

## **The Emerging Environmental Health Risks and Challenges for Tomorrow: Prospects for Malawi**

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### **Summary**

*This paper gives an overview of the current and emerging environmental health risks and the projected challenges for the future. The aim is to create awareness and incite debate among Environmental Health Professionals on solutions for the risks and challenges as they celebrate the “World Environmental Health Day” to be held on 26<sup>th</sup> September, 2013. The environmental health risks have been classified according to the five pillars of environmental health with climate change risks and challenges cutting across all the pillars. These include emerging risks and future challenges related to food consumption, pollution of water resources, air and soil, use of electronic products and electronic waste, poor sanitation, poor housing and those arising from peoples’ occupation. If not controlled, these risks and challenges may result into increased prevalence of accidents, injuries, communicable and non-communicable diseases. We propose partnerships, stronger political will, innovations and research as key factors in solving such problems.*

**Keywords:** *Environmental Health, Emerging risks, climate change, water and sanitation, occupational health, Environmental Pollution, food safety and Malawi*

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### **Introduction**

According to the World Health Organization (WHO), environmental health addresses all environmental (physical, chemical and biological) factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health and is targeted towards preventing diseases and creating health-supportive environments [1]. While most countries, especially those in the developing world like Malawi, are still struggling to address the existing environmental health problems, new challenges and risks are emerging which require complex solutions. Advances in technology, population growth, changes in standard of living, increase in industrialization and climate change are some of the factors that lead to emergence of challenges in environmental health. Emerging risks and challenges are those that are coming into existence because of changes in the environment. We present these factors according to the five pillars of environmental health. These pillars include: disease control, water, sanitation and hygiene (WASH), built environment, occupational health and food safety and hygiene (FSH). While these will be discussed, attention will also be given to how issues surrounding these pillars are being affected by climate change.

## **Disease Control**

Under disease control, we discuss the current, emerging and future risks and challenges relating to communicable and non-communicable diseases, epidemiology and health promotion.

Currently, Malawi faces a double burden of both communicable and non-communicable diseases[2] in the sense that while prevalence of communicable diseases is still high i.e. malaria related fever at 35% and diarrhea at 17.5% in the under-five children and 10.6% prevalence of HIV among those aged 15 to 49 years [3], the risks relating to non-communicable diseases are also high. A recent study showed that at least one in four men smoke tobacco, one in five people drink alcohol excessively and at least one in four women is overweight[4]. It also showed that a third (32.9%) of the adult population aged 25–64 years had raised blood pressure or were on antihypertensive medication, 5.6% had raised fasting blood glucose or were on medication and 8.7% had raised cholesterol [4]. The prevalence of diabetes was estimated at 5.6%, while injuries, other than road traffic accidents, were at 8.9%. The prevalence of cardiovascular diseases was 8.9% and that of asthma was 5.1%. The prevalence of road traffic accidents was estimated at 3.5%[5].

It can be observed from evidence above that Malawi is facing a double epidemic of communicable and non-communicable diseases. The risks associated with communicable diseases include inadequate safe water, sanitation and hygiene especially in rural and peri-urban areas (including institutions like schools and other public places), poor adoption of safe health behaviours (e.g. sleeping under treated mosquito nets, treating unsafe water, participating in immunizations and mass drug administration exercises), poor housing conditions, poverty and poor access to basic health information and facilities. The high burden of non-communicable diseases is partly due to increased drug and alcohol addiction, smoking, bad eating habits, poor food choices, pollution and environmental exposures. While these risks are already in existence, we observe that more are emerging including deforestation which will lead to reduction of quantities and pollution of water in water bodies, overcrowding, extreme temperatures due to climate change, pollutants from industries, use of genetic products and radiation from electronic products. Therefore, there is need for preparedness on how to tackle such risks.

In general, control of diseases through health promotion will be challenged by technology where information leading to poor health and that which promotes health is available on the internet. Technology will reduce the need for people to work as a group and the need to gather as a result there will be need to empower people on how to choose the right information. Those doing epidemiological studies will also be challenged by complex risk factors. It will be difficult to know the risk factors as they will become complex due to vast use of chemicals and modified products. There will be need for complex epidemiological methods to determine risk factors for ill health in the society.

## **Water, Sanitation and Hygiene**

Water supply, sanitation and hygiene mostly affect children and women living in rural and peri-urban areas of the country. People travel long distances to access water and in most cases the water sources are contaminated with chemical, physical and biological contaminants. These contaminants arise from unplanned settlements and associated poor sanitary conditions, as well as improper disposal of waste. The other sources are human settlements established in river

catchment areas mainly because many households either do not have latrines or general waste disposal facilities. There is also discharge of inadequately treated sewage from some institutions into rivers and streams. Lack of authority to control sanitary installations and of maintenance of sewer reticulation networks have led to overflow of septic tanks and sewers. On this pillar we discuss emerging environmental health risks and challenges relating to access to safe water, rural and peri-urban sanitation, urban sanitation, environmental pollution and hygiene.

### ***Access to safe water***

It is estimated that access to improved water sources is at around 78% of the population for the rural and 92% of the population for the urban areas [3]. Though the coverage seem to be very high, it is important to note that most of the Malawians live in rural areas where water is collected from communal water points and then transported to homes through various means and vessels. Water is not normally used directly upon reaching the households. Water is stored for a period ranging from few hours to several days. This is also the case with households that do not have regular water supply though having in-house pipe connections. If not handled properly, water will get re-contaminated during collection, transportation and storage. Stored water can become unsafe when it is touched by people with dirty hands, when it is poured into a dirty container, when dirt or dust gets in the water, and when dirty cups are put into it. This fact necessitates inclusion of point of use treatment in order to holistically deal with water borne diseases. Another important area to note on water supply is the management of the water point. Waste water from water points needs to be taken care of in order to avoid breeding of mosquitoes as part of Malaria control and avoid contamination of groundwater through seepage.

### ***Rural and Peri-Urban Sanitation and Environmental Pollution***

It is well known that only 8.8% of the population in Malawi have access to improved faecal disposal facilities [3]. Most of the households (60%) use basic sanitation facilities while 8% of the households do not have any form of faecal disposal facilities meaning they defecate in the open. Open defecation exposes the rest of the population to excreta related diseases like diarrheal and helminthic diseases. Most public places including schools and markets do not have adequate faecal disposal facilities putting all children, patrons and surrounding communities at risk of related illnesses.

Some of the complications in making progress on rural and peri-urban sanitation are depletion of natural resources that is making suitable construction materials to be scarce and unstable soil conditions in other parts of the country causing frequent facility collapses. As deforestation continues to occur due to increased population, addressing sanitation problems will be more challenging as the majority of the nation relies on pit latrines whose floor is supported by logs.

In rural areas, the increasing use of artificial fertilizers and pesticides are the major causes of water resources pollution. The pollutants affect people who use these waters. They also help insect vectors that breed in the rivers i.e. mosquitoes and black flies to develop drug resistance because of pre-exposure to chemicals. We expect high resistance of mosquitoes to indoor residual spraying chemicals and those used as larvicides for black flies due to pollution of river waters and other water resources. Cancer related diseases will also increase because of overuse of chemicals.

### ***Urban Sanitation and Environmental Pollution***

The risks and challenges related to environmental pollution include those related to liquid waste management, solid waste management and outdoor air pollution. The sewage system breakdown in the cities of Blantyre and Lilongwe and to a lesser extent, Mzuzu and Zomba are the major causes of water resources pollution. The causes of breakdown include vandalism of pipes, vandalism of pillars that support pipes, high load for pipes, old pipes which have outlived their design life; and lack of knowledge and carelessness on what to throw in a water closet latrine. The other causes include disposal of general and industrial waste into the rivers, sand mining, farming along the catchment area and defaecation along the river banks. The most affected are the poor people who use the stream waters for domestic uses in the cities and downstream while the lesser affected are urban dwellers who buy vegetables and other products grown and/or washed by this polluted water. Despite such existing problems, it is expected that without overhauling the system and putting in place integrated pollution measures, we expect more pollution of water resources. These will lead to more and new diseases associated with pollution water.

**Picture1&2: Polluted Mudi River**



**Pic. 2**



Improper solid waste management in the cities and district councils leads to environmental pollution and contributes to pollution of water bodies as well. The emerging risks from solid waste are mainly due to nature of the waste. Hazardous wastes may be inflammable, corrosive, explosive, toxic, mutagenic, carcinogenic and eco-toxic. They pollute water and diminish public health safety when improperly managed. They are highly corrosive and a potential threat to public sewers. Discharging them into waterways means pollution of drinking water and threats to aquatic life. Disposal of hazardous wastes on land renders arable land unsuitable for farming and destroys vegetation. The waste from electronic products like computers, computer batteries, phones and their batteries, though not highly researched, seem to be more dangerous as they contain chemicals that are reactive in nature. Donations of used electronic equipment that have no value are likely to encourage Malawi to be a dumping site for such waste. Other common types of wastes include plastics, used airtime vouchers, diapers and other sanitary waste for babies. The most affected include scavengers at dumping sites, people living around dumping sites, market users and waste collectors in City and District Councils. The general public is affected if the waste contaminates the soil and ground water. Every year thousands of tons of industrial wastes are discarded and the quantity, complexity and toxicity is increasing.

Solid waste management is also a major concern especially in the peri-urban areas and trading centers across the country. The most serious problem in relation to solid waste management is that most of the peri-urban areas are unplanned as such they are not serviced by the districts and city councils. The current situation in Malawi is that almost all districts and city councils do not have proper refuse disposal systems in place. Their disposal systems are indiscriminate and a serious hazard to public health as they are breeding paradise of vectors and sources of water contamination.

**Figure 3a: Solid waste in a skip**



**Fig.3b: Common Situations**  
(waterjournalistsafrika.wordpress.com)



Air pollution is mainly a result of industries producing fumes, car exhaust fumes, smoke and dust that are released into the atmosphere. The increasing number of vehicles in Malawi is posing a threat to air pollution. The particles in air are later inhaled by people and may affect their health depending on the nature of the particulate matter therein and the personal factors. In rural areas, the major sources of air pollution include bush fires and other activities involving burning of wood fuel. Air pollution also arises from construction, quarrying and coal mining activities. With the increased scope of these activities, air pollution could be a serious problem especially in nearby areas.

### ***Hygiene***

Hygiene coverage is the lowest as compared to water supply and sanitation. Hygiene is an important factor on transmission of diseases despite having hardware components like latrines and boreholes or taps. Most diarrhoeal and parasitic diseases are due to lack of hygiene. Currently, interventions are focusing much on water supply and sanitation while losing focus on hygiene. This will lead to increase faecal-oral diseases despite increase sanitation and improved water sources.

### **Occupational health and safety**

Under this pillar, our concern is on the workplace, people who work there, the visitors and the general population. People at workplaces are at risk of diseases and injuries due to unsafe working environments. Occupational diseases are those that workers get as a result of exposure in their work places. Occupational health and safety deals not only with health and safety of people in the work place but also visitors, customers and also the general public by making sure



the activities from work places or industries do not affect the environment. It looks at the health and safety of people who happen to visit various places like shops, hotels, stadia, play grounds, restaurants, streets and many other places. These places have to guarantee safety of the patrons in terms of accident and disease prevention. The safety issues include dangerous equipment, poor room conditions and physical hazards including fire, light, sound radiation and extreme temperatures. Although data on the exposure levels and prevalence of occupational diseases are not available in Malawi, several diseases are known to occur as a consequence of hazardous work environments. The occupational health risks are common in mines and industries. The Department of Occupational Health and Safety in the Ministry of Labour carries out routine factory inspection of all factory premises in Malawi with the aim of improving the working conditions. However, the frequency and extent of the inspections are hampered by lack of and inadequately trained personnel and financial resources. Lack of proper inspections by Safety, Health and Environment Officers in workplaces leads to companies putting the health of their workers at risk and polluting the environment. If not properly checked, the Government will continue losing scarce resources towards treating diseases that are due to ones' occupation and also as a result of pollution from industries and mines. There is need for collaborative effort by Ministry of Labour and Ministry of Health to overcome the labour shortage in implementing the occupational safety, health and welfare Act of 1997. Also there is need for revision of the Act to include current and emerging challenges in order to reduce the impact of occupational health and safety issues on the health of people.

### **Built environment**

Housing conditions in Malawi are generally poor. The population and housing census of 2008 indicated that on average 21% of the houses were permanent, half of the households in rural areas were temporary and 75% of the households had mud floors[6]. It was also observed that 38% of houses used either burnt or unburnt bricks for walls while the main source of energy for lighting was paraffin (85%) and that for cooking was firewood (87%) followed by charcoal at 8.5% and electricity at 2% [6]. It is expected that both rural household and the shortage for rural housing will double in the next 10 - 15 years. The demand for shelter and housing in peri-urban areas is expected to rise due to population growth and migration. This will lead to over-crowding in existing traditional housing and peri-urban areas. There is also a problem of unplanned construction of substandard houses. The dwelling units lack basic infrastructures and services such as roads, electrical and water supply and wastewater disposal systems.

Picture 4a & b: Peri-Urban areas

4b



Source: Internet (<http://4.bp.blogspot.com> and <http://www.aphrc.org/>)

Emerging environmental health risks in the built environment include the increased respiratory infections and diseases due to high reliance on wood for cooking and use of paraffin for lighting. The problems are exacerbated by people's behaviours like cooking in structures with poor ventilation and with under-five children at their backs. It is also common to find households where family members share the dwellings with livestock for the fear of losing them to theft. The other challenges on housing include poor structures with no windows or small windows in the wrong place. This results to poor ventilation which promotes transmission of diseases like tuberculosis.

### **Food Safety and Hygiene**

Food safety and hygiene is of immediate concern based on awareness and perceived issues with genetically modified foods, the use of cloned animals as food sources and the risk for new dietary allergens, eating habits and microbial contamination of foods. Other issues viewed as falling within this broad topic are the re-evaluation of food additives and other chemicals, food quantity and sources, patterns of food consumption and the distribution of food, the regulation of botanical products, the adulteration of food ingredients and possible chemical contamination.

There is little evidence on the health effects of genetically modified foods. We expect more challenges associated with genetic modification in future as these are not currently monitored. The high consumption rates of only processed foods where several chemicals have been added as preservatives and colourants or flavourings plus the fertilizers and pesticides in the fields put consumers at risk of cancers and skin diseases. The high consumption rates of sugars and oils means that diabetes prevalence will continue to increase and will also affect school going children. The low surveillance of restaurants and informal sector on food hygiene means an increasing prevalence of foodborne diseases.

On emerging risks relating to meat safety, there are more emerging animal related diseases partly due to changes in lifestyles and climate change which leads to emergence of new disease causing agents. The other risks include consumption of meat or its products not consumed before i.e. dog and horse meat due to illegal business, globalization of trade, increased movement of animals among other factors leads to new diseases.

Picture 1: Horse



Picture 2: Horse meat



Picture 3: Dog meat



Source: internet ([www.google.com/search?q=horse+meat](http://www.google.com/search?q=horse+meat) and [bp.blogspot.com](http://bp.blogspot.com))

It is estimated that over 70% of diseases affecting man in the past ten years originated from animals or animal products[7]. About 60% of these diseases are zoonotic and include Swine flu (H1N1), avian influenza, severe acute respiratory syndrome (SARS), Ebola haemorrhagic fever

and others implicate Human immune deficiency virus which leads to Acquired Immunodeficiency syndrome [7]. These diseases may not be in existence in Malawi, but once they occur in other countries pose a threat to the country and leads to use of scarce resources in getting prepared for them. There is need for Environmental Health Officers to work together with other stakeholders including veterinary department to sensitize people on risks from animal-human interaction and develop a joint program that will make sure that all meat sold in both formal and informal markets is inspected.

### **Climate change**

The effects of climate change are felt across all the pillars of environmental health. Climate change is defined as any significant variation in temperature, precipitation, wind, or other type of weather that lasts for decades or longer [8]. Over the last 50 years, human activities have released sufficient quantities of carbon dioxide and other greenhouse gases to trap additional heat in the lower atmosphere and affect the global climate[9]. Evidence suggests that the world's climate is becoming warmer, increasing the potential for extreme weather events around the world [8,9].

If not controlled, the effects of climate change will be a major contributor to the Emerging Environmental Health risks and challenges for tomorrow in most countries in the world. In Malawi, the current environmental health challenges that are closely linked to climate change include: lack of sanitation to those affected by floods, diarrhoeal and parasitic diseases due pollution caused by flooding, increased insect vectors (i.e. mosquitoes, cockroaches, flies etc.) due to increased temperatures, droughts and extreme temperatures. The floods destroy food stocks, livestock and other property leaving families in hunger and poverty which leads to high prevalence of malnutrition in the under-five children. Drought not only leads to food shortage which results to malnutrition but also increased prevalence of malaria due to high multiplication of mosquitoes. The other effects of climate change include production and allergenicity of aeroallergens such as pollen and mold spores and increases in regional ambient concentrations of ozone, fine particles, and dust. This leads to increased respiratory diseases such as asthma[10].

We anticipate more and complex environmental health challenges relating to climate change because the increasing population will still have a negative impact on the environment. Below are pictures of floods and drought in Malawi.

**Figure 3: Floods in Malawi**



**Figure 2: Droughts in Zomba**

Source: Drought in Malawi websites [10]



## Conclusion

The issues discussed above are just a few of the current and emerging environmental health risks and challenges that Malawi is facing. Environmental health professionals need to be aware of them and create a holistic approach involving all stakeholders to effectively combat them. There is need for all sectors to play their role in order to sustainably control environmental health risks.

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