EVALUATION OF SECTOR WIDE APPROACH IN PUBLIC HEALTH INFRASTRUCTURE DEVELOPMENT IN MALAWI

by

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May I also convey my deep gratitude to my close friends, classmates and colleagues for their encouragement along the rough journey of constructing this Master's thesis.

DECLARATION OF ORIGINALITY AND CONFLICTS OF INTEREST

I, Dr. Rabson Landson Justin Kachala, hereby declare that this thesis is a true discourse of my own original investigations and any other contributions from other persons are either cited or acknowledged appropriately. I also declare that I have no conflict of interests. Today, 20th July, 2011, I submit this thesis to the Graduate School of Asia Pacific Studies, Ritsumeikan Asia Pacific University in Japan for the partial fulfillment of the requirements for the acquisition of the Degree of Master of Science in International Cooperation Policy (ICP), Public Health Management (PHM).

THESIS DEDICATION MESSAGE

I am dedicating this thesis to my mother, Bertha and late father, Landson. Their love, care and possessiveness nurtured me what I am today, rising above all odds of poverty, marginalization, culture and vulnerabilities to excel in academia. This is yet another milestone in my dear life which vindicates my hard work spirit and deepest motivation instilled in me by my dear parents who left no stone unturned to promote my compassion for more knowledge. May God, the Omnipotent bless my dear mother and the soul of my father so that it may rest in eternal peace.

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LIST OF ACRONYMS AND TERMS……...**xiv**

ADB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
AIPs	Annual Implementation Plans
APU	(Ritsumeikan) Asia Pacific University
ARI	Annual Risk of Infection
ART	Antiretroviral Therapy
BCG	Bacillus-Calmette-Guerin
CAs	City Assemblies
CDC	Center for Disease Control
CHs	Central Hospitals
CHAM	Christian Health Association of Malawi
CHMTs	Central Hospital Management Teams
CHSU	Community Health Sciences Unit
CIDA	Canadian International Development Agency
CMERD	Central Monitoring, Evaluation and Research Development Directorate
CMS	Central Medical Stores
DARS	Department of Agricultural Research Services
DAs	District Assemblies

DDPs	District Development Plans
DC	District Commissioner
DCS	Directorate of Clinical Services
DFID	UK Department for International Development
DHMTs	District Hospital Management Teams
DHO	District Health Office/District Health Officer
DHS	Demographic Health Survey
DHs	District Hospitals
DIPs	District Implementation Plans
DNS	Directorate of Nursing Services
DOFA	Directorate of Finance and Administration
DOTS	Direct Observed Treatment Short Course
DPHS	Directorate of Preventive Health Services
$DPTH_{ib}HBV$	Pentavalent Vaccine (Diptheria, Pertussis, Tetanus, Hemophilus Influenza Type b and Hepatitis B Vaccine)
DRHS	Directorate of Reproductive Health Services
EHO	Environmental Health Officer
EHP	Essential Health Package
EMA	Environmental Management Act of 1996
EPI	Expanded Program of Immunization

EPO	Environmental Protection Order
ETHCO	Ethanol Company of Malawi
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HBsAg	Hepatitis B surface Antigen
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HQs	Headquarters
HSA	Health Surveillance Assistant
HSR	Health Systems Research
ICP	International Cooperation Policy
IEC	Information, Education and Communication
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
km	Kilometer
MBS	Malawi Bureau of Standards
MDGs	Millennium Development Goals
MGDS	Malawi Growth and Development Strategy
MDGP	Malawi Decentralization Governance Program
MDR-TB	Multi Drug-Resistant Tuberculosis

MHEN	Malawi Health Equity Network
MMJ	Malawi Medical Journal
MOH	Ministry of Health
MOU	Memorandum of Understanding
MPRS	Malawi Poverty Reduction Strategy
MPs	Members of Parliament
MSA	Medical Saving Account
MVI	(PATH) Malaria Vaccine Initiative
NDP	National Development Plan
NGOs	Non-Governmental Organizations
NHA	National Health Accounts
NMCP	National Malaria Control Program
NSO	National Statistics Office
NTP	National Tuberculosis Control Program
ODI	Overseas Development Initiative
ODPP	Office of Director of Public Procurement
OECD	Organization for Economic Cooperation and Development
OPV	Oral Polio Vaccine
PAM	Physical Assets Management
PASW	Predictive Analysis Soft Ware
PHC	Primary Health Care

PLWHA	People Living with HIV/AIDS
POW	Program of Work
PPP	Public-Private Partnership
PS	Principal Secretary
RCAPS	(Ritsumeikan) Research Center for Asia Pacific Studies
RSA	Republic of South Africa
SIDA	Swedish International Development Cooperation
SLA	Service Level Agreement
SPSS	Statistical Package for the Social Sciences
SSA	Sub-Saharan Africa
SWAp	Sector Wide Approach
T/A	Traditional Authority
TAs	Town Assemblies
TB	Tuberculosis
TOR	Terms of Reference
TWG	Technical Working Group
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development

WHO	World Health Organization
XDR-TB	Extensively Drug-Resistant Tuberculosis

ABSTRACT

The Background Information of the Study

The development of the public health infrastructure in Malawi was among the major culprits in the public sector which led to a near breakdown of public healthcare delivery system in the country in 2002 to 2003 financial year. However, Sector Wide Approach (SWAp) has increased the reallocation and flexibility in utilization of resources into the health care delivery system in the country under decentralization policy since 2004 under the banner of health reforms. However, the improved reallocation of resources into the public health sector without corresponding civil service's major reform could be hypothesized as a challenge in absorption capacity.

The Purpose of the Study and its Scope

In Malawi, it is not known how much of the disbursed resources the public health cost centers could be absorbed within the designated time of execution. It was against that background that the following health systems research investigated the public health cost centers' expenditure performances as regards to public health

infrastructure development funds from 2004 to 2009 in Malawi. Therefore, the purpose of the study was to evaluate SWAp on national public health infrastructure development pillar during the period under review.

The Study Methodology

The study applied a quantitative research design using a structured questionnaire to collect secondary data from 19 public health cost centers nationwide before analyzing them using Statistical Package for the Social Sciences (SPSS) Statistics 17 for correlation of variables and testing if there was consistency with SWAp expenditure model using Chi-Square test at a *p-value* of 0.01.

Main Research Findings and Conclusion

The public health cost center at the Ministry of Health headquarters failed to utilize twenty percent of the disbursed funds during the period under study. The overall calculated *p-value* was 0.00012 which showed inconsistency with SWAp expenditure model statistically at an *alpha* of 1%. Therefore, my evaluation of the results of this

study is that the average expenditure by public health cost centers in the country was not fully consistent with Sector Wide Approach Expenditure Model.

Main Research Recommendations

From this study, it is recommended to conduct further research to investigate the comprehensive causes of under-expenditure at the headquarters cost center if maximum output from the joint health sector wide approach resources is to be realized in order to achieve not only national health goals as set in the Malawi Poverty Reduction Strategy (MPRS) and Malawi Growth and Development Strategy (MGDS), but also global health goals of MDGs.

1. INTRODUCTION

1.1 STUDY AREA

1.1.1 Country Background, Geography, Demography and Political Structure of Malawi.

The Republic of Malawi is a Sub-Saharan African (SSA) landlocked country bordered by Zambia to the west, Tanzania to the north, and Mozambique to both west and south (Figure 1.1). Malawi covers an area of 118,480 km^2, which is about one-third of the size of Japan[1]. The population of Malawi was 13.2 million in 2008, according to the 2008 Malawi National Population Census. In comparison, the population was therefore almost similar to that of Tokyo City in Japan in 2010. With an average annual intercensal growth rate of 2.8% it is now expected to be not less than 14.3 million in 2011 population.

Politically, Malawi has three regions; northern with six district and a city-hub centered at Mzuzu; central region with nine district and a city-hub centered at Lilongwe which also happens to be the new national capital city; and southern region

with 13 districts and two cities, namely, Blantyre and Zomba (Figure 1.2). The former remains the most developed commercial city and the latter is a historical city because during British colonialism it was the first national capital city which had harbored the national parliament until 1998 when it shifted to the current new capital city. Each district is divided into constituencies and wards headed by elected members of parliaments (MPs) and councilors, respectively. The country's constitution has a five year presidential government in multi-party dispensation since 1994 through democratic elections with total separation of powers amongst the executives, legislative (parliament) and judiciary. However, the structure for public governance is divided into central government and local government through decentralization act of the Malawi parliament in 1998. The latter includes city assemblies (councils which are similar to prefectures in Japan), town assemblies and district assemblies. They are local government authorities empowered under Malawi constitution to mainstream economic development in cities, towns and districts, respectively.

Administratively, districts are also divided into traditional authorities (T/As) who are custodians of culture and traditions. As such they are very influential in mobilizing people for socioeconomic development, community participation and involvement. Each T/A is divided into group village head persons, who in turn are further sub-divided into villages headed by village head persons. Family is regarded as an administrative household unit headed by father or proxy in Malawi.

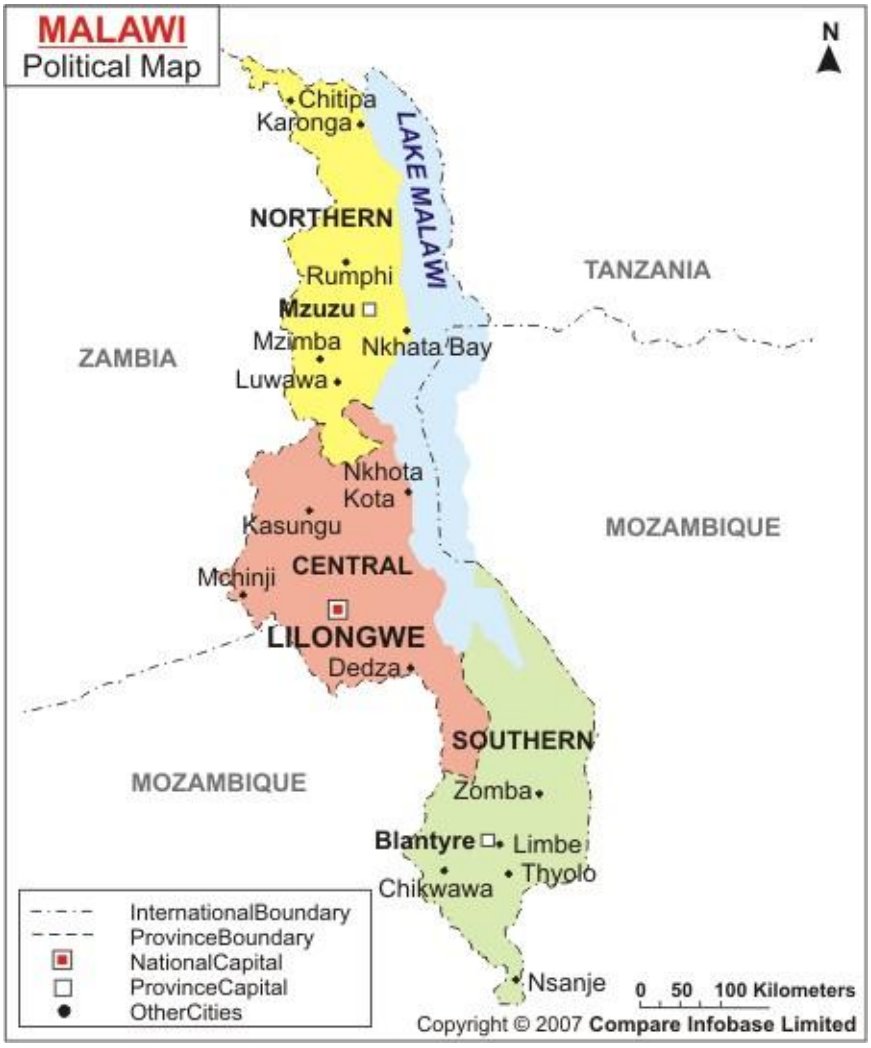
Geographically, Malawi contains an abundance of pristine nature. The Great Rift Valley runs through the country from the north to the south. Beautiful Lake Malawi, the third largest lake in Africa and the 10th largest in the world, covers 20% of the area of the country[1]. The tallest mountain in the country is Mount Mulanje, which is about the same height as Mount Fuji in Japan, at 3,002 meters. Majority of the land is plain suitable for arable farming. As such Malawi is an agricultural country with tobacco, tea and sugarcane as major cash crops. With the international anti-smoking campaign, the country is expected to find an alternative foreign exchange earner in the next five years, otherwise her economy is at stake. Maize is her major stable food. As regards to climate, Malawi has a sub-tropical climate. The wet season is typically

from November to April. Average rainfall during this period is from 725mm to 2,500mm. The cool-dry season is from May to August during which temperatures range between 17 and 27 Degree Celsius. The hot-dry season occurs between September and October, when temperatures range between 25 and 37 Celsius. However, climate changes seem to affect the span of seasons in the country[1].

Figure 1.1: Map of Sub-Saharan Africa showing geo-position of Malawi.

Source: *Systematic Review: Epidemiology of Esophageal Cancer in Sub-Saharan Africa by Rabson Kachala (with written consent).*

Figure 1.2: Malawi Political Map showing administrative regions and districts.



1.1.2: Socioeconomic Profile of Malawi

Malawi is among the poor Sub-Saharan Africa (SSA) countries with worst health indicators (Table 1.1). The 2008 UNDP Human Development Report rated Malawi as the 14th poorest country in the world with a GDP per capita of $667[2]. The causes of morbidity and mortality are similar to that of other Sub-Saharan African countries with HIV/AIDS epidemic as the main background factor. On the other hand, the expenditure on healthcare in the country is insufficient to address the health demands posed by HIV/AIDS burden and provide an essential health package (EHP). For instance, the Malawi National Health Accounts (NHA) conducted in 2006/2007 financial year showed that the annual healthcare expenditure was US$18 per capita[3].

Table 1.1: Social Profile of Malawi (Health Indicators).

Characteristic	**Value**
Total population (2008)	13,066,320
Annual population growth rate% (2008)	2.8
Life expectancy at birth (male/female) (years) (2006)	49/51
Infant mortality rate (per 1000 live births) (2006)	69
Under-five mortality rate (per 1000 live births) (2006)	118
Total fertility rate (2006)	5.7
Maternal mortality ratio (per 100,000 live births) (2006)	804
Stunting in under-five children (%) (2006)	19
Gross national income per capita (US$) (2006)	720
Population living below US$1 a day (%) (2004)	20.8
Human development index (2007)	0.493
HIV prevalence rate (%) (2006)	12
Prevalence of tuberculosis (per 100,000) (2006)	322
HIV prevalence 15-49 in 2007/2008[5]	11.9%

Malaria mortality rate in under five (per 1,000) (2006)	2
Per capita total expenditure on health (international dollars) (2006)	64

Sources: [NSO (2008), WHO 2006 database]

1.2 RESEARCH PROBLEM, SCOPE AND STUDY SIGNIFICANCE

Many studies on health reforms, including Sector Wide Approach (SWAp) in developing countries have been done to assess their progress and impact in various countries in Africa and Asia[4]. The results have shown tremendous improvements among others in *allocative efficiency*.

In Malawi, the Ministry of Health and her development partners have regularly conducted various annual and bi-annual joint health SWAp monitoring and evaluation meetings to assess the progress of the health reform since its inception in 2004 and there are significant achievements in health indicators. For instance, the number of HIV positive Malawians on antiretroviral therapy (ART) has increased from 3,000 in 2004 to 147,000 as of December, 2008 representing two-thirds of those

who needed the ART; maternal mortality ratio falling from 1,120 maternal deaths per 100,000 live births in 2004 to 506 in 2010; increase in training output for health workers; improved recruitments; and implementation of the retention incentives within the health sector which has improved among others, the nurse/population ratio from 1: 4,000 people in 2004 to 1: 3,000 people in 2008[5].

Under the pillar of public health infrastructure development, access to public health facilities in Malawi improved for the rural population living within WHO recommended 5 to 8 km of a public health facility from 60% in 2005 to 84% in 2007[5]. Secondly, there have been a notable number of public health infrastructure projects being completed among others, modern Nkhotakota and Neno District Hospitals (Figure 4.1), Umoyo staff houses, laboratories and health facility rehabilitations in various districts[5]. It was also interesting to note that in the current Malawi's 2010/2011 National Budget which was approved in June, 2010 Parliamentary Session, the Ministry of Health would disburse K24.8 billion of which K9.2 billion[1] was going to Local Government Authorities. The allocation for health

[1] . 2010 (May) Currency Exchange Rate @ US$1=MK145 (Malawi Kwacha)

infrastructure included K250 million for the rehabilitation of Zomba Central Hospital, K500 million for the construction of Phalombe District Hospital, K500 million for Nkhata Bay District Hospital, K55 million for construction of a new hospital in Dowa and K500 million for continued construction of health worker housing in order to recruit and retain skilled health workers. K150 million had been allocated for the construction of diagnostic laboratories[5].

However, on demographic and spatial aspects of health care delivery system in Malawi, the ratio of population to the total number of hospital beds worsened to 707 persons/hospital bed in 2007 of which 60% were in government health facilities while 37% belonged to CHAM and 3% belonged to other health providers. This represents a change from 637 persons/hospital bed in 1993[6], probably due to higher population growth with low development in health infrastructure.

On the other hand, the improved allocative efficiency could, hypothetically, also challenge the absorption capacity of some public health delivery cost centers in developing countries where procurement functionaries are not yet fully advanced. Currently, no paper has discussed about this potential challenge. For instance in

Malawi, the joint health SWAp Program of Work was developed to respond to the key bottlenecks which existed in the Malawi health system in 2002/2003 financial year[7]. Therefore, the health strategic plan had been implemented to achieve the policy goals as set in 2004. However, it is anticipated that this successful health strategic plan which was used to implement the current health activities to achieve the current successes may not be vibrant enough to maintain the profile of success onwards because of other emerging challenges. Therefore, it is fundamental to re-strategize the implementation plan in conformity with the new set of challenges which may arise because of the current sound policies. It is against this background that this study wants to assess and evaluate the policy implications of the joint health SWAp and decentralization policies on public health facility infrastructure funds' absorption capacity by the Malawi Ministry of Health (MOH) cost centers from 2004 through 2009.

Public health infrastructure development pillar of the joint health SWAp Program of Work was chosen because it is one of the capital investments which depicts non-

recurrent expenditures of health cost centers, and therefore, may be regarded as a proxy to vindicate intricateness in procurement in the Malawi Health Systems[8].

Secondly, public health infrastructure in Malawi was the worst culprit of the 2003 near-breakdown of the health delivery system in the country, therefore, would be regarded as the best pillar for a study to demonstrate the sustainability of health sector performance progress under the period of study where population growth was still high.

Thirdly, the health facility infrastructure is one of the main anchoring pillars for solid foundation of the health industry. For instance, the Republic of South Africa (RSA) has a reputable history of modern medicine and surgery worldwide and it is also where the first human heart transplant was successfully performed in Cape Town in 1967 at Groote Schuur hospital by Professor Christiaan Neethling Barnard and his team of medical professionals because it laid a solid foundation in health facility infrastructure[9]. And consequently, it is the leading destination of medical tourism in the African continent providing health care to people all over the world.

Therefore, a sound strategic implementation plan in this pillar would accelerate Malawi not only in achieving MDGs but also reducing the essential referrals to abroad for specialized healthcare because of their unavailability in the country's health delivery system.

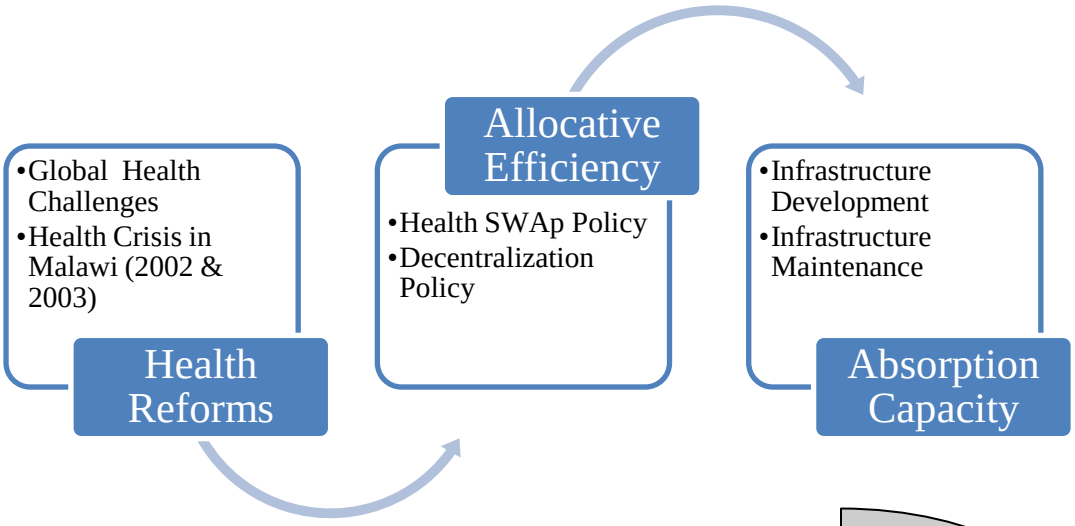
It was against this background that this research wanted to explore and assess, if there were any possible expenditure challenges by the public health cost centers by evaluating SWAp in public health infrastructure development in Malawi. Admittedly, corruption in public services is a sensitive issue in most developing countries including the country under study. However, the research was not focusing on governance and accountability.

1.3 RESEARCH PROBLEM DIAGRAM AND POLICY CYCLE DIAGRAM

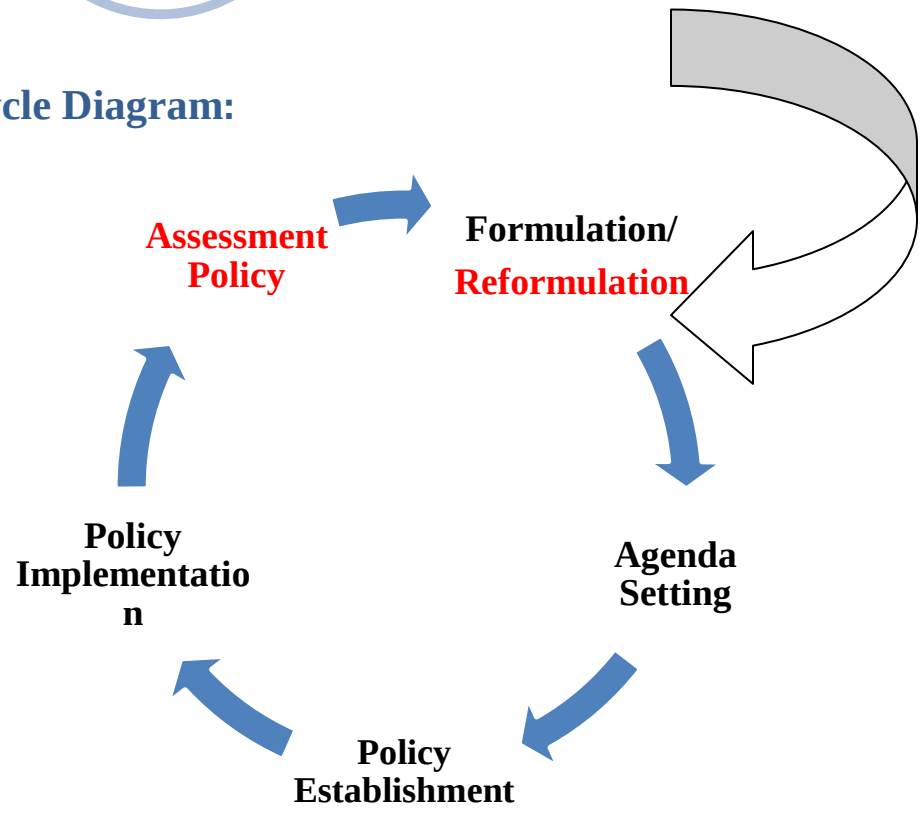
Figure 1.3 shows Research Problem Diagram and Policy Cycle Diagram which are flow diagrams depicting the research problem emanating from the instituted health sector policies which are to be investigated and evaluated in order to re-institute evidence-based revised new health sector policies.

Figure 1.3: Research Problem Diagram and Policy Cycle Diagram

Research Problem Diagram:



Policy Cycle Diagram:



1.4 RESEARCH QUESTIONS

1.4.1 What were the specific activities commonly planned and implemented by the public health cost centers from 2004 to 2009 under the pillar of health facility infrastructure in Malawi?

1.4.2 What was the trend of the public health facility infrastructure funds' utilization capacity by the Ministry of Health headquarters as a cost center from 2004 to 2009 in Malawi?

1.4.3 What was the trend of the health facility infrastructure funds' utilization capacity by public central hospitals as cost centers from 2004 to 2009 in Malawi?

1.4.4 What was the trend of the health facility infrastructure funds' utilization capacity by public district hospitals as a cost centers from 2004 to 2009 in Malawi?

1.5 RESEARCH OBJECTIVES

1.5.1 *Main Research Objective*

To assess the public health SWAp facility infrastructure development funds' absorption capacity of Malawi Ministry of Health cost centers from 2004 through 2009.

1.5.2 *Specific Research Objectives*

I. To find out the trend of the public health SWAp facility infrastructure development funds utilization by the Malawi Ministry of Health headquarters as a cost center from 2004 through 2009.

II. To find out the trend of the public health facility infrastructure development funds utilization by the Malawi public central hospitals as cost centers from 2004 through 2009.

III. To find out the trend of the public health facility infrastructure development funds utilization by the Malawi public district hospitals as cost centers from 2004 through 2009.

2 THE PUBLIC HEALTH SECTOR OF MALAWI (LITERATURE REVIEW)

2.1 Public Health Service Provision in Malawi

The goal of the Malawi Health Ministry "*is to establish through the joint health SWAp Program of Work, an effective and efficient health care delivery system that is responsive to the health needs and demand of the people of Malawi, especially the vulnerable groups, the poor, women and children*"[7]. The health care delivery system in the country consists of primary, secondary and tertiary levels linked through a well coordinated referral system. Primary Health Care (PHC) is provided through both community-based outreach programs at health posts and static health facilities including dispensaries, health centers, rural and community hospitals limited to providing mainly health promotion and EHP (Table 2.1).

Table 2.1: Components of Malawi's EHP and Pillars of Program of Work

NO	EHP CONDITIONS AND THEIR COMPLICATIONS	NO	PILLARS OF PROGRAM OF WORK
1	Vaccine Preventable Diseases	1	Human Resources Development
2	Malaria	2	Pharmaceuticals & Medical Supplies
3	Maternal & Neonatal Health Conditions including Family Planning.	3	Essential/Basic Medical Equipment
4	Acute Respiratory Tract Infections	4	***Health Infrastructure Development***
5	Acute Diarrhea including Cholera	5	Routine Operations at Service Delivery Level
6	Tuberculosis	6	Central Operations, including Policy & Systems Development
7	HIV/AIDS and STI		
8	Schistosomiasis		
9	Malnutrition including Micronutrients		
10	Eye, Ear and Skin Infections		
11	Common Injuries, Accidents including Trauma		

Source: Malawi MOH (2007)

Secondary level healthcare is provided primarily through district hospitals (DHs) for the public health sector and non-profit mission hospitals under the umbrella organization called Christian Hospitals Association of Malawi (CHAM) or for profit hospitals in the private health sector which are currently located mainly in the cities. Secondary level healthcare includes EHP (Table 2.1), diagnostic services, limited specialized care and limited operational researches. Finally, central hospitals (CHs) equipped with the state-of-the art medical diagnostic and medical equipments provide tertiary level healthcare, encompassing advanced specialized and sub-specialized healthcare services, research and tertiary teaching services. Table 2.2 shows the number of health facilities by type and ownership in the country.

Table 2.2: Health Facilities by Type and Ownership in Malawi.

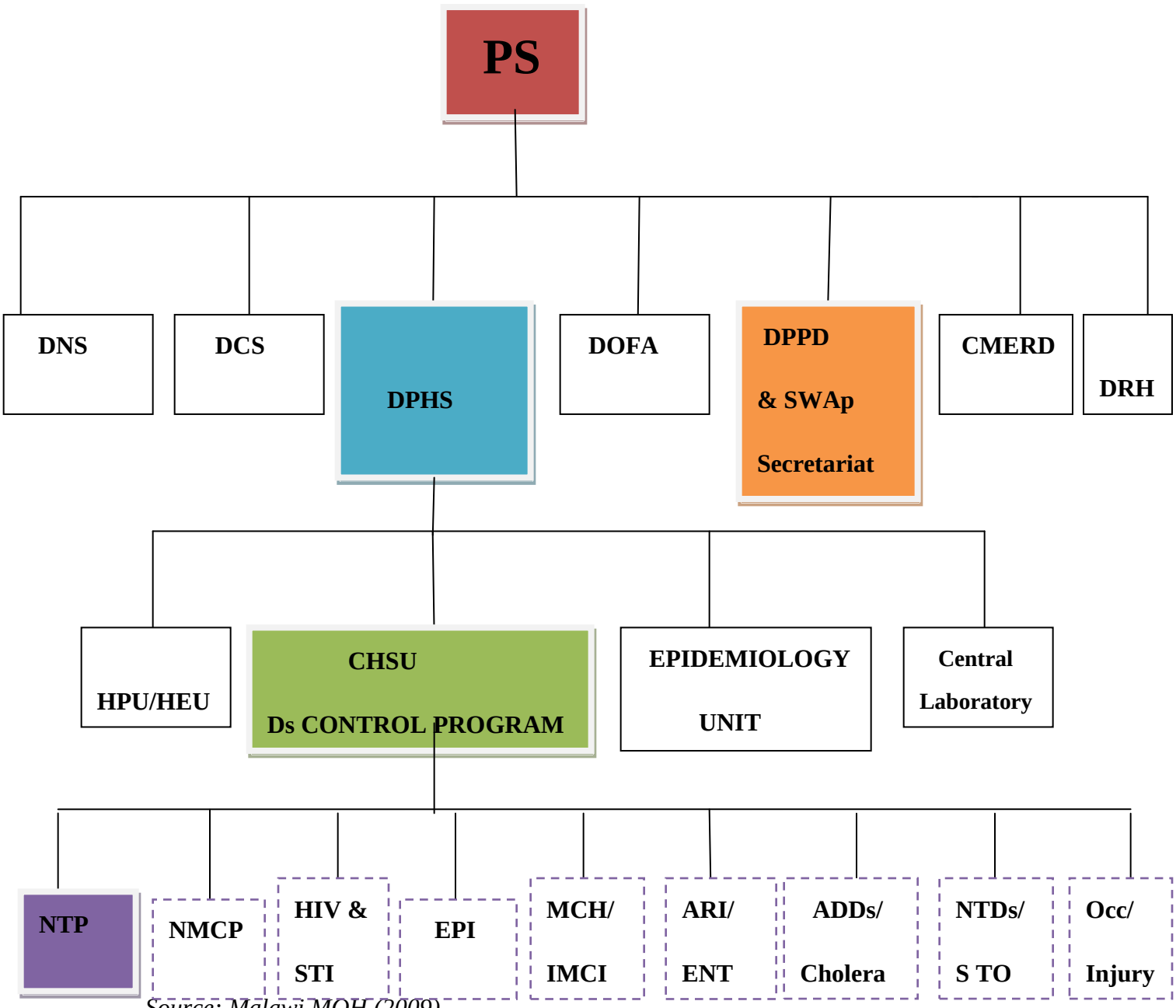
LEVEL OF HEALTHCARE INFRASTRUCTURE IN MALAWI					
OWNERSHIP	**Primary**	**Secondary**	**Tertiary**	**Others**	**Total**
Governmental (Public)	493	53	5	24	**575**
CHAM	96	42	1	8	**147**
NGOs	56	1	0	13	**70**
Private for profit	196	4	0	0	**200**
Statutory Organizations	13	0	0	7	**20**
Companies	47	0	0	0	**47**
TOTAL	**901**	**100**	**6**	**52**	**1059**

*Source**:** Malawi MOH (2007).*

The MOH in Malawi has the overall responsibility for health care provision in Malawi. The Public Health Delivery System in the country is divided into three levels

of administrative cost centers, namely, the headquarters, 5 central hospitals and 28 district hospitals through local assembly authorities.

Figure 2.1: Organogram of Malawi Central Public Health System



Source: Malawi MOH (2009)

ACRONYMS AND SYMBOLS:

———— = Line Authority

PS=Principal/Permanent Secretary

Directorates:

- **DNS**=Directorate of Nursing Services
- **DCS**=Directorate of Clinical Services
- **DPHS=**Directorate of Preventive Health Services
- **DOFA**=Directorate of Finance and Administration
- **DPPD**=Directorate of Planning and Policy Development and SWAp Secretariat
- **CMERD**=Directorate of Central Monitoring, Evaluation and Research Development
- **DRH**=Directorate of Reproductive Health Service

Directorate of Preventive Health Services' Departments:

- **HPU/HEU**=Health Promotion Unit/ Health Education Unit

- **Epidemiology Department**
- **Central Laboratory Service Unit**
- **CHSU**=Community Health Sciences Unit (Specific Disease Control Program):
    - NTP=National TB Control Program
    - NMCP=National Malaria Control Program
    - HIV and Sexually Transmitted Infections (STI)
    - EPI=Expanded Program of Immunization
    - MCH/IMCI=Maternal and Child Health/Integrated Management of Child Illnesses
    - ART/ENT=Acute Respiratory Tract Infection/Ear,Nose and Tract Common Conditions
    - ADDs/Cholera=Acute Diarrheal Diseases including Cholera
    - TNDs/STO=Tropical Neglected Diseases/Schistosomiasis, Trypanosomiasis, Oncorcerciasis
    - Occ/Injury=Occupation Diseases/Common Injuries.

At the central level structure, there is a Principal Secretary for Health, who is assisted by Director of Finance and Administration who is responsible for the financial and administrative affairs of the MOH. The MOH has seven technical directorates: Clinical Services; Nursing Services; Reproductive Health Services; Preventive Health Services; Planning and Policy Development which hosts the health SWAp Secretariat; Financing and Administration; and Central Monitoring, Evaluation and Research Development (Figure 2.1).

The DPHS is responsible for setting national standards for primary health care including disease surveillance, health promotion, health inspection programs and environmental health, expanded program of immunization, specific disease control programs, epidemiology and epidemic/emergency preparedness programs as well as multi-sectoral collaboration with other health partners in preventive health initiatives. On the other hand, the DCS, DNS and DRHS are directorates largely responsible for clinical or therapeutic care including secondary and tertiary prevention services.

The DPPD is responsible for health policy development; setting national health goals; mission statement and vision statement; devising formulae for justification of health

resource distribution countrywide; heading the SWAp Secretariat; and also responsible for provision of standardized health strategic planning tools of health activity itemized costing and health financing to all health cost centers in Malawi. As such there is a thin line between this directorate and the other two directorates, DOFA and CMERD in setting national governance standards, monitoring, supervision, reporting and evaluation of all health programs as well as responsible for health research promotion and development.

Below the central level there were three health regional offices for overseeing health activities at the regional level until 1998 public service functional review which led to their abolition, with monitoring and supervision responsibility shifting back to the central level[7]. This proved unsuccessful, with the result that the MOH in 2002 rescinded the decision by establishing five health zonal support offices which are extensional arms of DPPD and CMERD, each providing technical and facilitative supervisory support of health decentralization to district local authorities; EHP planning and implementation; and inter-district collaboration amongst five or six districts, but not having any management responsibilities[7].

Administratively, the country's health system is divided into 28 districts. Each district has a District Health Officer (DHO) who leads a District Health Management Team (DHMT) which is accountable to the Local Government Financing Committee through district assemblies and answerable to the Principal Secretary of MOH (Figure 2.1). The DHO and DHMT members run the District Hospital and the peripheral health units which consist of health centers, dispensaries, health posts and mobile clinics and coordinate with district health partners including Public-Private Partnership (PPP) and Service Level Agreement (SLAs) with Non-Governmental Organizations (NGOs) especially mission health facilities under the umbrella of CHAM. Therefore, the DHMT is responsible for the district health planning, coordinating district health partners, planning itemized budgeting of district health activities and execution, monitoring, supervision, evaluation and reporting of all district health activities.

2.2 The Malawi Essential Health Package (EHP)

The EHP is the health sector's main pro-poor PHC strategy which focuses on the priority areas to achieve not only national goals set in the Malawi Poverty Reduction

Strategy (MPRS) and Malawi Growth and Development Strategy (MGDS) but also global health goals like MDGs. It aims at addressing the major causes of morbidity and mortality among the general population focusing particularly on medical conditions and service-gaps that disproportionately affect the rural poor. The Malawi EHP consists broadly of the following eleven intervention areas in order of priority from 2004 to 2010 (Table 2.1):

- Prevention and treatment of vaccine preventable diseases
- Malaria prevention and treatment
- Reproductive health interventions
- Prevention, control and treatment of tuberculosis and related complications
- Management of acute respiratory infections and related complications
- Prevention and management of HIV/AIDS, sexually transmitted infections and related complications including VCT and the provision of ART
- Prevention, treatment and care for acute diarrhoeal diseases (including cholera)
- Prevention and management of malnutrition, nutrition deficiencies

- Management of eye, ear and skin infections and related complications
- Prevention and treatment of schistosomiasis and related complications
- Treatment of common injuries and their complications

2.3 Malawi Expanded Program of Immunization (EPI)

Table 2.3 shows the summary of recommended schedule for active immunization of healthy infants and children in Malawi.

Table 2.3: Summary of the Recommended Schedule for Active Immunization of Healthy Infants and Children in Malawi

Recommended Age	**Vaccine and Dose Number**	**Comments**
Birth	BCG, OPV#1	HBV not given to infants at birth, mothers not checked routinely for HBsAg (Assumption is that the mother is HBsAg-neagative)
6 WEEKS	OPV#2, *PENTAVALENT* ($DPTH_{ib}HBV$)#1	DPT-HBV is a 2 dose vial of liquid Tritanrix which is combined on site (at health facility) with Powdered Hiberix (Haemophilus influenza type b capsular polysaccharide bound to Tetanus Toxoid)
10 WEEKS	OPV#3, *PENTAVALENT* ($DPTH_{ib}HBV$)#2	DPT-HBV is a 2 dose vial of liquid Tritanrix which is combined on site (at health facility) with Powdered Hiberix (Haemophilus influenza type b capsular polysaccharide bound to Tetanus Toxoid)
14 WEEKS	OPV#4,	DPT-HBV is a 2 dose vial of liquid Tritanrix which is combined on site (at health facility) with Powdered Hiberix (Haemophilus

	PENTAVALENT ($DPTH_{ib}HBV$)#3	influenza type b capsular polysaccharide bound to Tetanus Toxoid)
9 MONTHS	Measles	9 Months is the earliest recommended time in Malawi to administer this vaccine after studies done by CDC, WHO and MOH. However, weakness is that no booster is given at or before school entry (4-6 years). As a result, there are frequent outbreaks.
Up to 15 YEARS	Measles (*?Booster*)	Only when there is an outbreak, like in 2010.

Source: Malawi MOH (2007) with Author's perspective comments.

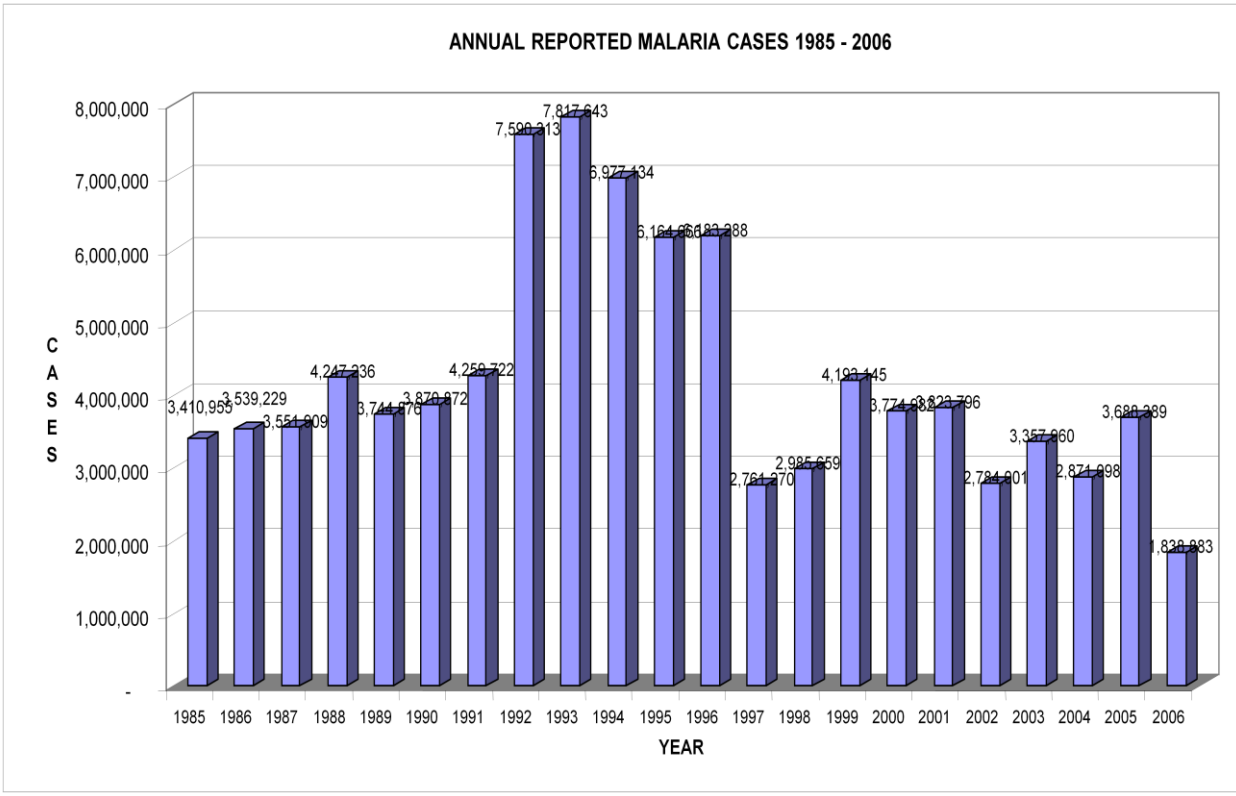
2.4 Malaria Control in Malawi

Malaria is a major public health and economic problem in Malawi. All Malawians are at risk of contracting malaria. However, the poor rural people are badly hit by the disease and as a result it makes them poorer. According to NMCP, adults lose an average of 25 working days per year, which results in a significant loss of family income. In addition, the cost of drugs to treat malaria can easily overwhelm family resources, especially those in the lowest income categories. In the country, it is estimated that low-income families spend more than one quarter (28%) of their yearly income to treat malaria[23]. Over 85% of malaria infections in Malawi are due to *Plasmodium falciparum*[24]. The peak transmission season for malaria in Malawi follows the rainy season which span from November to April. And children under five, pregnant women and those living with HIV/AIDS represent the most at-risk populations for malaria-related morbidity and mortality. It was estimated that there were approximately 680,000 pregnant women and 2.31 million children under five in Malawi in 2008[25].

The MOH estimates that there were approximately eight million episodes of malaria per year in the country in 2008 (estimated from trend as depicted in Figure 2.2). According to the 2003 Health Management Information System (HMIS) report, health facilities reported 250,000 - 350,000 malaria outpatient cases monthly throughout the country (Figure 2.2). Malaria is the number one cause of hospital admissions and the leading cause of death among children under five. Children under five suffer on average 9.7 malaria episodes per year, while adults suffer 6.1 such episodes[26]. Malaria accounts for 40% of causes of in-patient admissions, while severe anemia, most of which is attributable to malaria, accounts for an additional 11%[25]. The malaria inpatient death rate is 2/1000 in under-fives as compared to 0.3/1000 in those over five in 2006[25]. This is quite concerning especially as the overall mortality among children under the age of five years gradually decreased to 189, 133,122, 111/1000 live births in 2000, 2004, 2006, 2008, respectively[27, 28]. There is growing evidence that the rapid scale-up of malaria prevention and control measures during the last two to three years is causing a significant reduction in the frequency of malaria infections and associated anemia (Figure 2.2) regardless of

increase in population. This is reported to be due to a strong collective effort at global, regional and national levels to mitigate the malaria burden in the country.

Figure 2.2: Malaria Trends in Malawi



Source:Malawi NMCP Report (2008)

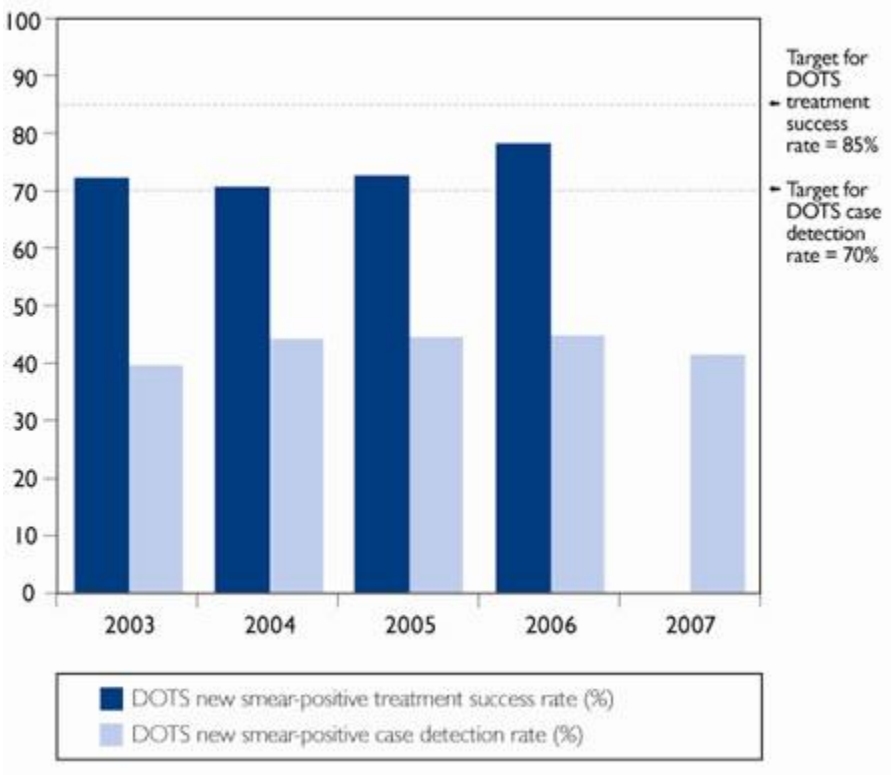
2.5 Tuberculosis Control in Malawi

Tuberculosis (TB) continues to be a public health problem in Malawi. According to WHO's Global TB Report 2009, there were an estimated 48,144 new cases of TB, but Malawi NTP estimates for the same year were around half of that figure (Table 2.4).

Table 2.4: Tuberculosis Country Profile for Malawi

Country Population	13,925,000
Est. number of new TB cases	48,144
Est. TB incidence (all cases per 100,000 pop)	346
DOTS population coverage (%)	100
Rate of new SS+ cases (per 100,000 pop)	132
DOTS case detection rate (new SS+) (%)	41
DOTS treatment success rate, 2006 (new SS+) (%)	78
Est. new adult TB cases (HIV) + (%)	68.1
MDR-TB among all new TB cases (%)	2.3
All data are for 2007 except where otherwise noted. WHO Global TB Report 2009	

Figure 2.3: Case Detection and Treatment Success Rates under DOTS



Source: Global Tuberculosis Control WHO Report 2009.

There have been many extensive studies and researches on TB in Malawi and most of their findings are transformed into public health policies of the day. As regards to the epidemiology of TB in the country, the strongest risk factors for Malawians to developing the disease are the HIV infection, malnutrition, household contact with index case, overcrowding, poverty and older or younger age.

The Malawi NTP started implementing TB control in full conformity with Directly Observed Treatment Short Course (DOTS) which is the internationally recommended strategy for TB control, for two decades now. It has strived to achieve nationwide coverage which has included the provision of TB home-based care using community "guardians" to observe and follow up the TB patients. The other interventions in TB control in Malawi include: BCG vaccination (Table 2.3), information, education and communication (IEC) to improve health seeking behaviors of the community, better clinical practice with *isoniazid* preventive therapy for people living with HIV (PLWHA) and children who are household contacts of smear positive pulmonary TB case indices, *cotrimoxazole* prophylaxis to reduce morbidity/mortality among HIV-infected TB patients, safe TB case management within healthcare settings to prevent transmission to health workers and active TB case finding among high risk groups including PLWHA and prisoners.

However, despite these advances in TB control, the high HIV/AIDS prevalence, narrowly contained from 14% to 11%, has had a devastating impact on the success of the TB program in the country thus 72% of all TB patients in Malawi were HIV

positive, similar to the 2009 WHO estimates which was pegged at 68% for new TB patients to have HIV[29]. On the other hand, TB case detection was stuck at 42% from 2003 to 2007, which remains below WHO's target of 70%[29, 30]. The DOTS new smear positive treatment success rate was also stuck at 72% between 2002 and 2005 and improved to 78% in 2006, although it remains below WHO's target of 85% (Figure 2.3).

In striving to win the battle against TB in Malawi, the Malawi TB-HIV/AIDS Technical Working Group and NTP in 2002 started implementing a three-year plan for joint TB and HIV/AIDS services, consistent with WHO/UNAIDS recommendations for policies and TB-HIV/AIDS collaborative activities. On the other hand, the Malawi Government became the second country in Africa to declare TB as a disease of emergency in 2007[29]. Although the country is yet to report an extensively drug-resistant TB (XDR-TB) case, however, 872 cases of MDR-TB were reported in 2007[29].

The 2004 WHO TB Report stated that the impact of TB disease globally accounted for 2.5% of the global burden of disease, mainly due to premature death[31]. However,

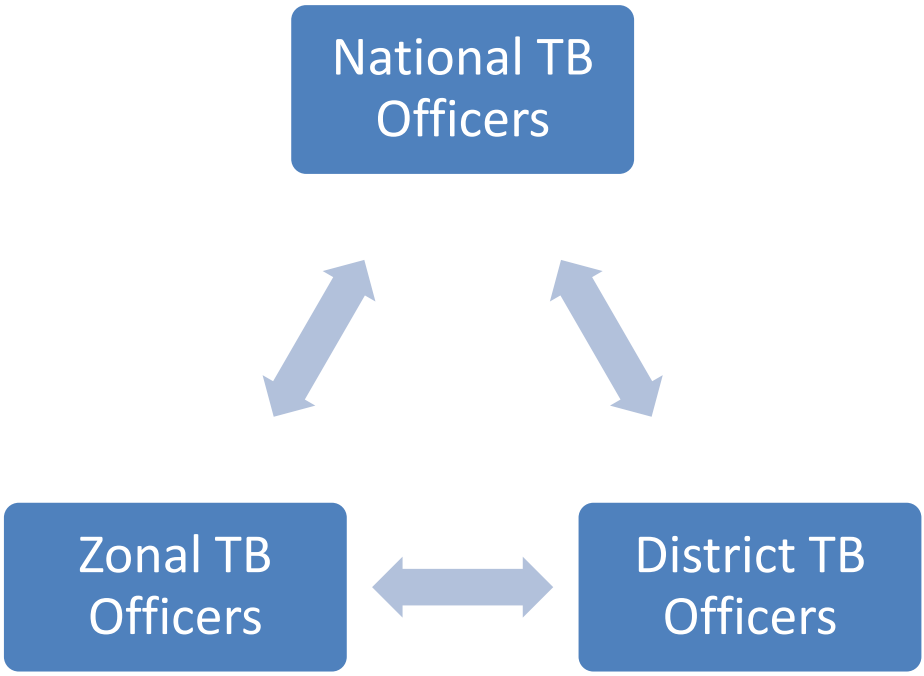
in Malawi TB claims a mortality rate of 20-50% of TB patients and TB also causes higher disease rates among health workers and attrition due to deaths[32]. On the other hand, treatment outcome among children diagnosed with TB remains poor, especially among smear negative and very young children because pediatric ART is not advanced.

However, the Malawi NTP is well established in the health delivery system with good reputation within the SSA Region. The program has attempted to be responsive to the needs of different social groups through the development of community based activities to intensify case finding amongst poor groups[32]. Unfortunately, there are core challenges including: increasing number of TB cases due to HIV co-infection, high numbers of missing TB cases due to passive case finding strategy, and background context of poverty, malnutrition and gender inequity. Therefore, there is a need for further and continued program adaptation, innovation and operational research.

The Malawi NTP has historically been implemented as a vertical program and has been implementing the WHO recommended DOTS strategy since 1964[32]. The DOTS

strategy has five elements: government commitment, case detection through passive case finding, administration of standardized short course chemotherapy to at least all confirmed sputum smear positive cases of tuberculosis under proper management conditions, establishment of a system of regular drug supply, and establishment and maintenance of a monitoring system[33]. In the first half of 2005, in response to the development of the Malawi joint health SWAp POW, the Malawi NTP began the process of moving away from a vertical program and realigning its planning, approach and budgeting to be in tandem with SWAp policy in the country[29].

Figure 2.4: TB Control Implementation Cycle



At the central level, there are national TB officers headed by the Director of NTP (Figure 2.4). Their principle responsibility is mainly to set national standards in TB control in the country through research and quality control. In a decentralized health political structure, there are zonal TB officers, who are solely strengthening the DHMTs in terms of planning, implementing, diagnostic, quality control, monitoring

and evaluation of all TB control activities at the district level (Figure 2.4). Each zonal TB officer is responsible for four to six districts and reports directly to the national TB officer through HMIS and CMERD. At the district level, the DHMT headed by the DHO is responsible for resource mobilization and partnership coordination as well operation research in TB control activities at district level. On the other hand, the DHMT is responsible for appointing a district TB officer whose duties are to coordinate all the TB control activities at individual, village, community and district level on behalf of the DHMT (Figure 2.4). The district TB officer supervises the clinicians, nurses, laboratory assistants, community health nurses, environmental health officers (health inspectors) and health surveillance officers (HSAs). Clinicians, nurses and laboratory assistants are involved in diagnostic and management of TB at health facility level which ranges from outreach clinic, dispensary, health post, health center, rural hospital and community hospital to district hospital. On the other hand, environmental health officers, community health nurses and HSAs are involved at village and community level in community surveillance (passive) of TB, health education and health promotion as well as follow-ups of TB suspects and TB patients.

There is a well coordinated structure in which the villagers and communities themselves are directly incorporated actively as village health committee members, health facility committee members or as volunteers in TB activities. Reporting and feedback of TB control activities follow the same ladder in the reverse direction through HMIS (Figure 2.4).

2.5.1 Incidence of TB in Malawi

The attack rate of smear positive TB diagnosed between 1999 and 2002 in the country, by sex and age groups in adults were highest amongst people between 25 and 44 years[34]. The age and gender specific incidence rate was 1100/100,000 population for both males and females in age group 25-34 years while in age stratum of 35-44, males had an incidence rate of 1300/100,000 population while their gender counterpart had 950/100,000 population. On the other hand, the diagnosis of TB in children is difficult, especially in HIV endemic areas like Malawi[34, 35]. The Malawi NTP, however, estimated that the rates of TB in children in 1999 were 78/100,000 in children under-one year, 83/100,000 in children aged 1-4 years and 33/100,000 in those aged 5-14 years[29]. Because half of Malawi's population is aged below 15,

despite these lower attack rates, children still formed 12% of all reported TB cases in 1999[29]. And in general, the ratio of men to women among TB patients in Malawi from NTP data is 1.1[29].

2.5.2 Prevalence of TB in Malawi

The actual prevalence of TB in Malawi is not known. However, modeling done by the WHO predicts that Malawi only diagnoses around 48% of the prevalent TB cases and 36% of the prevalent smear positive TB cases[31]. Although passive case finding may miss some cases, the WHO figures cannot presently be contested in the absence of a prevalence survey. Such a country survey was underway in Malawi in 2009[29].

One way of estimating the smear positive prevalence rate, the major source of TB infections, has been through calculating the Annual Risk of Infection (ARI). The average annual risk of infection is calculated from the proportion of 6 year-old children, not vaccinated with BCG, who are tuberculin skin test positive in a particular area. This is done in the form of a community survey[36].

In Malawi, the only community TB survey was conducted in 1994 and showed an ARI of 0.9[37]. This meant a predicted prevalence of 45 smear positive cases per

100,000 population. In 1988, Malawi reported 2,665 new smear positive and 184 relapse TB cases while in 1994 there were 5,988 new smear positive cases and 504 relapse TB cases reported[29]. Assuming a country population of 8 million (1998 Malawi NSO Census)[38], this translates into a smear positive TB prevalence of 36/100, 000 in 1988 and 81/100, 000 in 1994. However, interpretation should be based on the condition that there was no other causes of gross immunodeficiency in general population. This is different with SSA countries where HIV/AIDS and malnutrition are endemic and there is increasing re-emergence of TB disease burden. For instance, in a country like Tanzania where serial ARI surveys were conducted between 1984 and 1995, the ARI gradually declined while the number of reported cases increased nationally[39]. This emphasizes the impact of HIV on interpreting ARI.

2.6 Environmental Health in Malawi

The Republic of Malawi is a sovereign state with National Constitution and various Acts enacted by the Malawi Parliament to promote the health of her people as she strives to maintain the pristine status quo of her ecological environment. Both the Environmental Health Policy and National Constitution articulate a common stand

together with section 5 of the Environmental Management Act of 1996 (EMA) by guaranteeing every person the "*right to a clean and healthy environment"*. This human right flows from the constitutional principles of national policy in respect to the environment. Section 13 (d) of the Malawi Constitution which spells out the principles in this respect is in the following terms[40]:

> "*The State shall actively promote the welfare and development of the people of Malawi by progressively adopting and implementing policies and legislation aimed at achieving the following goals-*
>
> ***The Environment***
>
> *To manage the environment responsibly in order to-*
>
> *(i) prevent the degradation of the environment;*
>
> *(ii) provide a healthy living and working environment for the people of Malawi;*
>
> *(iii) accord full recognition to the rights of future generations by means of environmental protection and the sustainable development of natural resources;*
>
> *(iv) conserve and enhance the biological diversity of Malawi."*

Therefore, the government has the machinery to develop, design, regulate and reinforce public policies and laws designed to protect the health of the public from environmentally caused diseases. It is also interesting to note that there are various Acts enacted by the Malawian Parliament which emphasize on the cast of duties "*on every person to take all necessary and appropriate measures to protect and manage the environment and to conserve natural resources and promote the sustainable utilization of natural resources*" (EMA) as well as providing the "*unfettered powers invested in local authorities to issue Environmental Protection Orders (EPO) to perpetrators of environmental pollution and any act endangering the environment*". However, the country is currently not well equipped with the state-of- the-art equipment in her regulatory bodies to measure, monitor and quantify metrologically all possible pollutants. On the other hand, some WHO recommendations like banning smoking in public places and indoors to prevent passive smoking phenomenon are yet to be upheld in the country although the indicators of hygiene and sanitation are slowly improving towards reaching the MDGs.

2.6.1 Guiding Tools for Environmental Health in Malawi

A. The Malawi National Environmental Health Policy.

B. The Malawi Environmental Health Act.

C. The Malawi Environmental Management Act of 1996.

D. The Malawi Pharmacy, Medicine and Poison Act.

E. The Malawi Biosafety Act of 2002.

F. The Biosafety Protocol of 2000.

G. The Malawi Science and Technology Act.

H. The Malawi Occupation Safety and Health Act

I. The Malawi Tourism Act.

J. The Malawi Poverty Reduction Strategy

K. The Malawi Growth and Development Strategy.

2.6.2 Provision of Environmental Health Services

The DPHS is responsible for implementing the environmental health policy through the Department of Environmental Health Services of the District Assemblies (DAs),

Town Assemblies (TAs) and City Assemblies (CAs). The statutory responsibility for enforcing and monitoring the implementation of the policy at all levels is carried out by environmental health officers (EHOs). Roles and responsibilities have been allocated to the different levels of environmental health services. These comprise the national level, district assembly level, enterprise level and the community level.

National Level Functions:

a. Initiate the review and development of legislation, standards, policies and guidelines on environmental health.
b. Establish mechanisms for inter-sectoral coordination and community participation.
c. Develop guidelines for an integrated and decentralized environmental health management system including environmental health impact assessment and action plans.

District Assembly Level:

a. Participate in DAs management teams and development committees.
b. Monitoring and evaluation of environmental health programs.

c. Review and approve environmental health impact assessment reports and action plans.

d. Conduct education and information campaigns to promote environmental health.

e. Maintain a database and information network on environmental health.

f. Prepare periodical reports on the state of environmental health in the district.

Enterprise Level:

a. Formulate sector environmental health policy and procedures.

b. Ensure compliance with all statutory regulations and standards on environmental health.

c. Establish training and information programs for workers and surrounding communities.

d. Carry out surveillance of workers' health and working environment.

Community Level:

a. Establish community-based development and management committees for environmental health programs.

b. Participate in policy decisions to identify and determine local priorities in resources, developmental projects and services in environmental health.

c. Develop plans and mobilize the community for timely response to emergencies and management of epidemics.

d. Participate in the monitoring and evaluation of effectiveness of environmental health intervention measures.

2.6.3 The Science and Technology Policy

The policies on environmental health in Malawi are formulated based on scientific findings from various players in research and development. For instance, the Malawi Bureau of Standards (MBS) was established approximately 30 years ago and is a statutory institution under the Ministry of Industry, Trade and Private Sector Development. It is responsible for standards development, quality assurance, testing and metrology. However, by 2004, the laboratories at the MBS were not yet accredited[41].

For consistent presentation into this study, the country's research and development performing institutions are divided in into five groups for discussion purposes, namely: the government-based research institutions, the higher learning institutions, the statutory research institutions, the private research institutions, and the international research institutions.

a. Government-based Research Institutes

These institutes are set up and controlled by government (Table 2.5). All their funding comes directly from government revenue and development budgets.

Table 2.5: Malawi Government-based Research Institutes

Research Institute	**Where it is located**
Central Veterinary Laboratory	Agriculture and Food Security
Central Water Laboratory	Irrigation and Water Development
Community Health Sciences Unit (CHSU)	Health
Department of Agricultural Research Services (DARS)	Agriculture and Food Security
Fisheries Research Unit	Mines, Energy and Natural Resources
Forestry Research Institute of Malawi	Mines, Energy and Natural Resources
Geological Survey Department	Mines, Energy and Natural Resources
Health Sciences Research Unit	Health
Meteorological Department	Transport and Public Works
National Aquaculture Center	Mines, Energy and Natural Resources
Wildlife Research Unit in the Department of Parks and Wildlife	Mines, Energy and Natural Resources

Source: Malawi Science and Technology Report (2009)

b. The Higher Learning Institutions

The Public University of Malawi through its five constituent colleges, Mzuzu University and other private universities provide a strong national research entity in different fields, most of them related to environmental health. For instance, the Center for Water, Sanitation, Health, and Appropriate Technology Development at Polytechnic of the University of Malawi; the Center for Reproductive Health and Bioethics Research Unit at College of Medicine of the University of Malawi; and the Center for Natural Resource and Environment, Molecular Biology and Ecology Research Unit at Chancellor College.

c. The Statutory Research Institutes

These are government-assisted institutes that work outside the normal government settings. The most notable here are the Malawi Industrial Research and Technology Development Center, and the National Herbarium and Botanic Gardens of Malawi. It is interesting to note the enthusiasm of the former center which initiated research on an ethanol-driven vehicle in Malawi in 2002 and the results were reported successful

for environmental friendly machinery in automobile[42]. Supporters of the project argue that a switch to ethanol fuel would not only benefit the environment but also increase employment in the country's sugarcane industry and save foreign exchange spent on fuel imports. The Malawi government is promoting imported ethanol-fuelled cars to wean the country off its fossil fuel dependency and better harness the country's ethanol industry. The Malawi's department of science and technology, in partnership with the privately owned Ethanol Company of Malawi (ETHCO), is promoting the import of Brazilian-made 'flex-fuel' vehicles, propelled by locally manufactured sugarcane ethanol[42]. In automobile industry, the Malawi Government is indeed taking a bold stand to promote environmental health. Until February 2006, all cars in Malawi used leaded petrol blended with 20 percent ethanol. Since then, the country has switched to unleaded petrol blended with 10 percent ethanol. Proponents of ethanol use argue that continued over-dependence on fossil fuels has economic, social, climate and biodiversity impacts for humans and the entire ecosystem. Malawi produces ethanol from sugar molasses in bulk amounts at Dwangwa from Illovo Sugar (Malawi) Group, in the central region lakeshore district of Nkhota-kota[42].

d. The Private Research Institutes

The most outstanding research company here is the Illovo Sugar (Malawi) Group. Sugarcane is one of the important foreign exchange earning cash crops in the country.

e. The International Research Institutes

There are several international research institutions operating in Malawi. Some notable ones are Wellcome Trust; University of Caroline (UNC) Malaria Project as a satellite of PATH Malaria Vaccine Intiative (MVI); the WorldFish Center; the Research Foundation of Central Africa which is located in Malawi but conducts research for Malawi, Zimbabwe, South Africa and Zambia; the International Center for Research in Agro-forestry; and the International Crops Research Institute for the Semi-Arid Tropics.

2.7 Millennium Development Goals and Need for Coordination of Foreign Aid

The inception of the third millennium and its global challenges compelled all Member States of the United Nations (UN) at the Millennium Summit in 2000 to formulate the Millennium Development Goals (MDGs) and reaffirmed their commitment to eradicate world poverty and improve the health and welfare of the world's poorest nations by 2015[12]. Health is at the centre of these MDGs as half of the eight MDGs numbered 4, 5, 6 and 8 are directly measured by health indicators under themes of child health, maternal mortality, communicable diseases such as HIV, tuberculosis and malaria; and environmental health, respectively. Besides, health contributes significantly to the achievement of the other MDGs. Consequently, these MDGs gave impetus to the global consensus for more emphasis on an aid coordination mechanism to developing country to be driven and owned by the recipient governments. This was articulated on one hand by the Organization for Economic Cooperation and Development (OECD), International Monetary Fund (IMF), World Health Organization (WHO), World Bank and by the United Nations

on the other hand[13]. The health pundits in the former group advocated a shift from project-based delivery of development aid assistance to sector wide approach. This mechanism of health-financing in developing countries has been referred to as Sector Wide Approach (SWAp). It is now deemed as an increasingly popular approach to development cooperation for many bilateral and multilateral development agencies[12]. SWAp as a concept is well explained in the "*Guide to SWAps for Health and Development*" by Andrew Cassels[14] where the basic current understandings of SWAp can be extrapolated to differentiate it from other development approaches. Cassel's discourse emphasized partnership and long time sustainability of sector wide approaches. However, as expounded by Jesper Sundewall and Kerstin Sahlin-Andersson in their comparative study of health sector development cooperation in Uganda, Zambia and Bangladesh, SWAp as a model has been redefined by various health pundits as a dynamic transition from donor-led national development strategy[15]. Therefore, more SWAp emphasis is now on government ownership and capacity building which could be re-shaped further probably by the recent global economic recession of the 2008-2009 along the same direction of transition as donor

agencies might reduce their financial and technical contribution to the developing countries[16].

In theory, SWAp has been recommended as an integral part of health reforms in developing countries in the view that a well functioning SWAp could necessitate robust working relations between recipient government and her donor partners which is still regarded as a prerequisite for improving efficiency in both allocation and usage of health resources[4]. On the other hand, available literature has separately shown that the role of the Ministry of Health and recipient governments grew stronger when SWAp was introduced in Uganda, Zambia, Bangladesh and Malawi[5, 15, 17].

Many developing countries have adopted the Health SWAp as early as 1993[18, 19, 20]. In the SSA Region, Ghana, Uganda, Tanzania, Mozambique and Zambia were the main pioneers to embrace health SWAp as well as Bangladesh in Asia[15, 17, 18, 21, 22]. Although, the concept of SWAp is, theoretically, the same but each recipient government has embraced it differently to suit her allied health reforms and her peculiar environment of donor groups[15]. In Malawi, the Government and its

development partners embraced the health reform in 2004 while her neighboring countries; Zambia, Tanzania and Mozambique were among the earliest pioneers in 1993, 1998 and 2000, respectively[21, 22].

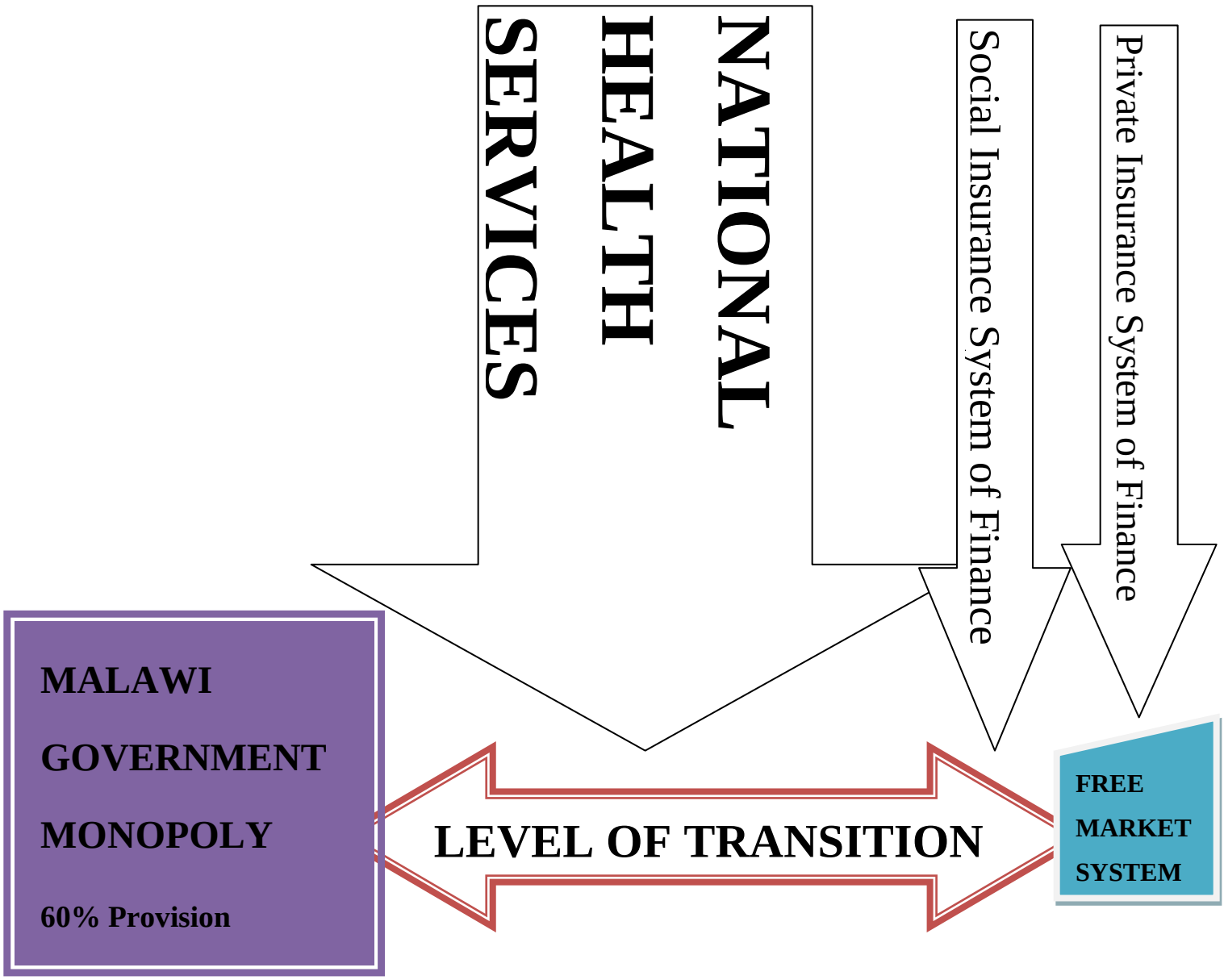
2.8 HEALTH FINANCING IN MALAWI

In literature there are seven forms of health sector funding mechanisms. They are through tax revenue in government budgets, social insurance, medical saving account (MSA), private-financing or out-of-pocket payments, private insurance, external (aid) assistance through bilateral or multilateral agreements and philanthropy. However, as revealed in this study, Malawi health sector is financed through tax revenue in government budgets (approximately covering 60 percent in 2009), external aid assistance (about 35 percent in 2009), private insurance, out-of-pocket payments and philanthropy.

Private Insurance at low scale, only in cities and out-of-pocket payments, is the major source of financing the private health sector in Malawi with philanthropy exclusively reported in mission (private non-profit) hospitals through CHAM. Unlike in private

health sector, tax revenue and external aid assistance are the main sources of financing public health sector through joint health SWAp resource reallocation. The public health sector remains the single most important source of finance for health care in the country because of government subsidy through free health services for all Malawians regardless of the level of health care (Figure 2.5). Constitutionally, public health in the country is regarded as *public goods* as opposed to private goods in health economic concepts. Ellias Ngalande Banda and Henry Simukonda in 1994 reported that the Malawi MOH 1983 Report highlighted public health sector as the most important source of health-financing then, while CHAM was the major recipient of the direct out-of pocket payments because for-profit private health facilities were then insignificant[43].

Figure 2.5: Type of Health Care System by Provision and Financing in Malawi. The diagram depicts the level of transition which Malawi Health Delivery System is currently at from monopoly of national health services by government to free market system at the other extreme.



2.9 Project-financing Approach and Need for Program-financing Approach in Malawi

Previously, financing of health sector by Malawi Government and her development partners was through a traditional health project approach and disease-specific vertical programs which proved to be ineffective in fostering sustainable improvements in health. Available literature singles out irrational distribution of resources, duplication of health activities and efforts resulting into high transaction costs, fragmentation of the sector, weakening of government capacity and local ownership[14, 15, 17, 18, 19, 20]. Consequently, the Malawi Healthcare Delivery System went into a deep crisis in the 2002/2003 financial year leading to a near-breakdown of the national healthcare service delivery[7]. Professional health workers and public health infrastructure crisis were among the most critical challenges the sector faced in addition to other numerous attributes. Access to health services in 2003 was limited with only 46% of the rural population living within 5 to 8 km of a health facility[5]. This prompted health sector management together with its various development partners to analyze the challenges, and consequently a POW was devised as a six-

year strategic plan to address the main bottlenecks to delivering universal and effective health services to Malawians. However, the strategic plan of health sector POW could not perform efficiently with the same old bureaucratic framework of leadership and authority in the sector. At the first step, the Malawi Government initiated major health sector reforms which could provide the optimum conducive environment for the success of the POW. As regards to policy context, there were two main health reforms which occurred concurrently, namely, decentralization and SWAp.

2.10 PUBLIC HEALTH SECTOR REFORMS

2.10.1 The Malawi Decentralization Policy

Decentralization was the first reform of the sector to reduce the central control and political authority which proved to be inefficient in all avenues of healthcare delivery from planning, implementation, partnerships and coordination, to reporting and feedbacks, monitoring and evaluation. As a central plank in her strategy to combat poverty, Malawi established a legal framework in principle for a comprehensive decentralization of government functions as early as 1996[44]. The National

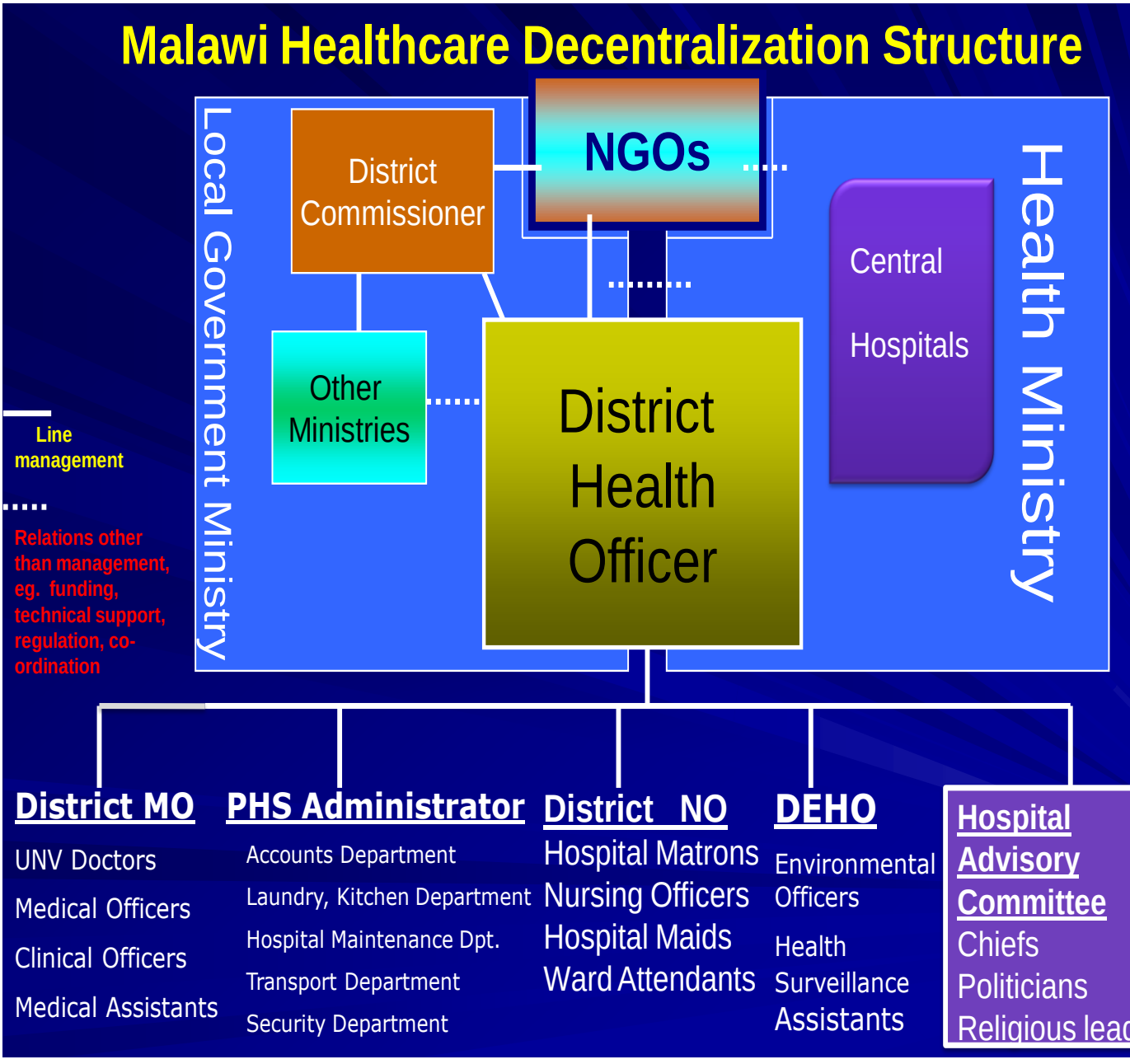
Decentralisation Policy was finally approved by the Malawi cabinet in October, 1998 which mandated the parliament to pass and gazette a new Local Government Act which enshrined the policy of decentralization[45]. The main key principles of the policy included;

1. Formation of the new local government system made up of DAs.
2. Devolution of central administration and political authority to the district level.
3. Integration of the governmental agencies at the district and local levels into one administrative unit, through the process of institutional integration, manpower absorption, composite budgeting and provision of funds for the decentralised services.
4. Diversion of the central implementation responsibilities by transferring them to the districts.
5. Promotion of community participation in governance and development of districts.

Collins in 1994 defined decentralization as a term loosely used to cover a number of different forms of decision-making structures, including delegation of powers and devolution[46]. As such there are different models of decentralization of which Collins summarized as devolution, functional de-concentration and integrated de-concentration[47].

Therefore, based on these key principles of decentralization outlined by the Malawi Government, one could conclude that she modified the two models of decentralization described by Collins, devolution and integrated de-concentration into a composite in which the coordination by the District Commissioner (DC) is very strong (Figure 2.6).

Figure 2.6: Organogram of Malawi Healthcare Decentralization Structure.



The Malawi decentralization may be regarded as devolution because the nature of the transfer of both power and responsibilities for the performance of the city, town and district assemblies from the central government to the local government was political through legislation. On the other hand, the Malawi decentralization policy may also be regarded as an integrated decentralization not only because CHs are not under local government though they have administrative powers from the central Ministry of HQs and also at local assembly level under local government, there is administrative transfer of some powers from the headquarters at the city, town or district assemblies to the field offices (health facilities) but the assembly headquarters keeps the right to overturn field office decisions and could, at any time, take those powers back.

The functions of the DAs subject to the National Development Plans (NDPs) and policies include:

a. To make policy and decisions on local governance and development for the district.
b. To consolidate and promote local democratic institutions and democratic

participation.

c. To promote infrastructural and economic development through district development plans.

d. To mobilize resources within and outside the district.

e. To maintain peace and security in the district in conjunction with the National Police Service.

f. To make district by-laws which facilitate DAs' functions.

g. To appoint, develop, promote and discipline its staff.

h. To cooperate with other DAs to learn from their experiences and exchange ideas or benchmarking.

i. To perform other functions including the registration of births and deaths and participate in the delivery of essential and local services as may be prescribed by Act of Parliament.

Some of the specific health and environmental health functions and services assigned to District Assemblies in the country as prescribed by the Act of Parliament include full delivery of the comprehensive EHP[48].

However, initially the decentralization policy in the country faced some obvious challenges and resistance to roll out nationwide. Sholto Cross and Milton Kutengule in 2001 argued that although in principle decentralization was desirable in Malawi by then, however, the prerequisites to make it work were absent[44]. Some of the prerequisites mentioned included, genuine internal commitment to decentralization as a transformation, an informed and involved citizenly, an effective representation, full accountability at all levels and financially empowered local government system. Thanks to the Malawi Decentralized Governance Program (MDGP) which was a joint United Nations Development Program (UNDP) and United Nations Capital Development Fund (UNCDF) program that was launched in 2002 for the mainstreaming of financial and technical support to Malawi Government for the implementation of the decentralization policy of 1998[44]. The five year program from 2002 to 2006 with a total estimated budget of US$21,274,820.00 vindicated the decentralization policy in Malawi. There was a rapid improvement in institutional development and capacity building which enhanced capacity of both central and local governments to effectively carry out their roles and responsibilities related to

decentralization policy and Local Government Act. Moreover, substantial improvement in fiscal decentralization and financial management happened which supported the development of competent local government finance system that enhanced local revenue generation and mobilization for local development[49]. Consequently, health sector was the first sector in Malawi to fully devolve central administration and political authority to the district assemblies by 2004. Therefore, the planning of health activities through District Implementation Plans (DIPs) and District Development Plans (DDPs) and their consequential resource mobilization, execution, monitoring, evaluation, coordination, reporting and dissemination were sorely in the hands of the DAs' health officials (DHMTs). The line Ministry of Health HQs was there to set operational standards and other major health developmental projects including major public health infrastructure projects.

2.10.2 The Malawi Health Sector Wide Approach (SWAp) Policy

Cassels in 1997 defined ***SWAp*** as an approach to organizing and financing a sector based on a comprehensive policy framework and program of work[14]. Through

negotiated process, the government works together with donors, non-governmental organizations (NGOs) and other stakeholders to plan and monitor progress. As such SWAp is regarded as an adaptation process and not a blueprint. As a concept, SWAp is based on ***key principles*** which a country attempts to apply progressively. However, it is unique in practice probably due to the set of terms of references which are dependent on the type of donors and political stance of the country in question. In this paper, SWAp is defined as a form of program-based approach (PBA) applied at a sector level. The following were the key principles of SWAp in Malawi which bound the SWAp MOU with her development partners, since its inception in 2004[7]:

1. Leadership and stewardship spearheaded by the host country.
2. An aggregated, single comprehensive program and budget framework, which is called Program of Work (POW).
3. A formalized process for development partners' coordination and harmonization of donor procedures for reporting, budgeting, financial management and procurement. Technical Working Group (TWG) as an

advisory committee to the Joint Health SWAp Secretariat in the Ministry of Health.

4. A progressive and increasing reliance on the use of local systems for program design and implementation, financial management and accountability, monitoring and evaluation.
5. Implementation principles included:
    A. A multi-sectoral approach to health.
    B. A health-promotive and preventive approach.
    C. Community participation as individual's responsibilities for health and community involvement in decisions about health-care.
    D. Health as public goods.
    E. Equity in access and utilization according to need both horizontally and vertically.

Operationally, the Malawi Government embraced health SWAp in 2004. With the opportunity of learning from other developing countries which adopted health SWAp

earlier, including neighboring Tanzania, Zambia and Mozambique, Malawi's SWAp was expected to be robust. Admittedly, the Malawi Government has shown her leadership skills in health SWAp through among others in chairing the SWAp secretariat, overall planning, procurement, monitoring and evaluation of national health activities as well as in health-financing[5]. For instance in health-financing, the Malawi Government reduced its dependence on developmental partners by increasing her health budgetary allocation contribution from 40% in 2004 to 65% in 2009[50].

2.10.3 The Joint Health SWAp Program of Work

The joint health SWAp POW is an aggregated, single but inclusive comprehensive budgetary framework with which the Malawi Government strategized to meet her overall goal for the health sector. Therefore, it is an overarching strategy guiding tool for planning, financing, implementation, monitoring, evaluating and reporting of health sector activities in the country both at policy level and execution level. The joint health SWAp's POW have six pillars of health systems and activities, namely: human resources, pharmaceutical and medical supplies, essential medical equipment, *health facility infrastructure development*, routine operations at service delivery level and central institutions, policy and system developments (Table 2.1). These health systems and activities were implemented at the interface of the MOH, NGOs, private health institutions, developmental partners, health training institutions and other governmental departments[51]. Therefore, POW has been implemented at both central and district levels since October 2004 with financial and technical support from the Government of Malawi and her development partners. The initial implementation of the POW cost at US$ 763 million for six years[7].

Consequently, in tandem with POW, the Malawi SWAp excelled in the formalized process for the development of partners' coordination and harmonization of donor procedures for reporting, budgeting, financial management and procurement. By the end of 2004 there was already a highly anticipated harmony amongst the donor community as stipulated in the SWAp MOU with the Malawi Government[5]. For coordination purposes, the MOU and the Malawi health SWAp's terms of reference (TOR) empower one donor group at a time in a yearly rotational term to become a leading donor group amongst the development partners. Such an arrangement has been appreciated by all donor groups since the inception of health SWAp in the country[5].

Lastly, the progressive and increasing reliance on the use of local systems for the health SWAp's program design and implementation, financial management and accountability, monitoring and evaluation has proven to be among the anchoring key principles of capacity building in Malawi. One isolated milestone in this key principle was the successful transformation of the CMS to a trust through institutional autonomy gazetted by the Act of Malawi Parliament in 2010. Other bold stands taken

by the Malawi Government to cement governance of joint health SWAp include: the establishment through parliament of the Local Government Finance Committee to probe all audit queries from the local government cost centers and establishment of five public health zonal offices equipped with supervisory monthly checklists to all districts for monitoring and evaluation purposes. Some of the isolated donor groups amongst development partners supporting health SWAp in Malawi include[5]:

1. World Health Organization (WHO)
2. United States Agency for International Development (USAID)
3. United Nations Children's Fund (UNICEF)
4. World Bank
5. United Nations Population Fund (UNFPA)
6. Norwegian Church Aid
7. Japan International Cooperation Agency (JICA)
8. Canadian International Development Agency (CIDA)
9. KFW Development Bank (German Development Cooperation)

10. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) which is now called Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
11. African Development Bank (ADB)
12. UK Department for International Development (DFID)
13. Save the Children

2.11 Public Health Facility Infrastructure Development as a Pillar of POW in Malawi

The public health facility infrastructure was one of the crucial areas which were spotted as the main background problem leading to the near-breakdown of the public health delivery system in Malawi in 2003. The health facility infrastructure then was old, inadequate for the patient load, neglected, dilapidated and in desperate need of repair and ongoing maintenance[7]. Access to health facilities in Malawi was less than 46% for the rural population within 5 to 8 km in 2002[7]. Many health centers lacked water and electricity. The public health infrastructural inadequacies reflected the severe shortage of funds for the public health system over many years. A 2001 assessment of the public health facilities indicated that a significant number of them

needed rehabilitation and upgrading in order to be able to provide the full EHP[7]. Consequently, national health indicators were worsening and escalating unchecked.

2.12 Implications of the EHP on Service Delivery and Infrastructure Development.

Full EHP delivery requires a certain minimum standard of health facility infrastructure to be accessible to communities[52]. From this premise a dispensary nor maternity unit alone does not have the design qualities and capacity to deliver the full EHP[51]. Therefore, there was a need to upgrade those units to the level of a health center to be equipped with standard medical equipment list and appropriately staffed. The capacity of the various DHOs in Malawi to develop EHP investment plans, in terms of the costs of planning the rehabilitation of infrastructure and determination of criteria to establish new facilities has been enhanced[5]. With the devolution of the health services to DAs, the investment plans and costing framework comes in handy to prioritizing public health infrastructure development[51]. However, the investment and maintenance costs for equipment are available under another pillar of basic

medical equipments through Physical Assets Management (PAM) Unit[51] which is beyond the scope of this study.

Within the scope of the POW from 2004 to 2010, the priorities of public health infrastructure development were based on both area/district vulnerability assessed by poverty head counts and the following hierarchical needs[51]:

A. Rehabilitation of existing facilities.

B. Upgrading or expansion of existing facilities.

C. Construction of new facilities according to both National Development Plan (NDP) and DDPs.

D. Wherever deemed necessary, managing PPP or SLA.

2.13 RESEARCH CONCEPTS AND OPERATIONAL DEFINITIONS

2.13.1 Allocative Efficiency

In this paper "*allocative efficiency*" is defined as a concerted and or synergetic commitment by Malawi Government and her development partners in realizing

yearly financial health sector itemized and approved budget timely as planned by all public health cost centers in the country. This is in accordance with the World Bank 1998 conceptual definition which advocates reallocation of resources to cost centers according to their need in reference to their respective situation analyses as a fundamental activity of health sector planning[47]. Therefore, in this study allocative efficiency is measured as a proportion of the approved public health infrastructure development vote (budget) which has actually being disbursed timely to the respective public health cost in Malawi during the period under study. The SWAp allocative efficiency model is hundred percent (Figure 3.2).

However, theoretically, this definition may not necessarily be inclined fully towards "pareto efficiency" because the concept of the latter does not necessarily result in a socially desirable distribution of resources, as it makes no statement about equality or the overall well-being of a society in question[53, 54].

2.13.2 Delegation of Powers

It is conceptualized in this research in the form of decentralization where there is administrative passing of some authority and decision-making powers to local officials in a line ministry. However, the central government returns the right to overturn local critical decisions and can, at any time, take those powers back as described by Meinzen-Dick in 2001[55]. Green in 2002 expounded the scope of delegation to be confined only to a specific sector in contrast to territorial or geographic generalization[47].

2.13.3 Devolution

This research conceptualizes the devolution of powers as a constructive transfer of powers and responsibilities for the performance of specified ministrial functions from the central government to the local government without reference back to the central government. As expounded by Meinzen-Dick in 2001, the nature of transfer of power is political through legislation in contrast to the administrative decentralization and the scope is territorial or geographic in contrast to sectoral confinement[55].

2.13.4 Financial Year Calendar

Financial year calendar is contextualized as that of Malawi Government Calendar which starts from July1st of the year to June 30th of the following year.

2.13.5 Health as Public Goods in Malawi

In this research, public health in Malawi is conceptualized as *public goods* which are described as non-excludable and non-rivalry such that the marginal cost of providing the public health to another consumer is zero. The key principles in health care characteristics as economic goods or services in Malawi include:

- Health care is considered a right by all Malawians as an analogue to "*health for all*" slogan by WHO.
- Malawi Government shoulders both positive and negative externalities through internalizing externality costs of public health care.
- In principle, the Malawi Government provides public health care to her population under economic guise of small price elasticities of demand without laissez-faire.

2.13.6 Health System

In this research, health system is conceptualized as defined by Zwarenstein and Bachmann in 1997 and quoted as "*a set of components that function together to support and improve the health of the population*."[56].

2.13.7 Health Systems Research (HSR)

HSR is defined in this study as an applied scientific investigation done on the health system and all its component parts and activities. As described by Zwarenstein and Bachmann in 1997, HSR aims at supporting the decision-making process at all levels of the health system by providing not only relevant but also timely information[56]. Therefore, the purpose of HSR is to improve the operation of the health system, leading to an improvement in the impact of health care, which in turn leads to an equal improvement in the health of the population. Unlike health services researches which focus only on provision and utilization, hence health care providers and health care users only, HSR encourages comprehensive collaboration between or among

health researchers, health institutional and program managers, politicians and health policy makers, health care providers and health care users and communities.

2.13.8 Hospital Autonomy

In this research design, hospital autonomy is conceptualized as a public health reform that gives public health provider organizations greater flexibility and control in management to rely on market or "market-like" signals or incentives to generate operational pressures to improve performances[8]. However, unlike corporatization which gives managers a virtually complete control over all inputs and issues related to service delivery, autonomy is not legally established as an independent entity or firm.

2.13.9 Public Health Cost Center

In this research design, public health cost center is defined as an administrative entity within the public health system delivery machinery which has a share of government vote as well as authority and decision rights to plan the yearly budget and implement the activities accordingly.

2.13.10 Public Health Infrastructure

In this study, a public health infrastructure is conceptualized as any structure designed to be used for provision, facilitation and support of healthcare delivery activities by the Malawi public health delivery system at all levels from PHC to specialized health care. As such, it includes health facilities, laboratories and health care providers' houses.

3 METHODOLOGY

3.1 RESEARCH TYPE AND DESIGN

This is a public health system research which assesses and evaluates health reform-policy implications. It applies a quantitative research design using a structured questionnaire to collect secondary data (Appendix 1).

As such, the researcher was in an epistemological position in terms of theoretical orientation as a positivist[58] such that there is already data routinely collected by all public health cost centers in Malawi in form of annual expenditure reports against the district DIPs at district level or AIPs at both central hospitals and ministry headquarters.

3.2 RESEARCH STUDY SUBJECTS

The subjects are the public health cost centers of the MOH in Malawi which have the authoritative decision to plan, implement, evaluate and report health activities including health facility infrastructure management and development. The Malawi legislation and constitution provide the cost centers' management leaders with the

power to utilize the public funds in accordance with regulations depicted in the Malawi Public Procurement Act which are monitored by the ODPP. Therefore, the questionnaire respondents are the management team members of the public health cost centers.

In the country, there are 33 public health cost centers nationwide. The researcher included all the cost centers for data collection. However, only data from 19 cost centers qualified according to the criteria to be included for data analysis (n=19). They are one cost center at the Ministry of Health headquarters (n_h=1), three cost centers at central hospital level (n_c=3), namely: Mzuzu Central Hospital, Kamuzu Central Hospital and Zomba General Central Hospital from the northern, central and southern parts of the country, respectively and 15 cost centers at district hospital level (n_d=15). Out of 15 district hospital cost centers, 3 were from the northern region, namely, Chitipa, Karonga and Nkhatabay; 5 were from the central region, namely, Nkhotakota, Kasungu, Salima, Mchinji and Ntcheu; and the remaining 7 cost centers were from the southern region under the names of Balaka, Mangochi, Chiradzulu, Mulanje, Thyolo, Chikwawa and Nsanje (Figure 1.2).

3.3 DATA COLLECTION

Data was collected from the cost centers from 16th August, 2010 through 6thOctober, 2010.

3.3.1 Data Collection Tools

Tools used for collecting data included a structured questionnaire (Appendix 1) to collect secondary data on public health infrastructure development budget estimates and expenditures of each public health cost center, planning documents including DIPs and AIPs of respective public health cost centers, and where possible snapshots of some public health infrastructure built through the public health infrastructure development funds and a computer that was used for data entry in Microsoft excel program.

3.3.2 Ethical Compliance and Political Sensitivity Compliance

The researcher is affiliated with both the Ritsumeikan Research Center for Asia Pacific Studies (RCAPS) and Malawi Health Sciences Research Unit. The letter of approval from research supervisor was presented to the Malawi National Research

Council and Health Sciences Research Unit which in turn authorized the researcher with a letter of informed consent to present to the correspondents at the public health cost centers. In turn, the line ministry's DOFA consented to the researcher's proposal by authorizing all public health cost centers to consent to provide the researcher with full access to the required data. Data was collected only by the researcher to honor the sensitivity of the information.

3.3.3 Research Field Work and Challenges

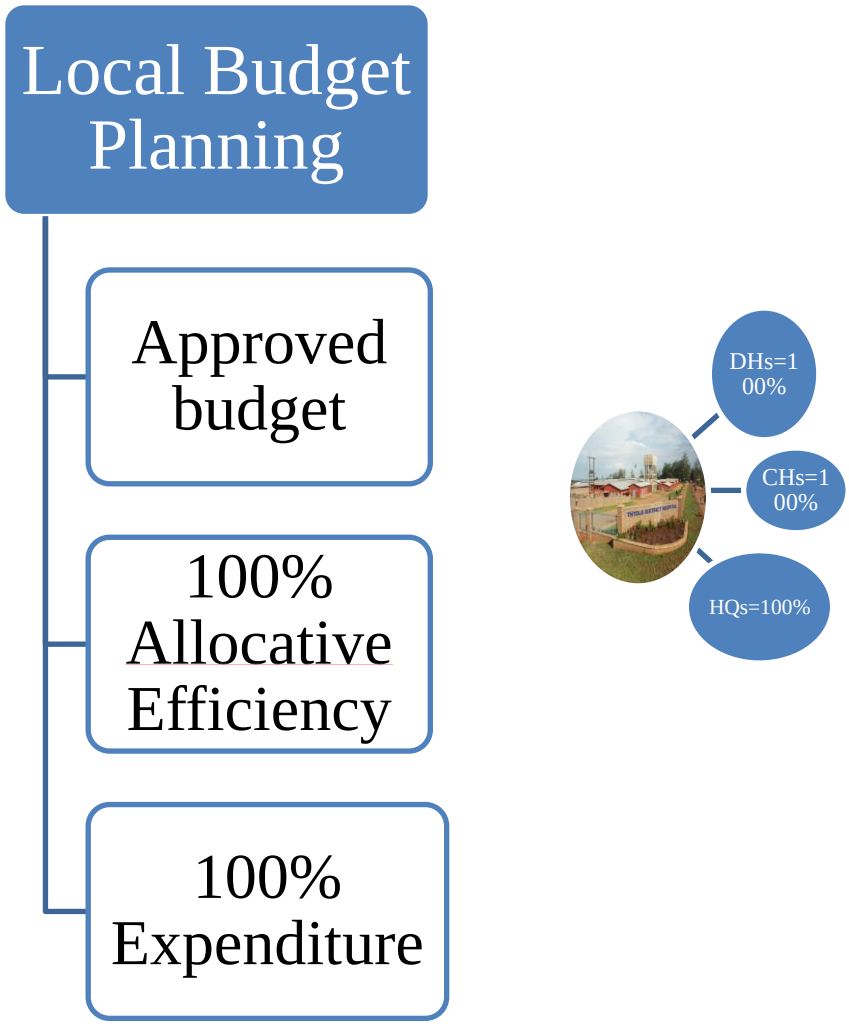
The researcher was using public transport to visit the public health cost centers. Field work included briefing the DHMTs and CHMTs about the procedures of collecting data at their respective centers to obtain their informed consent before obtaining the sensitive data. As such data was collected only during week days to comply with their normal working hours from 07:30 to 12:00 and from 13:30 to 17:00. No cost center declined to consent. Challenges of the research field work included delays in reaching the cost centers due to unpredictable public transport system in the country and failure to meet some heads of the DHMTs and CHMTs for counter-confirming the data.

3.4 RESEARCH DATA ANALYSIS

3.4.1 Research Paradigm and Ontological Assumptions

The ontological assumption of the research paradigm is that there is a possible existence of "best performance" of health sector as depicted by the SWAp Expenditure Model[59, 60] (Figure 3.1). This assumption may be described to say that any cost center in the Ministry of Health is expected to execute hundred percent of the public health infrastructure funds during the period under study as an ideal performance.

Figure 3.1: SWAp Expenditure Model



3.4.2 Unit of Research Data Analysis and Axis of Comparison

The unit of research analysis is public health cost center. Therefore, all the completed and validated data from public health cost centers were set of elements the research was interested in for analysis. For analytical comparison purposes, the cost centers are disaggregated into three homogenous groups; the HQs, central hospital cost centers and district hospital cost centers. The categories are according to; the ceiling-expenditure limit of a public vote in the annual budget to be executed by a public cost center before seeking for a waiver from the ODPP which is highest at the HQs and lowest at the district hospital cost center; the volume of activities entrusted by the cost center; magnitude of the catchment area served by the cost center; and type of government governing the operations. The HQs is a cost center entrusted with major public health infrastructure projects like building secondary or tertiary hospitals and national laboratories; and it serves the entire population in the country under central government dispensation. On the other hand, the district hospital cost center which operates under local government dispensation has a capacity to execute minor public health infrastructure development activities like building a health post, rehabilitation

and maintenance of district hospitals and health centers against a population ranging from 200,000 to 600,000 in a specified geographical area of the country (Figure 1.2). Therefore, analysis of data is done, both, horizontally within the homogenous groups (intra-categorically) and vertically along the homogenous groups (inter-categorically).

3.4.3 Data Validity

To improve the data validity, only data which was both confirmed by the head of the cost center, and counter-confirmed by the DOFA at the line health ministry HQs was included for data analysis. Whenever there was data inconsistency, the researcher sought clarification from the DIPs and AIPs for the respective public health cost centers. On the other hand, research data was collected and entered in computer only by the researcher to reduce any probable compromise and inconsistencies which could emanate from using research assistants.

3.4.4 Limitations of the Research Design

Some limitations of the study design and methodology include: no verification of the public health infrastructure development activities executed against their respective expenditures, no verification of the executed public health infrastructure development activities against those planned in specific annual financial calendar, and failure to capture information on how the expenditure fluctuated within a financial calendar in terms of monthly expenditure flow.

3.4.5 Tool of Data Analysis

The tool used to summarize the data and testing hypothesis was, originally, Statistical Package for the Social Sciences (SPSS) Statistics 17 which has changed its name in 2009 to Predictive Analytics Soft Ware (PASW) Statistics before SPSS-IBM as premier vendor in 2010.

4. RESEARCH FINDINGS (RESULTS)

The study enrolled 19 public health cost centers which were clustered into homogenous public health cost centers in terms of population size, volume of funds received and magnitude of the public health infrastructure projects, namely; HQs, central hospitals and district hospitals in the ratio of 1: 3:15, respectively. During the period under study, the headquarters planned many health infrastructure activities including erecting the new state-of-the-art district hospitals of Nkhotakota (Figures 4.1, 4.2 and 4.3), Thyolo (Figure 4.4 and 4.5), Neno, Nkhatabay and Phalombe.

Figure 4.1: The new Nkhotakota District Hospital

Figure 4.2: The new Nkhotakota District Hospital (Aerial View)

Figure 4.3: The new Nkhotakota District Hospital officially opened.

Figure 4.4: The new Thyolo District Hospital

Figure 4.5: The new Thyolo District Hospital (Aerial View)

On the other hand, central hospitals included the new state-of –the art laboratories, general maintenance works and expansion of the tertiary hospital structures while district hospitals included building of public health post structures, rehabilitation and installation of electricity, solar lightning, solar water pump.

The trends in public health infrastructure development funds allocation to all public cost centers under the period of study showed a steady continuous rise in all planned budgets, approved funds and disbursed funds (Figures 4.6, 4.7 and 4.8).

Figure 4.6: Trends in Infrastructure Funds Expenditure at HQs as a Cost Center from 2004 to 2009.

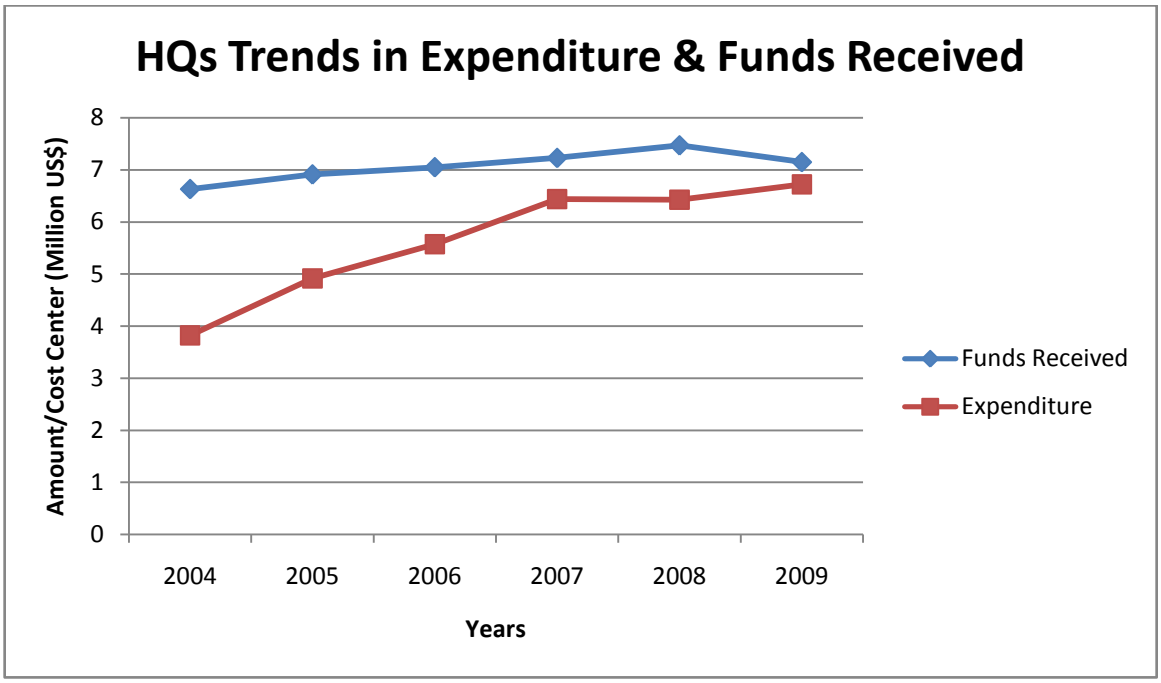


Figure 4.7: Trends in Public Infrastructure Funds Expenditure at CHs as Cost Centers from 2004 to 2009.

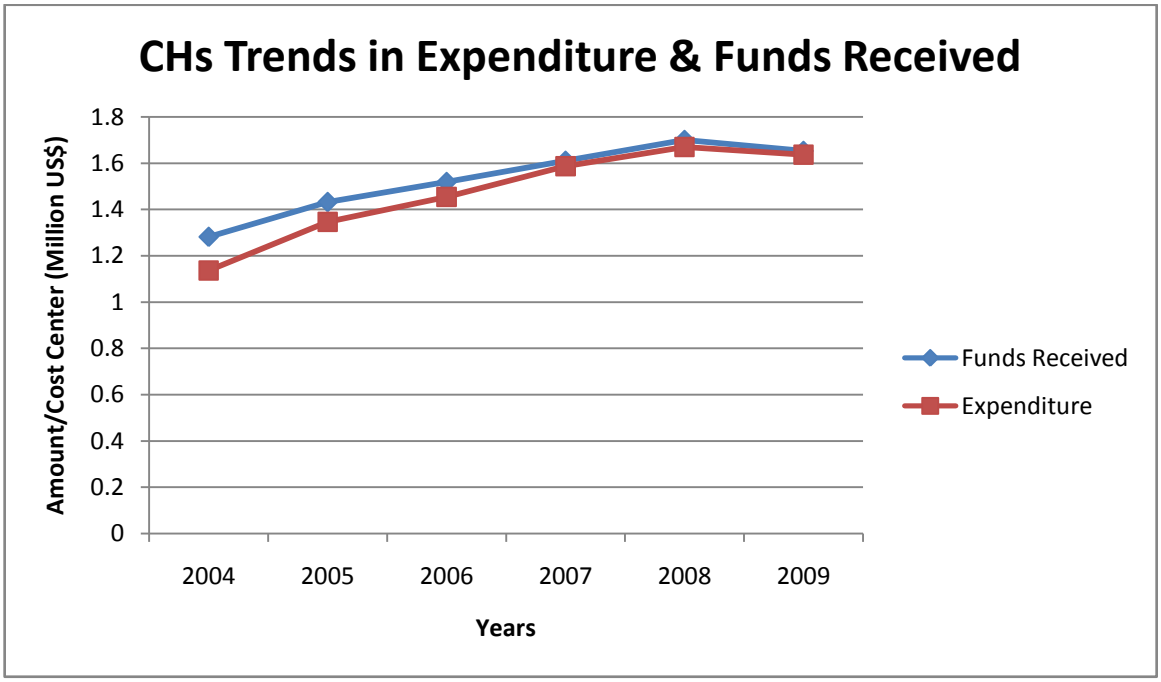
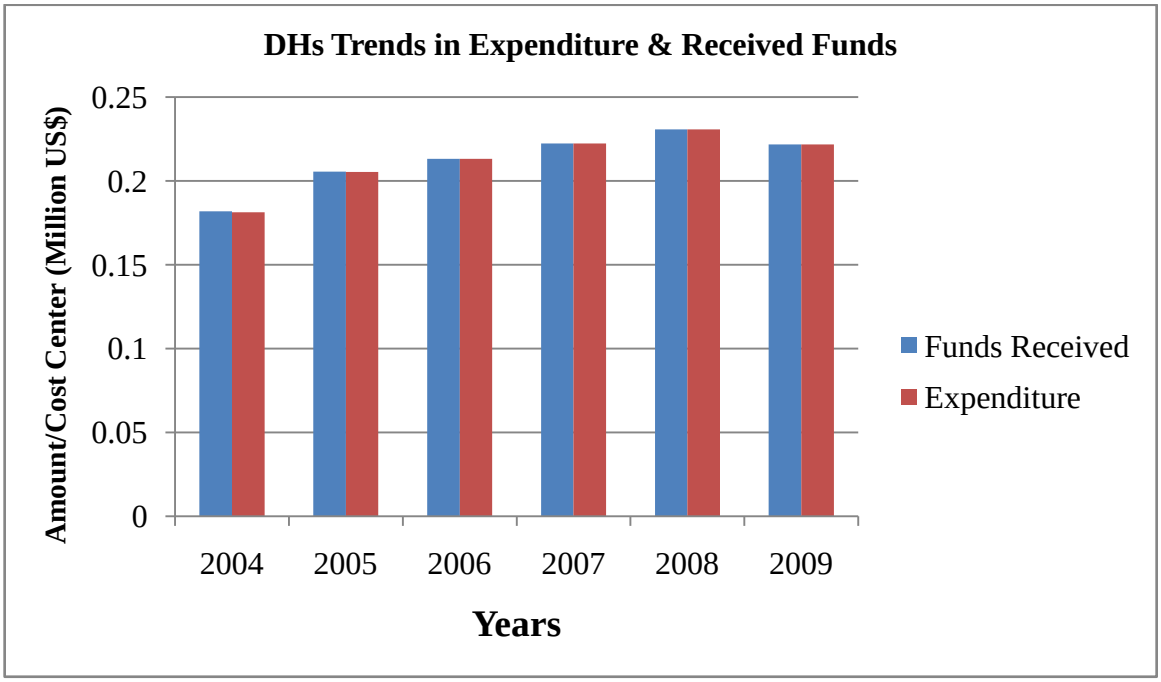


Figure 4.8: Trends in Infrastructure Funds Expenditure at DHs as Cost Centers from 2004 to 2009.

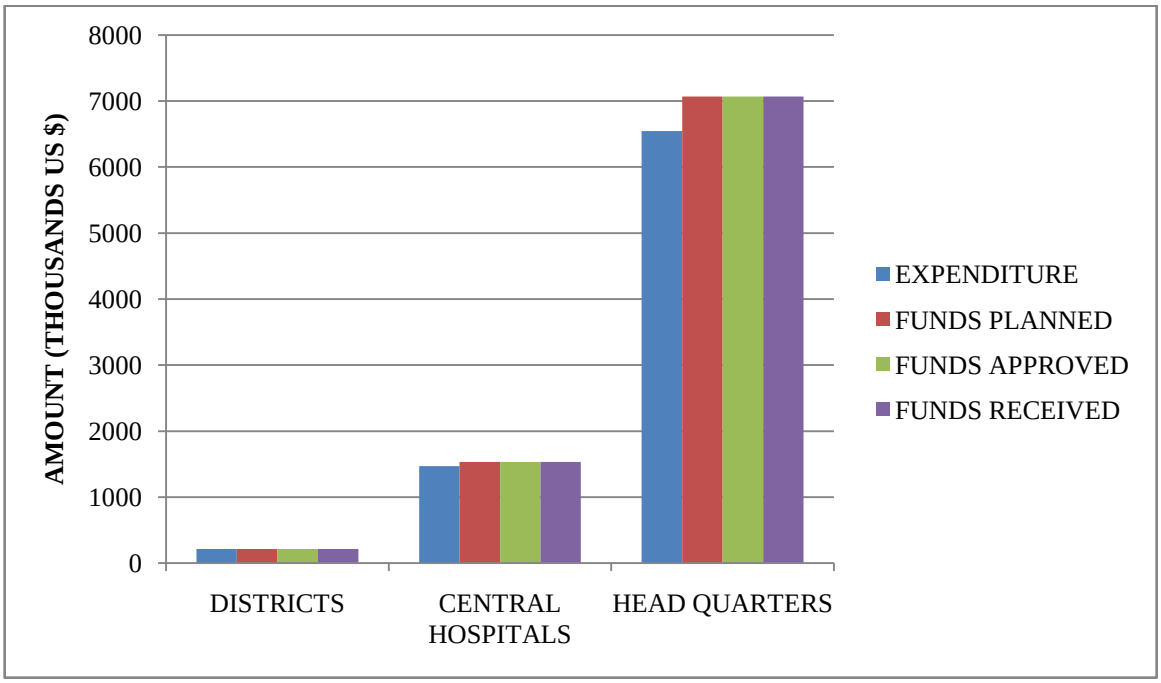


The approved budgets for all cost centers mirrored their respective planned budgets (Table 4.1 and Figure 4.9). The pledges by the Malawi Government and her development partners were absolutely honored (100%) during the period under study (Table 4.1 and Figure 4.9).

Table 4.1: Mean Infrastructure funds planned, approved, received and expended (in million US$) by cost centers against their catchment population (in millions) per year.

COST CENTER	Catchment Population	Funds Planned	Funds Approved	Funds Received	Expenditure
Headquarters	12.55007996	7.070879862	7.070879862	7.070879862	5.646211833
Central Hospitals	3.031761949	1.532361701	1.532361701	1.532361701	1.471057394
District Hospitals	0.387788934	0.212559932	0.212559932	0.212559932	0.212447422

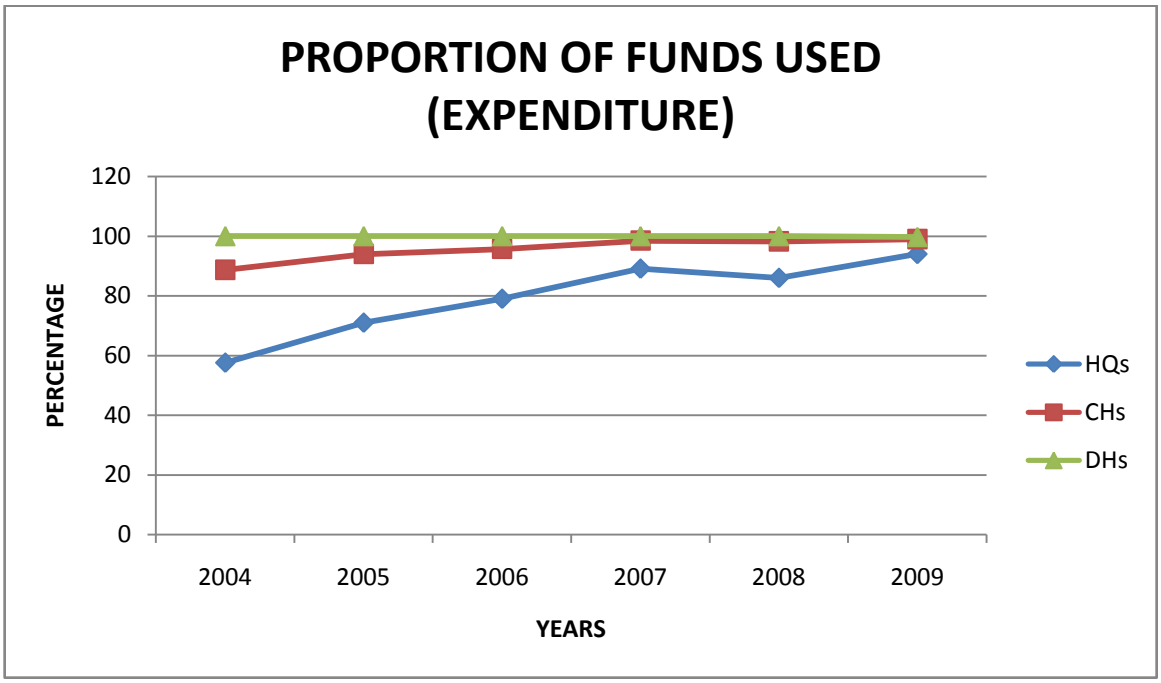
Figure 4.9: Mean cluster expenditure and planned, approved, received funds by cluster cost centers from 2004 to 2009.



The annual public health infrastructure development budgets planned, approved and funds disbursed to the HQs as a public health cost center ranged from US $6.6 million to US $7.5 million while their respective expenditures ranged from US $3.8 million to US $6.7 million from 2004 to 2009, respectively (Figures 4.6 and 4.9). Both the public health infrastructure development funds disbursed and expenditures at the MOH HQs were increasing steadily with the latter having a sharper gradient from 2004 to 2007 (Figure 4.6). However, in 2008, the expenditure performance

decreased against a steady increase in the public health infrastructure development funds disbursed; and interestingly the following fund disbursed later in 2009 was reduced drastically showing a steady declining trend (Figures 4.6 and 4.10).

Figure 4.10: Yearly Mean Utilization Ability by Clustered Cost Centers from 2004 to 2009.



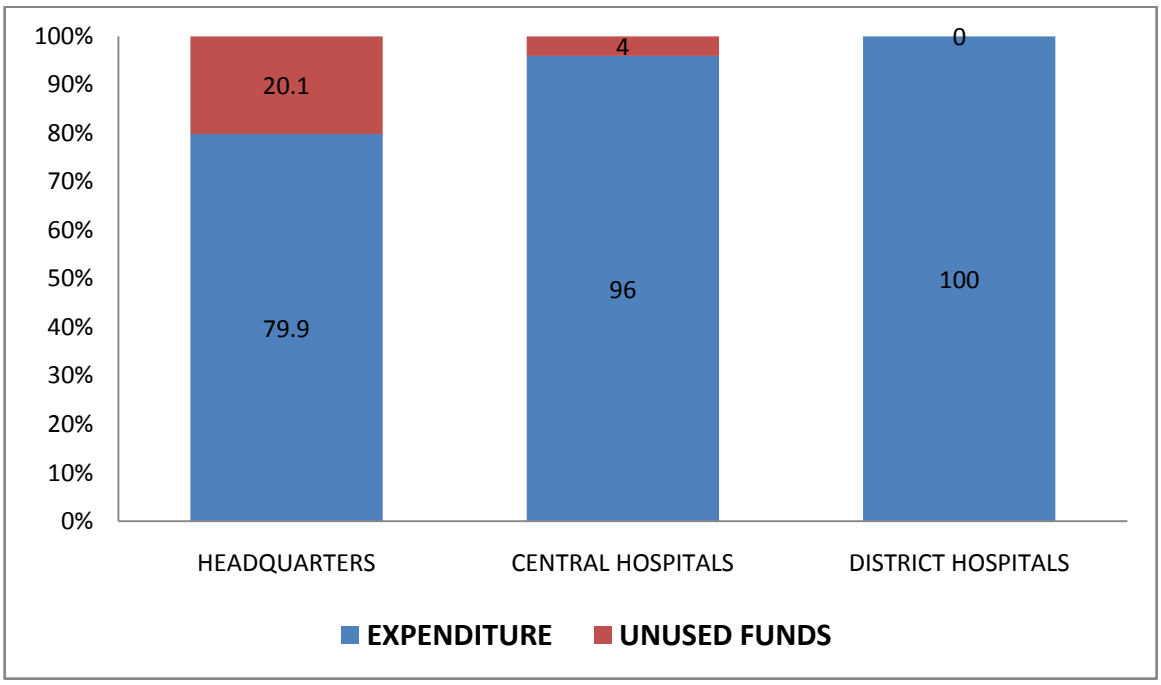
On the other hand, the range of the yearly public health infrastructure development budgets planned, approved and their respective public health infrastructure development funds disbursed to CHs were US $1.3 million to US $1.7 million and their respective expenditures ranged from US $1.1 million to US $1.67 million from 2004 to 2009, respectively (Figures 5.7 and 5.9). Just like the trends in both public health infrastructure development funds disbursed and their respective expenditures at the MOH HQs, at CHs, there was also a steady increase in both variances from

2004 to 2008 with the latter having a sharper gradient (Figure 5.7). However, unlike the MOH HQs, there was no isolated decrease in expenditure performance in 2008 although both variances showed a correlative declining trend from 2008 to 2009 (Figure 4.7 and 4.10).

At DHs, the trends in both annual public health infrastructure development funds disbursed and their respective expenditures mirrored those of the CHs but with an absolute (100%) expenditure performance throughout the period under study (Figure 5.8 and 5.10). However, the range of the annual public health infrastructure development budget planned, approved and their respective infrastructure funds disbursed at the DHs decreased from US $0.18 million to US $0.23 million with their respective expenditures from US $0.18 million to US $0.23 million from 2004 to 2009, respectively (Figures 4.8 and 4.9).

As regards to expenditure performances of the cost centers, the DHs used all the funds disbursed to them (99.9%) during the period under study while CHs and MOH HQs used 96% and 79.9%, respectively (Figure 4.11).

Figure 4.11: Mean Utilization Ability by Clustered Cost Centers from 2004 to 2009.



However, the trends in expenditure performances at both MOH HQs and CHs, as cost centers, were improving with time from 2004 to 2009 ranging from 57.6% to 94% and 88.6% to 99%, respectively (Figure 4.10). The MOH HQs as a public health cost center improved its public health infrastructure development funds expenditure by a magnitude of 36.4% while its counterpart, CHs improved by a margin of 10.4%. As regards to the catchment area populations served by the public cost centers, there were also variations during the period under study. The MOH HQs was serving the total Malawi population which ranged from 11.7 million in 2004 to 13.8 million in

2009 with a mean of 12.6 million persons per year (Table 4.1). On the other hand, the CHs and DHs in the country had catchment populations ranging from 2.8 million to 3.3 million with a mean of 3.0 million, and 0.38 million to 0.43 million with a mean of 0.39 million people per cost center per annum, respectively (Table 4.1).

4.1 Correlation Coefficient Matrix

Correlation was done between population and expenditure for each cluster of the public cost centers as well as between funds received and expenditure. Tables 4.2 and 4.3 show the matrix of Pearson's correlation coefficient. Testing for consistency with SWAp expenditure model using the ***Chi-Square Test*** at a ***p-value*** of 0.01 (*the probability of making an error in concluding that there is an effect, when in truth there is not, is less than 1%*), two-tailed was done for each set of Pearson's correlation coefficient. The calculated p-values were 0.00021 for population against expenditure and 0.00011 for funds received against expenditure.

The *Chi-Square* critical value for variables between population and expenditure was 7.1 against a calculated *p-value* of 0.00021 while that for funds received and expenditure was 9.6 against a calculated value *p-value* of 0.00011.

Table 4.2: Disaggregated Pearson's Correlation Coefficient Matrix of Population served against Expenditure from 2004 to 2009 by clustered Cost Centers.

VARIANCES	**POPULATION (x)**			**EXPENDITURE (y)**		
Correlation Coefficients Matrix	DHs	CHs	HQs	DHs	CHs	HQs
POPULATION (x)	1	1	1	**0.87**	**0.94**	**0.94**
EXPENDITURE (x)	**0.87**	**0.94**	**0.94**	1	1	1

Table 4.3: Disaggregated Pearson's Correlation Coefficient Matrix of Funds received against Expenditure from 2004 to 2009 by clustered Cost Centers.

VARIANCES	**FUNDS RECEIVED (x)**			**EXPENDITURE (y)**		
Correlation Coefficients Matrix	DHs	CHs	HQs	DHs	CHs	HQs
FUNDS RECEIVED (x)	1	1	1	**1.00**	**0.99**	**0.90**
EXPENDITURE (y)	**1.00**	**0.99**	**0.90**	1	1	1

5. DISCUSSION OF RESEARCH FINDINGS

5.1 SWAp Public Health Infrastructure Development Funds Allocation in Malawi

On health-financing during the period under study, Malawi's health SWAp showed an absolute efficiency with a100% allocation of both approved and disbursed infrastructure funds to all cost centers. This means that the Malawi Government and her development partners (donor agencies) honored their commitment timely and in full amount during the period under study. The development partners did not hide their satisfaction during bi-annual and annual SWAp reviews with the Malawi Government of the day as regards to milestones of the SWAp MOU[5]. The host government showed her 360 degrees efforts to reduce her dependence on development partners as regards to her health-financing. For instance, it increased her yearly budgetary allocation from 40% in 2004 to 65% in 2009[61]. Consequently, all the five major key principles of the joint health SWAp in Malawi were on track[5].

However, in other developing countries practicing joint SWAp there are many reports revealing unfulfilled commitments of SWAp funds disbursement by donor partners. It

is argued that this factor had been a major set-back on SWAp advancement in many developing countries during the first two to three years as expounded by many recipient governments[62].

For instance, Ghana performed badly in 1997-1998 period with only very limited releases against budget because donor contributions were lower than promised (as planned). And by 2001, the donor partners' contribution towards Ghana's Health Fund reached only 67% of the expected total[63, 64]. Separately, Zambia also suffered from donor aid fluctuations into SWAp during her implementation of the 1998-2000 Health Sector Strategic Plan with only 57% of pledges being met in 1998 and over-disbursement of 15% in 1999[15]. While in Uganda, the education SWAp which started in 1998, received only 90% of the intended SWAp funds which was reaching the primary schools by 2005[62]. As such many recipient governments had cried foul that the variations between commitments and disbursements had serious consequences for the planning, budgeting and implementation system[15].

Some of the isolated reasons for the unfulfilled commitments by donor agencies were concerns over implementation procedures as in Ghana and lack of capacity in

procurements as in Bangladesh[62] and disagreements amongst donor agencies supporting the index government as it was in Mozambique[21].

However, in Malawi this factor of unfulfilled commitment by donor partners in joint SWAp does not apply as shown by the study results because the flow of donor funds since 2004 had been timely and in full commitments. This phenomenon was also highlighted in the Malawi public expenditure review report of 2008.

5.2 SWAp Public Health Infrastructure Development Funds Expenditure in Malawi

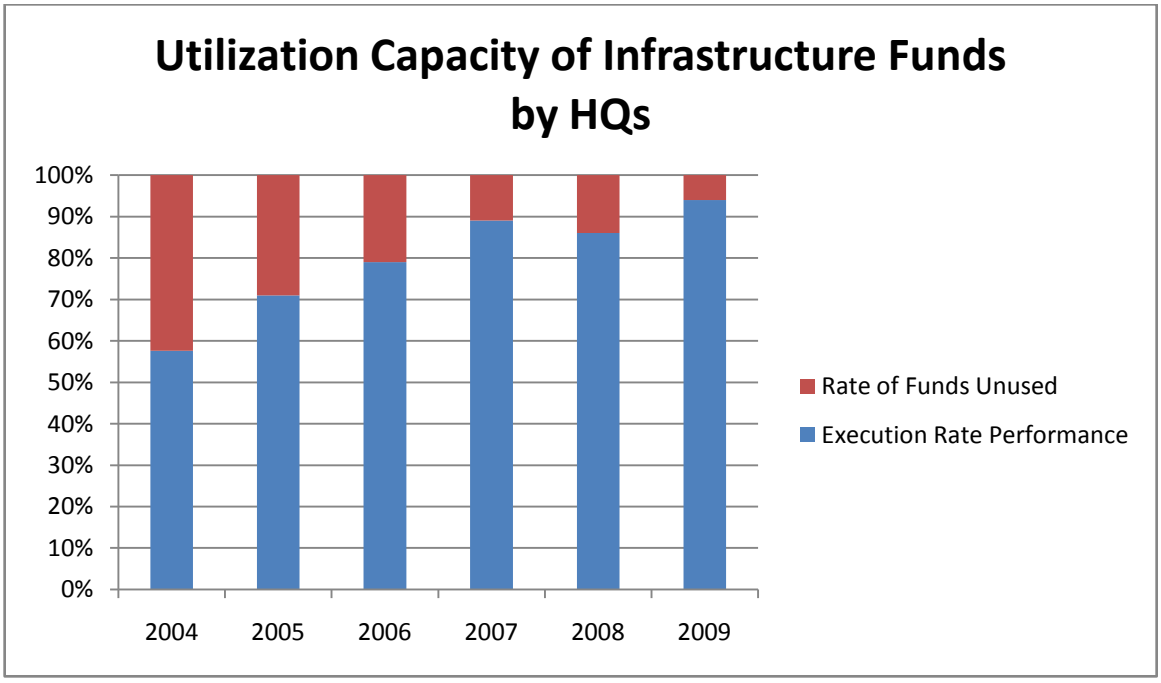
In general, the study vindicates under performance of the public health cost centers under the pillar of the joint SWAp's program of work in question with an average of 92% expenditure of the total disbursed funds within the expected time frame of the activity implementation. However, district hospital cost centers were the best performers which met the ideal SWAp Expenditure Model of 100%. The HQs cost center, on the other hand, was the worst with 79.9% expenditure rate while central hospital cost centers failed to utilize 4% of their public infrastructure development funds disbursed to them within the period under study.

These results are better than those conducted in different countries who also embraced the strategy of SWAp in their various sectors. Many studies and reviews have shown low expenditures by many governments who adopted SWAp not only in the health sector but also in the other sectors including education and agriculture. For instance, in Bangladesh the first two years of the health SWAp program's expenditure had an execution rate of 32% amongst her five largest sub-programs namely: construction (infrastructure), essential health package reproductive health, essential health package health services, hospital services, and community nutrition[62].

Therefore, Malawi's SWAp with a mean execution rate of 92% in infrastructure funds utilization under the period of study may be regarded as a greater improvement in the history of SWAp Expenditure Model. However, disaggregated results as regards to homogenous cost centers in Malawi showed that the MOH HQs was the worst cost center with execution rate of 79.9% during the period under study, followed by central hospitals with a magnitude of 96%. However, each public health cost center had shown the capacity to improve its execution rate with time.

The public health cost center at the MOH HQs had a base line execution rate performance of 58% in 2004 which kept on increasing steadily to 71%, 79% and 89% in 2005, 2006 and 2007, respectively (Figures 4.6, 4.10 and 5.1).

Figure 5.1: Trends in Public Infrastructure Funds Expenditures at Ministry Headquarters as Cost Center from 2004 to 2009.

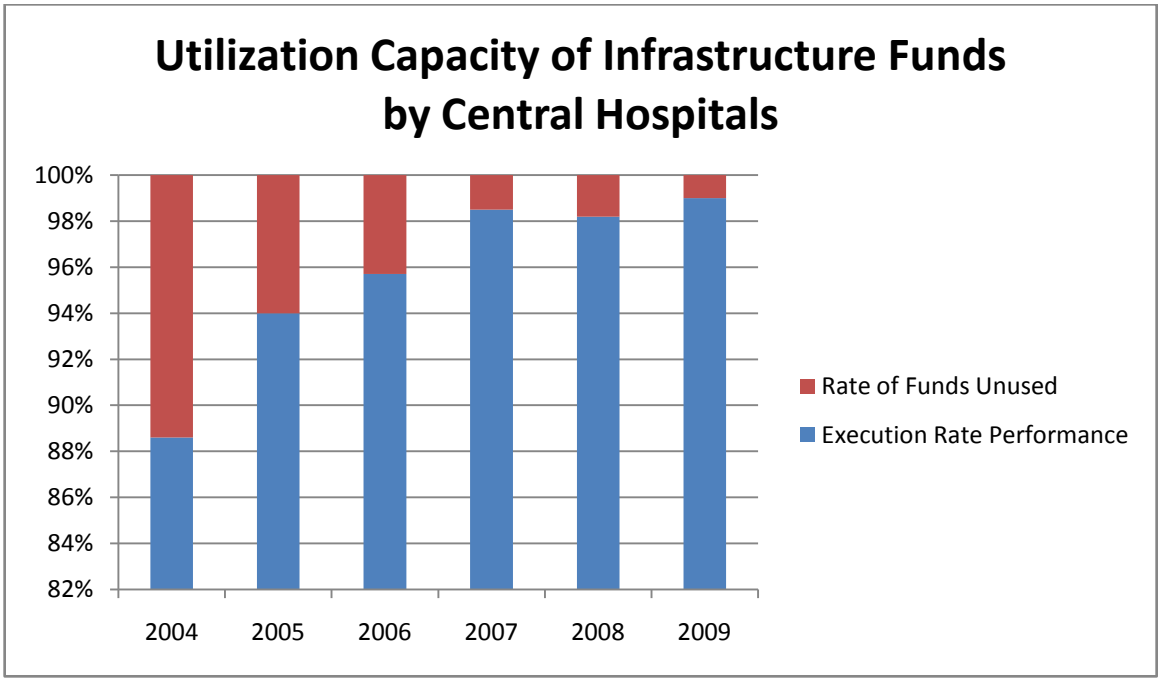


This steady improvement could be attributed to similar improvements in procurement processes following the appearance of robust capacity to implement then after learning from previous errors through ongoing monitoring and evaluation. However, in 2008, the expenditure performance at the MOH HQs decreased abruptly from 89% in 2007 to 86% (Figure 5.1) against a steady increase in the public health infrastructure development funds disbursed, from US $ 7.226 million in 2007 to US$7.466 million in 2008 as depicted in Figures 4.6 and 4.10. This deceleration in

execution rate could be argued as due to unrealistic budget estimates planned after reaching a threshold through laws of diminishing marginal utility and pareto efficiency such that the potential capacity of the public cost center at the MOH HQs to expedite infrastructure development activities reached its optimum in 2007 with a tag of US $ 7.226 million per annum. This line of argument is supported by the sequelae in funds disbursed and its respective execution rate performance in 2009. Consequently, the Government of Malawi reduced the disbursed funds to the MOH HQs cost center, probably as a punishment or a cost effective mechanism, from US$7.466 million in 2008 down to US$7.146 million in 2009 which is slightly below the threshold of 2007. And interestingly, the sequelae was a steady increase in execution rate performance from 86% in 2008 to 94% in 2009 as depicted in Figure 5.1.

This institutional phenomenon also applies to central hospitals as cost centers in Malawi during the same period of study with US$1.6 million per cost center per annum as threshold with a possible optimal execution rate performance (99%) according to their respective public CHMTs capabilities (Figure 5.2).

Figure 5.2: Trends in Public Infrastructure Funds Expenditures at Central Hospitals as Cost Centers from 2004 to 2009.



However, in observing a marginal improvement over time during the period under study, the MOH HQs as a cost center was better than its counterpart because it improved its public health infrastructure development funds expenditures by a magnitude of 36.4% while its counterpart, central hospitals improved by a margin of only 10.4%. This difference could be attributed to a greater marginal range of potential improvement in the former cost center.

On the other extreme, district hospitals performed with excellence with a magnitude of public health infrastructure development activities execution rate of 100% (Figure 4.8). Therefore, the DHMTs' capability to utilize their respective public health infrastructure development funds vindicated the SWAp Expenditure Model. Some of the attributes to this splendid performance at the district level in the country could be argued as due to: adequate capacity to procure and manage, full involvement of all partners, and community participation which are mere conjectures subject to be confirmed through further researches. The amount of public health infrastructure funds disbursed to district cost centers ranged from an equivalent of US$60,000 to US$450,000 per cost center per annum which could be regarded as manageable at district level based on this study. Therefore, from these results one may comfortably argue that the capacity threshold to expedite public health infrastructure development activities at public district hospitals in Malawi as public health cost centers is yet to be reached which must be more than US$450,000 per cost center per annum.

From literature, the two top most outlined reasons for reduced expenditure on SWAp programs are limited absorption capacity by the index government and unfulfilled

commitments of funds disbursement by donor partners[62]. However, this study adds other possible reasons including: poor cross sector coordination; administrative delegation of powers against full devolution in a decentralization dispensation, and the political landscape of the index government.

5.2.1 Limited Absorption Capacity by the index Government

Institution capacity to implement the activities within the planned time-frame is highly dependent on the robustness of existing public administration systems, as well as the capacities of individuals within them[19]. The civil service in most developing countries in the late 1980s and early1990s was characterized by a lack of accountability, transparency and participation which prompted the WHO and IMF to advocate for civil service reforms before adopting SWAp[65].

Lack of capacity to absorb the SWAp funds or resources was the isolated reason for the low expenditure in Bangladesh[62]. Health pundits argued that in Bangladesh such a low magnitude in expenditure performance was expected because their previous record soon before adopting SWAp strategy in their health delivery system was only a 12% utilization of the consortium fund disbursed during the past 4 years of its implementation[62]. In separate case studies by Foster and Mackintosh-Walker in 2001, they observed that lack of capacities in other institutions included failure to cost the sector program and little participation by civil society as was in Tanzanian health sector in 1999-2000, and inadequate skills in finance and reporting, and poor

financial sustainability adherence as was in Mozambique and Ugandan health sectors in 1998-2001and 2001-2005, respectively.

5.2.2 Unfulfilled Commitments by Donor Partners

Many studies have shown that various recipient governments of SWAp funds have cried foul that the variations between commitments' pledge and their actual disbursements had serious consequences for the planning, budgeting and implementation of the SWAp activities[62]. It is a known fact that a cost center executes its activities better if it plans realistically. Unfulfilled commitments by donor partners, whatever the reason could be, affect the timely implementation of the intended activities. Therefore, it is expected to underperform within the designated time frame. However, this argument could not apply to Malawi health SWAp as regards to results of this study.

5.2.3 ***Poor Inter-sectoral Collaboration***.

Although the cross sector coordination has not been debated as one of the attributes to low expenditure of SWAp funds in literature, however, this paper puts this factor in

the lime light. Implementation of SWAp activities needs inter-sectoral collaboration. For instance, in this study it is argued that health sector infrastructure development activities needs full involvement of other sectors including land, building, energy, finance, economic planning, local government and environmental sectors. The broad concept of health should not only be emphasized on the initial planning of health infrastructure activities through resource mobilization but also be highlighted in implementation stage. The HQs and central hospitals as cost centers in Malawi have performed poorly in execution rates than district hospitals, partly because of poor inter-sector collaboration. However, this is a conjecture which needs to be hypothesized and confirmed by formal scientific investigation. The HQs are mainly responsible for policy settings, policy re-enforcement and setting of the national standards in health sector infrastructure development. As such their collaboration with other sister sectors is mainly on policy framework. On the other hand, district hospitals collaborate with other sectors more in execution than policy issues. This argument is in line with some studies in SWAp. Foster and Mackintosh-Walker, 2001 argued that only HIV/AIDS activities were well coordinated at inter-sectoral level as

evidenced in Ugandan education and health SWAp reviews. On the other hand, many developing countries who adopted SWAp are practicing little or diluted involvement of other sectors. In Cambodian education sector, the coordination was hampered by the political situation in 1998-2003[62] while in Mozambique the coordination was on ad hoc basis in 1998-2000[21].

5.2.4 Administrative Delegation of Powers against full Devolution in a Decentralization Dispensation

In Malawi, district hospital cost centers and central hospital cost centers operate under full devolved decentralization and on administrative delegation (decocentration) from central government, respectively (Figure 2.6). Unlike the public district hospital cost centers which have the authority, powers and responsibilities entrusted by the act of the national parliament to perform specific healthcare functions without reference back to the central government, the latter arrangement involves passing of only some authority and decision-making powers to public CHMTs from the central government which is at liberty to overturn critical public central hospital decisions. As such, public CHMTs are likely to consult

extensively for any flexibility in execution than public DHMTs thereby compromising the efficiency in expenditure performance. This line of argument is depicted in the results of the study with public district hospital cost center performing far much better than their public central hospital cost center counterparts (Figures 4.6, 4.7, 4.8, 4.10 and 4.11).

By early 2000, different models of decentralization were widely used in Africa for the delivery of public health care. Deconcentration was adopted initially by Ghana, Mozambique and Zambia where responsibilities were still with the health ministry, but some authority was delegated to DHMTs to plan and deliver public health activities[66]. On the other hand, devolution was initially adopted by Tanzania, Uganda and Ethiopia[66]. The latter countries had more flexibility in procurements and execution of capital projects including public health infrastructure development.

5.2.5 *Political Landscape of the index Government*

Political landscape of the index government may be argued as one of the potential factor influencing the expenditure performance of the SWAp funds. Political stability

of country guarantees better governance, rule of law, reduced scope of corruption, community participation and involvement which are favorable conditions for optimal efficiency in execution of health activities. Ghana is deemed to have excelled in public health expenditures in late 2000s because of better governance secondly to her political stability which accelerated tertiary public hospitals attaining meaningful hospital autonomy in management[64]. In Malawi, it is also likely that this factor was the main contributing attribute where the economic indicators were tremendously improving with a parameter of economy growth of slightly over 8 per cent in 2008, making it the world's second fastest growing economy after Qatar; and the inflation rate stood at 9.5 percent as of March 2009[67]. It was a time of a global financial and economic crisis secondly to economic recession whereby the economic growth of Africa as a continent declined from 4% in 2008 to 1.6% in 2009[67].

5.3 Interpretation of Results and Generalization

The results of this study have shown that there was inconsistency of infrastructure public funds expenditure with SWAp expenditure model at a probability of making an error of less than 1%. Therefore, the public health infrastructure development

funds expenditure by the public health cost centers from 2004 to 2009 in Malawi was ***not*** consistent with the SWAp Expenditure Model.

On the other hand, if the research design and paradigm, data validity and data analysis are taken into scientific consideration, this research results may be generalized to all public health cost centers in the country because the methodology was plausible, professional and consistent.

5.4 Research Results Dissemination

The researcher disseminated research results to the RCAPS to defend the Master's Thesis before submission to the Graduate School of Asia Pacific Studies Master's Thesis Committee for acquisition of Master of Science Degree. If it would be successful, then the thesis shall be either published in any journal preferred by the researcher or as a book. On the other hand, the researcher wishes to also disseminate the research results at the November, 2011 College of Medicine Dissemination Conference in Malawi because the results are expected to be of policy relevance to the Malawi Government and other similar developing countries.

6. CONCLUSION AND RECOMMENDATIONS

This study has shown that Malawi's policies on health sector reforms including decentralization and SWAp had increased the reallocation and flexibility in utilization of public health infrastructure development funds during the time of study, from 2004 to 2009. However, expenditure performances by public health cost centers were, on average, not fully consistent with SWAp Expenditure Model as assessed at a *p-value* of 0.01 (*alpha 1%*).

On one side there was public health cost center at the Ministry of Health headquarters which failed to utilize 20% of the disbursed funds, while on the other extreme, there were district hospitals as cost centers which had vindicated SWAp Expenditure Model in the country as regards to infrastructure development funds' expenditure during the period under study. Some suggested attributes leading to the former institutional phenomenon of under-expenditure were limited absorption capacity by the cost center management team and poor inter-sectoral collaboration. On the other hand, the contextualized attributes leading to the ideal expenditure by the district

hospital institutions were full decentralization of district assemblies in the country and stable political landscape of the index government.

Therefore, the study results appeal to Malawi health sector stakeholders to conduct detailed scientific investigations on the attributes which led to both low expenditures of health infrastructure development funds at headquarters and central hospitals as cost centers, and ideal expenditures at district hospitals as cost centers in Malawi from 2004 to 2009, if optimum output from joint health SWAp is to be strived for in achieving health MDGs.

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APPENDICES

Appendix 1: Data Collection Questionnaire

ASSESSMENT/EVALUATION OF HEALTH SECTOR REFORMS IN MALAWI: SECTOR WIDE APPROACH AND PUBLIC HEALTH INFRASTRUCTURE.

Name of Public Health Facility:……

Type of Public Health Facility:

① Headquarters
② Central Hospital
③ District Hospital

Catchment Population it serves:…….

Total Public Health Facility Infrastructure Budget Planned:

① 2010/2011……
② 2009/2010……
③ 2008/2009……
④ 2007/2008……
⑤ 2006/2007……
⑥ 2005/2006……
⑦ 2004/2005……

Total Public Health Facility Infrastructure Budget Approved:

① 2010/2011……
② 2009/2010……
③ 2008/2009……
④ 2007/2008……
⑤ 2006/2007……
⑥ 2005/2006……
⑦ 2004/2005……

Total Actual Public Health Facility Infrastructure Funds Received:

① 2010/2011……
② 2009/2010……
③ 2008/2009……

④ 2007/2008……
⑤ 2006/2007……
⑥ 2005/2006……
⑦ 2004/2005……

Total Actual Public Health Facility Infrastructure Expenditure:

① 2010/2011……
② 2009/2010……
③ 2008/2009……
④ 2007/2008……
⑤ 2006/2007……
⑥ 2005/2006……
⑦ 2004/2005……

The Actual Ceiling Provided by the O.D.P.P. on Public Health Facility Infrastructure Expenditure:

① 2010/2011……
② 2009/2010……
③ 2008/2009……
④ 2007/2008……
⑤ 2006/2007……
⑥ 2005/2006……
⑦ 2004/2005……

Main Public Health Facility Infrastructure Activities Planned:

① 2010/2011:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

② 2009/2010:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility

e. Others

③ 2008/2009:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

④ 2006/2007:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑤ 2005/2006:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑥ 2004/2005:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

Main Public Health Facility Infrastructure Activities Done:

⑦ 2010/2011:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility

e. Others

⑧ 2009/2010:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑨ 2008/2009:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑩ 2007/2008:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑪ 2006/2007:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑫ 2005/2006:

a. Maintenance of old health facility structure
b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility
e. Others

⑬ 2004/2005:

a. Maintenance of old health facility structure

b. Building new health facility structure
c. Expansion of old health facility structure
d. Service Level Agreement with CHAM facility