditions. The proposal is not to incinerate all solid urban waste (household wastes, industrial wastes, etc.), but only selected contaminated health care wastes. Appropriate incinerator technology is supported by the WHO elsewhere in Africa. For example, during vaccination campaigns against tuberculosis in Togo and Benin, the WHO has supported, since 2001, a program to produce craft incinerators (made of local materials, cement with clay), in order to destroy the syringe needles used in the vaccination program. WHO organized a workshop in Bamako in 2001 to train some African technicians in the building of these types of incinerators. These models can reach very high temperatures (800° C) able to get the needles and sharp objects melted (the model is shown in annex 2).

190. Presently, there are no environmentally sound options at low-cost for safe disposal of infectious wastes. Incineration of wastes has been widely practiced, but alternatives, which may be preferable under certain circumstances, are becoming available, such as autoclaving, chemical treatment and microwaving. Land-filling, when safely practiced, may also be a viable solution for part of the already segregated wastes.

191. Autoclave, microwaves systems are surely more efficient and environmentally sound, but more difficult to operate, too; they are very expensive and require qualified staff for operating. They cannot be used for all types of waste and generate contaminated wastewater, and in case of malfunction, the spare parts are not available locally. So, these types of technologies should not be recommended in The Gambia, given the present economic situation. Chemical disinfection requires chemical products permanently and qualified staff for operating; the disinfected wastes must also be sent to landfill disposals or other systems of disposal after such treatment.

192. It is therefore important that where incineration is recommended, it should be accompanied by: (i) appropriate skills training of those who will operate the incinerators; (ii) appropriate and continuous monitoring of level of inflammability and type of waste incinerated.

193. Whenever incinerators become an increasingly difficult option to use, the following treatment systems should be proposed:

Chemical disinfection:

194. This method gives highly efficient disinfection, and some chemical disinfectants are not expensive. As for drawbacks, the method requires highly qualified technicians for operating and it is inadequate for pharmaceutical, chemical and some types of infectious waste. In central, general and regional hospitals, which produce rather important quantities

of HCW, the latter should be disinfected with chemical products, then evacuated to the public landfills where specific areas have been prepared beforehand.

Disposal at municipal landfills:

195. In case hazardous health-care waste cannot be treated or disposed elsewhere, direct burying in the municipal landfill should be recommended. To prevent the important disease burden currently created by these wastes, it is necessary to prepare specific areas for HCW disposal, to limit access to this place (wire fencing and lock) and to bury the waste quickly to avoid contact with people or animals. It is a temporary solution before more suitable treatment methods are found.

Burying inside hospital premises:

196. In health centres where the HCW production is small, a ditch should be dug. Its bottom and walls must be cemented (or stabilized) to avoid contamination of the water table and prevent the walls from collapsing. The HCW thrown in the ditch must be covered with sand. The same procedure is repeated every time a new quantity of HCW is disposed, until the hole is full; in such a case, another hole is dug nearby. The hole must be protected (fence/lock) to avoid access and accidents. The main drawback is that burial places are not always available inside the health centres.

197. In all cases, the principle of waste segregation at source of production must be seriously respected, to minimize the contamination of general wastes by the infectious ones.

Sharps and needle treatment

198. Probably the most frequent risk is created by sharps (needles, scalpel blades, blood vials, glassware, etc.) in contact with infectious germs. In health facilities, needles and sharps should be collected in non-reusable containers, such as puncture-proof “sharps boxes”, specific cardboard, metal or plastic boxes, or in empty rigid plastic bottles (with a tight fitting lid), if financial resources are not available. One must not put sharp objects in any container to be recycled or returned to a store. Table 10-2 demonstrates the advantages and drawbacks of each treatment system for sharps, along with its suitability in the economic and socio-cultural context of The Gambia.

Table 10-2 Comparative analysis of sharps treatment systems

Technology	Technical feasibility	Investment Cost	Operating Cost	Easiness /Simplicity	Availability of spare parts in The Gambia	Environmental viability	Social acceptance
Autoclave Microwave irradiation	Very efficient	Very high	Average	Needs very qualified staff	Not available	Non-polluting, but requires disposal of residue	Very good
Melting in incinerator (or needle incinerator)	Very efficient	Medium for modern incinerator) and low (for craft ones)	Low	Low skills staff	Possible	Non polluting	Good
Chemical disinfecting	Efficient	Low	Low	Qualified staff	----------	Polluting and Requires disposal of residue	Fairly good
Storage in specific containers then landfill burial	Fairly efficient	Very low	Low	Low skills staff	----------	Non-polluting but risks digging out sharps	Fairly good
Burial in the site of health centre	Inefficient	Very low	Very low	Low skills staff	----------	risks of digging out sharps	Bad
Mechanical grinding	Very efficient	High	Low	Low skills staff	Not available	Non-polluting, but ground sharps must be disposed	Good
Encapsulation	Efficient	Low	Low	Low skills staff	----------	Safe and non-polluting	Good

199. The melting of sharps in incinerators is very efficient. Whenever incinerators become an increasingly difficult option to use, encapsulation (filling metallic or plastic containers up to ¾ with wastes then filling up with cement, bituminous sand, etc.), chemical disinfecting, storage in specific containers (then landfill burial), should be recommended because of the very low cost. Autoclaving is a very efficient system, but it is very expensive.

10.2 LIQUID WASTES TREATMENT

200. For liquid wastes, there are many treatment systems among which: (i) physical and chemical treatment; (ii) intensive biological systems (activated mud system; biological disk; bacterial field, etc.); (iii) septic pits/tanks; (iv) disinfection; and (v) decanting and digesting basin. Table 10-3 demonstrates the advantages and drawbacks of each treatment system for liquid wastes, along with its suitability in the economic and socio-cultural context of The Gambia.

Table 10-3 Comparative analysis of liquid waste treatment systems

System of treatment	Technical Characteristics	Technical Efficiency	Investment and Operating Cost	Recommendation for The Gambia
Decanting and digesting basin	- Mud draining - very weak area (buried)	Medium	Fairly high	Recommended in central and Provincial hospitals
Septic pits	- Mud draining - very weak area (buried)	Medium	Very low	Recommended in health centres
Activated mud system	- sifting - mud draining - ventilation - fairly important area	Very high	Very high	Not recommended (very expensive)
Biological disk, bacterial field	- sifting - mud draining - fairly important area	High	Very high	Not recommended (very expensive)
Physic and chemical treatment	- sifting - chemical products - fairly important area	Very High	Very high	Recommended for central or general hospitals only
Chemical disinfection	- use of chemical products only - little area is necessary - No investments in infrastructure	High	Medium	Recommended

201. Disinfection is clearly the most efficient way to deal with liquid infectious wastes. That is why this option should be favoured among the other interventions. Consequently, a combined system (disinfection then storage in septic pits) is recommended for the regional hospitals, general hospitals, major Health centres and minor health centres, which don't produce much liquid waste. For the referral and general hospitals, a physical and chemical treatment, comprising a disinfection system, is recommended. The implementation of this option requires a feasibility study.

10.3 EQUIPMENT SUPPORT

202. With regards to providing support on equipment and appropriate technology for those handling waste:

- Funding needs to be allocated to repair all the defective incinerators;
- Maintenance of the generators should be performed on a regular basis, and a budget should be allocated for this purpose;
- a training program should be prepared on key aspects of management of HCW;
- a budget line for the training of staff dealing with health-care waste management, with a specific training plan, particularly in the areas of segregation, collection storage and disposal should be instituted;
- There is a need to designate a focal point staff to be in charge of the operation of the incinerators;
- Advocate for the adoption of a specific budget line to re-train hospital workers handling HCW in standard procedures;
- Strengthen communication and awareness for better management of HCW;
- Develop communication plans for the management of HCW and support the implementation of this plan;
- Fencing and signage in areas where the incinerators are located should be done;
- Adequate spill kit and protective gear such as gloves, overall, masks and boots must be provided at the storage sites. The kit sites must include absorbent materials, disinfectant, buckets, shovels, etc. for staff to clean up any spills and must be easily accessible

11. DETERMINATION OF DISPOSAL SITES

11.1 CHOICE OF LANDFILL SITES

203. In big cities such as Banjul, incineration residues, which are considered as household waste, can be disposed in the public municipal landfill, if specific burial areas are prepared, mainly to receive sharp objects not melted during the process. These types of waste hurt scavengers and street children even though they are sterilized during incineration. At District and local level, the remaining wastes after burning can be buried inside health centres, away from patient treatment areas.

11.2 DECISION TREE SCENARIOS

204. Five scenarios have been developed to describe the context within which health care facilities operate and must find solutions for the safe management of their wastes. The scenarios mainly distinguish between the population density of the area, the proximity to modern waste treatment facilities, and whether facilities are located in **urban, peri-urban** or **rural** environments. Five decision trees corresponding to each scenario are presented to show treatment choices and disposal options:

- **Scenario 1 (Annex 5) :** Urban area with access to a modern waste treatment facility or located within reasonable distance of a larger health-care facility with treatment facility
- **Scenario 2 (Annex 6) :** Urban area without access to modern waste treatment facility
- **Scenario 3 (Annex 7) :** Peri-urban area
- **Scenario 4 (Annex 8):** Rural area without access to modern waste treatment or disposal facility
- **Scenario 5 (Annex 9):** Rural area with access to modern waste treatment or located within reasonable distance of a larger health-care facility with treatment facility.

12. THE MONITORING PLAN

12.1 PRINCIPLE AND OBJECTIVE

205. Waste management is a continual task demanding a permanent effort from each and every person at the health care facility. During the upgrading phase, the process of HCWM must be investigated and recorded. Once the required level is reached, regular monitoring should ensure that the desired standard is maintained. The monitoring of HCWM is part of the overall quality management system. To measure the efficiency of the HCWMP, as far as the reduction of infections is concerned; activities should be monitored and evaluated, in collaboration with concerned institutions: MoHSW, MFE, NEA, Local Authority, NGOs, etc.

12.2 METHODOLOGY

206. The HCWMP will be executed over 5 years and implementation monitoring will be carried out as follows:

Table 12-1 Implementation Plan for M&E

OBJECTIVE	TIMING/PERIOD	RESPONSIBLE PARTY
Development of HCWM policy		
Legal framework: • Development of HCWM policy • Regulation of HCW management • Development of technical guidelines • Development of standard operational procedures	At the beginning of the program (first year)	EHU/ MoHSW
Institutional arrangements • Setting up a structure for coordination and follow up of the POA • Supporting private initiatives and partnership in HCWM	At the beginning of the program (first year)	EHU/ MoHSW
Planning activities	At the beginning of the program	EHU/ MoHSW
Implementation of health facility HCWM Plan	Yearly, according to the time-table established	EHU/ MoHSW
Control and follow up of the execution of HCWM Plan activities	Daily	Health facilities
	Monthly	Health Department in the Districts (MoHSW)
	Yearly	EHU/ MoHSW

OBJECTIVE	TIMING/PERIOD	RESPONSIBLE PARTY
Training : • Elaboration of training programs and training of trainers • Training for health staff active in HCWM	- two first years	- EHU/ MoHSW, National Consultants, Training Institutes
Awareness • Public awareness (general public	- yearly	- EHU/ MoHSW and NGOs, CBOs
HCWM Plan Evaluation	Half-way (at the end of the 2nd year)	EHU/ MoHSW, with the support of international consultant
	At the end of the 5th year	EHU/ MoHSW, with the support of international consultant
Supervision	Six-monthly	EHU/ MoHSW; MFE; Local Authority

12.3 MEASURABLE INDICATORS

207. Program level indicators are presented in Tables 6-1 to 6-6 of the Logical Framework for the HCWMP. At the facility level, the following framework and measurable indicators could be developed into a standard format to facilitate comparability and usefulness of the data:

- **HCW management structure:**
  Reduction of waste, increase in efficiency; standard of hygiene; awareness of staff and patients; statistical data on waste generation; financial resources; functioning of responsibilities; training and awareness creation activities; monitoring and recording activities;

- **HCW collection:**
  Sufficient and appropriate collection containers; efficiency of waste segregation; frequency of waste removal; environmentally friendly handling of waste; responsibilities;

- **HCW transportation and storage:**
  cleanliness and functioning of transport equipment; execution of recommended transport procedures; status of storage facilities; cleanliness; separate storage of hazardous items; emergency equipment; lock and safety measures; responsibilities;

- **HCW treatment:**
  Incinerator for infectious waste; proper functioning of incinerator; maintenance procedure; safety regulation for operation; safe disposal of ash; responsibilities; sewage system; functioning of septic tanks; maintenance procedure; wastewater treatment;

- **HCW disposal:**
  Proper operation of landfill site; proper operation of waste pit for infectious waste; transport of chemical and radioactive waste; responsibilities;

- **General cleanliness:**
  containers not overfull; no used sharps outside or protruding from sharps containers; no foul-smelling waste in facility or on premises; no litter in facility or on premises; no faeces on premises; waste pits not overfull.

12.4 MONITORING AND EVALUATION

208. There is need to improve the HCW information system within the context of Health Management Information System (HMIS) and Strengthening Monitoring and Evaluation of the HCWM:

- It is imperative that a reliable information system related to HCWM be created and integrated in the HMIS, to enable the preparation of timely reports that will allow timely interventions;
- The monitoring and coordination needs to be strengthened by appointing a Monitoring and Evaluation Officer;
- Monitoring and Evaluation (M&E) Reports should be prepared on a quarterly basis to report on progress of the activities related to the performance of the HCWMP; this should be included as a section in the regular monitoring and evaluation reports of the project
- Public awareness in HCWM should be enhanced.

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ANNEXES

ANNEX 1 NUMBER OF HEALTH FACILITIES BY CATEGORY

NO.	INSTITUTION	SERVICES OFFERED	NUMBER IN THE COUNTRY	SAMPLE SELECTED
INSTITUTIONS	MINISTRY OF HEALTH AND SOCIAL WELFARE		1	1
	MINISTRY OF FORESTRY AND THE ENVIRONMENT		1	1
	NATIONAL ENVIRONMENTAL AGENCY (NEA)		1	1
	LOCAL AUTHORITIES		6	2
	ANALYTICAL SERVICES PROVIDERS (LABORATORIES)		10	1
	MEDICAL RESEARCH COUNCIL		1	1
RHT	REGIONAL HEALTH TEAM		6	3
TERTIARY	REFERRAL HOSPITALS	In-patients, specialist out-patients, surgery, obstetrics, laboratory, intensive care unit, general practice, gynaecology, emergency/casualty	4	3
	HOSPITALS		5	1
SECONDARY	REPRODUCTIVE AND CHILD HEALTH CLINICS (RCH)	In-patients, specialist out-patients, surgery, obstetrics, laboratory,	**315**	
	MINOR HEALTH CENTRES		**41**	**6**
	MAJOR HEALTH CENTRES		**6**	**4**
	PRIVATE FOR PROFIT		**23**	**2**
	PRIVATE NON-PROFIT		**18**	**3**
PRIMARY	PRIMARY HEALTH CARE (PHC) - KEY VILLAGES		**74**	**0**
	PRIMARY HEALTH CARE (PHC) - VILLAGES		560	0
	VETERINARY HOSPITALS		1	1
	PHARMACEUTICALS		7	0
	BLOOD TRANSFUSION SERVICES		1	1

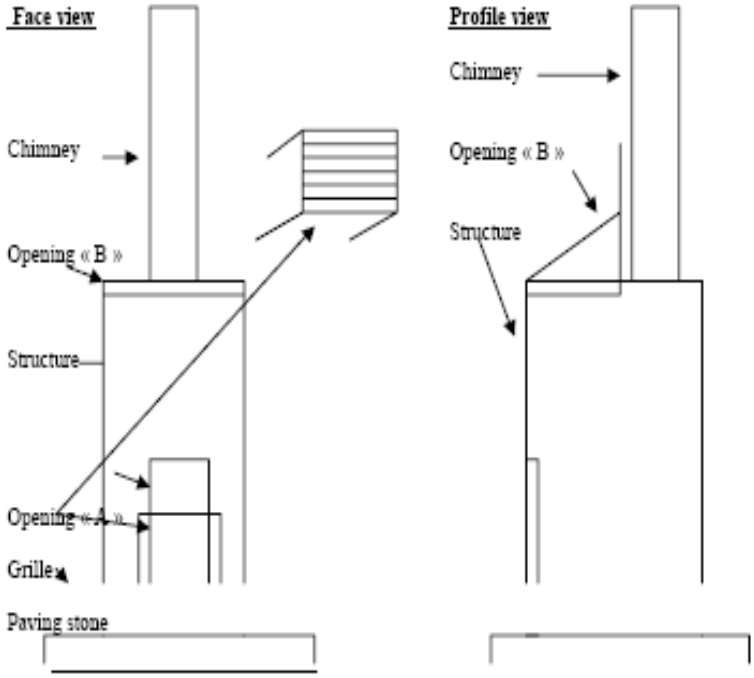
ANNEX 2 MODEL OF "WHO" INCINERATOR MADE WITH LOCAL MATERIALS

Some technical characteristics:

- Materials: red sand (laterite), clay, white cement
- Bricks of cooked sand
- Galvanized metal sheet Chimney

Structure:

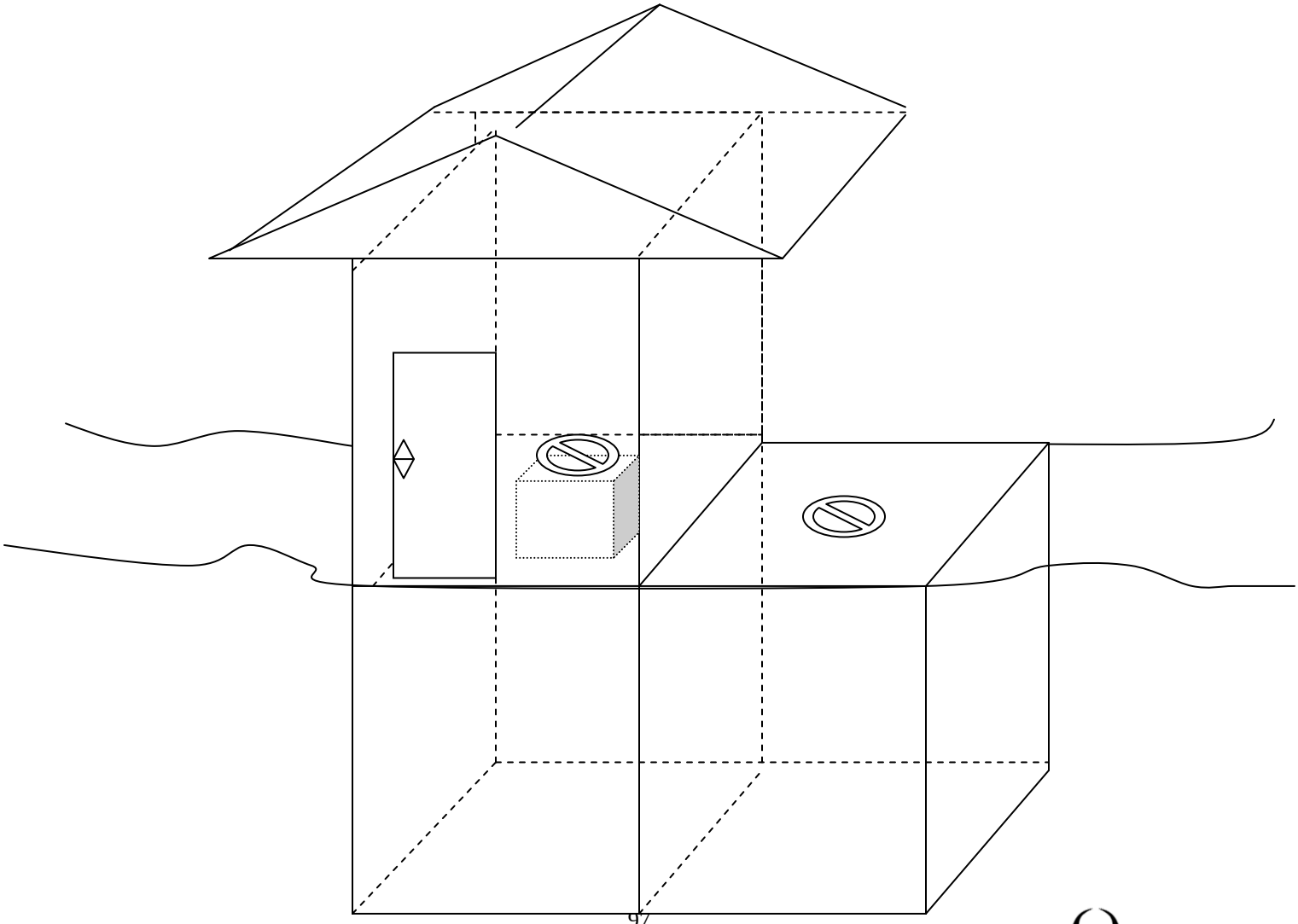
- 0.6m x 1mx 1.5m
- Height of chimney: 5 to 6m
- Opening « A » for lighting and ashes recuperation: 40cmx30cm
- Metallic gate (Galvanized metal sheet galvanized) for opening « A »
- Metallic grate for burning the waste
- Opening « B » for the introduction of waste: 40 cm x30cm
- Mobile lid for shutting opening « B »
- Concrete paving stone (2m x 2m)



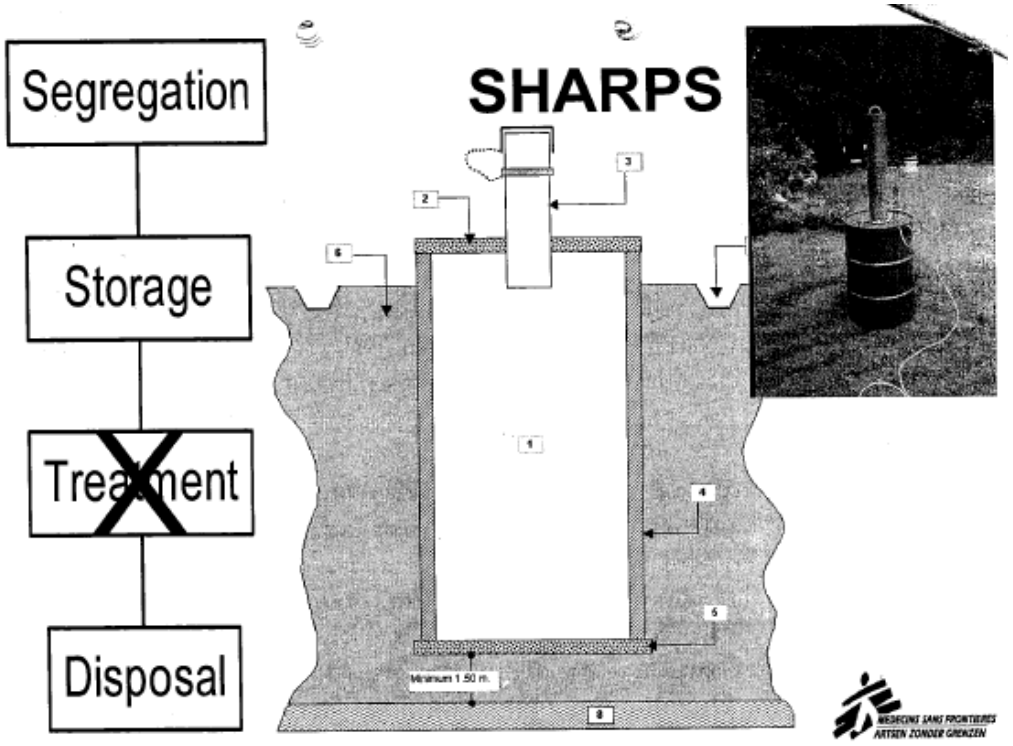
ANNEX 3 CONCRETE LINED PIT - HOME BASED CARE WASTE DISPOSAL

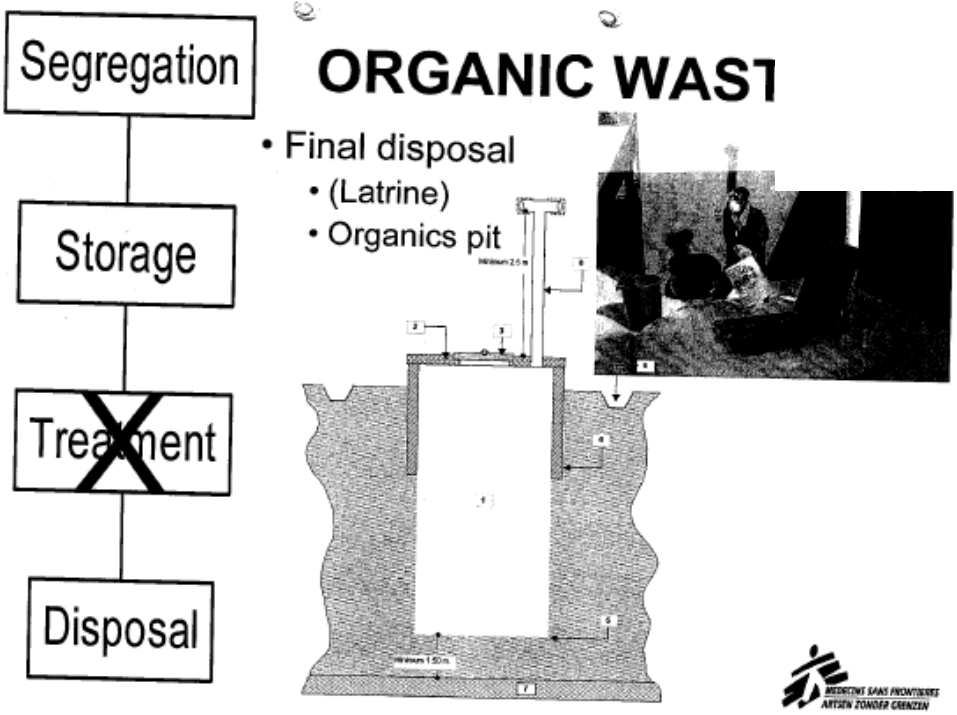
Pit with Pit Latrine for home based care

Design:



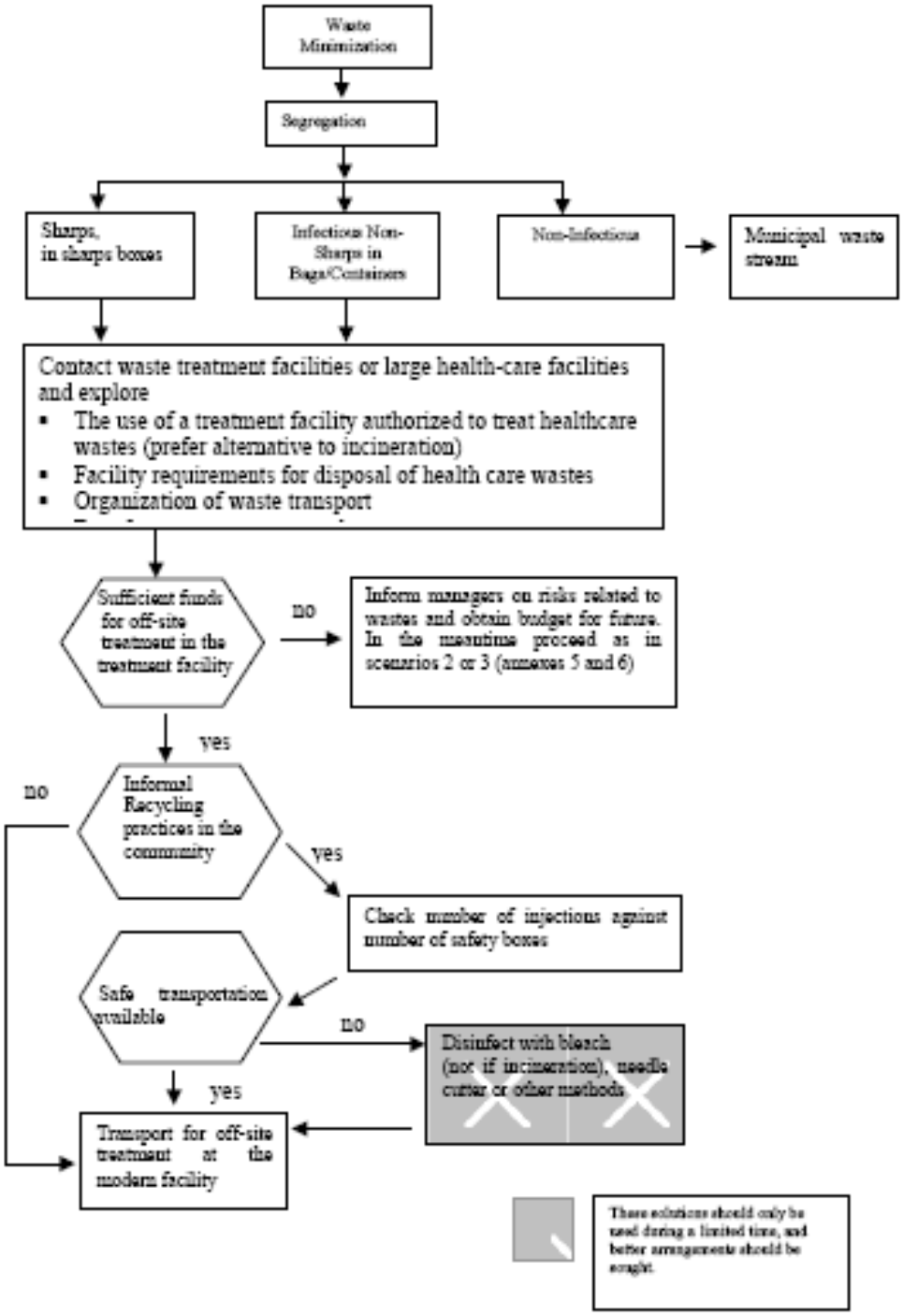
ANNEX 4 CONCRETE LINED PIT - SHARPS AND INFECTIOUS DISPOSAL





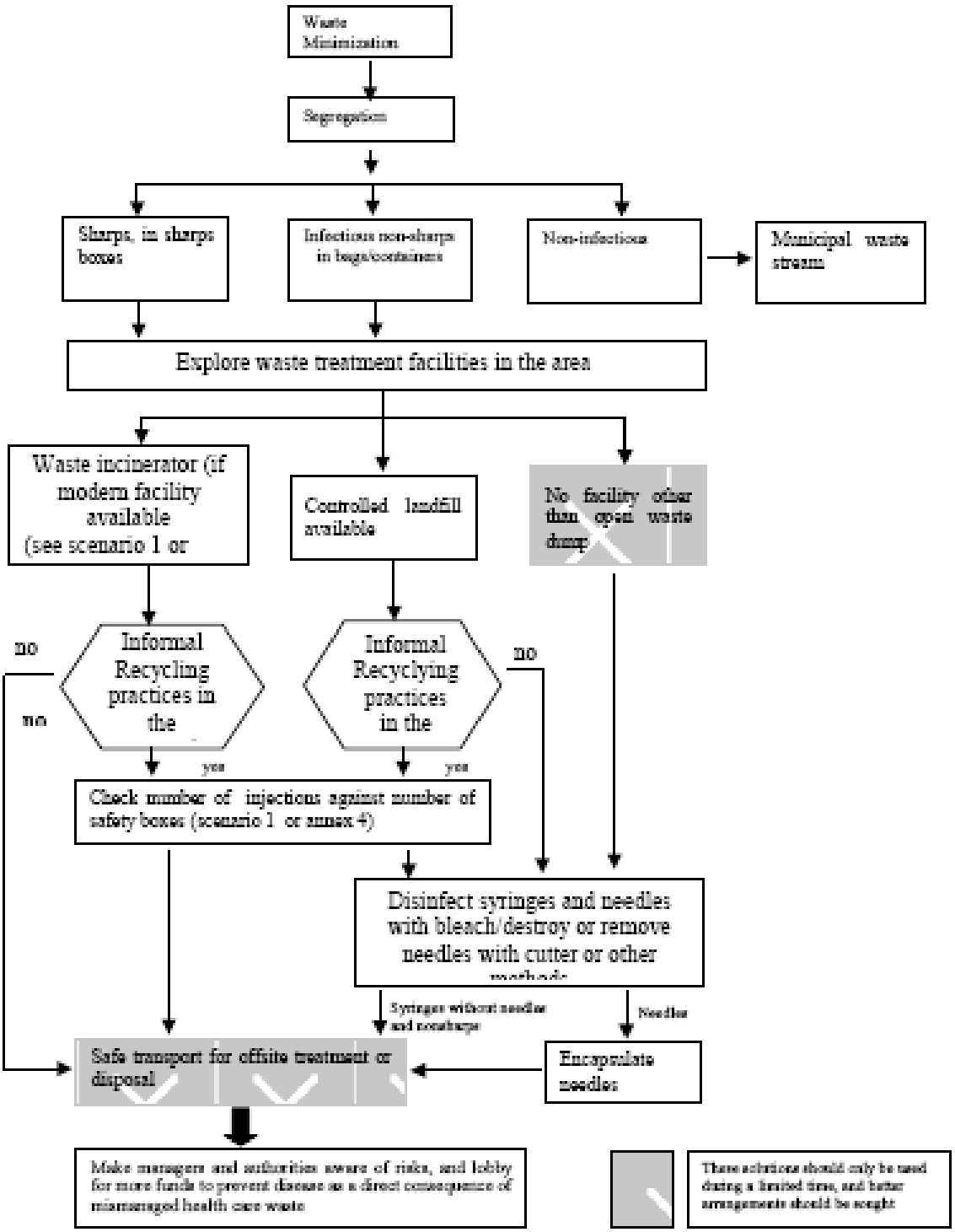
ANNEX 5 HCW FACILITIES OPERATING SCENERIO 1

Scenario 1: Urban area with access to a modern waste treatment facility or located within reasonable distance of a larger health-care facility with treatment facility



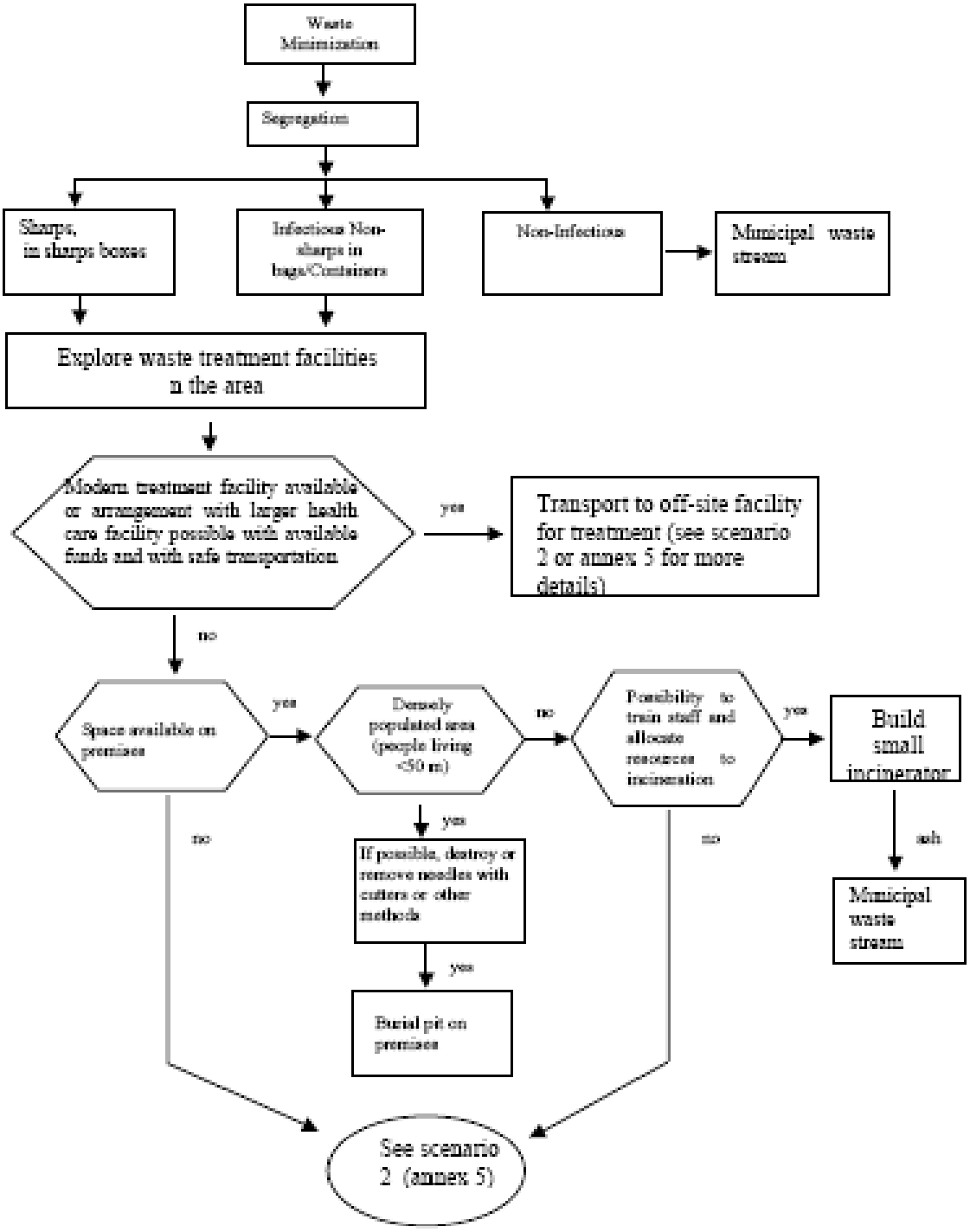
ANNEX 6 HCW FACILITIES OPERATING SCENERIO 2

Scenario 2: Urban area without access to modern waste treatment facility



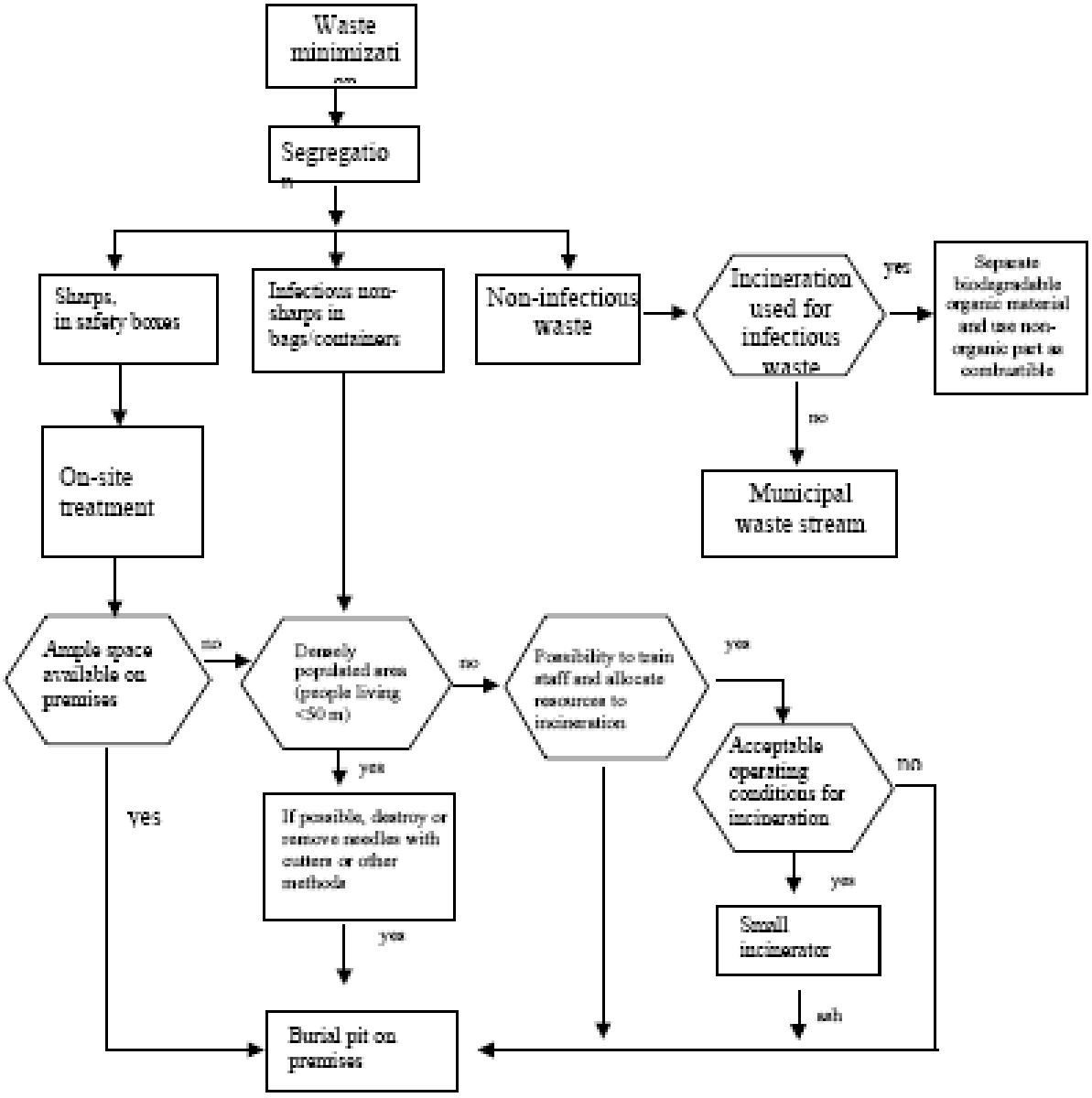
ANNEX 7 HCW FACILITIES OPERATING SCENERIO 3

Scenario 3: Peri-urban area



ANNEX 8 HCW FACILITIES OPERATING SCENERIO 4

Scenario 4: Rural area without access to modern waste treatment or disposal facility



ANNEX 9 HCW FACILITIES OPERATING SCENERIO 5

Scenario 5: Rural area with access to modern waste treatment or located within reasonable distance of a larger health-care facility with treatment facility.