THIRD INTERMINISTERIAL CONFERENCE ON HEALTH AND ENVIRONMENT IN AFRICA

Libreville, Gabon 6–9 November 2018

Health and Environment Joint Interventions in Africa

The Costs of Inaction

Executive Summary

This is a supplementary Concept Paper for the Third Interministerial Conference on Health and Environment in Africa (IMCHE/3/CP5). It reviews readily available quantified and monetized data on the economic impacts of the suboptimal investment in environment and health interlinked priorities for achieving the Sustainable Development Goals in Africa.

It analyses carefully selected information on costs along the entire causal chain of environment-health outcomes, in view of raising political awareness of the economic benefits for scaled-up investment in critical environment and health joint interventions in countries.

The paper conceptualizes three dimensions of costs associated with environmental determinants of ill health and degraded ecosystems, which are often undercounted, externalized and hidden in economic statistics: costs of illness, productivity and depletion of natural capital.

While information remains patchy, incomplete and in many cases limited, the available data strongly demonstrate the economic benefits of managing environmental determinants upstream, before they become costly as a growing and avoidable burden of disease to health-care systems. It shows that a dollar invested on sanitation will yield a six-fold return in terms of averted health costs and increased human capital and participation in labour markets. A dollar invested in controlling lead paint in households could yield up to US$ 155 in savings from averted health costs and gains in human capital. Establishment of poisons control centres could offer a return on investment at a rate of 1:14 for each dollar invested, amounting to an estimated saving of US$ 1.8 billion per year due to avoided costs of hospitalization. Without stepped up investments in prevention, the costs of pesticide poisonings on smallholder farmers in Africa could reach US$ 97 billion by 2020. The adjusted net savings, the portion of gross national income that incorporates depletion of natural capital stocks, continues on a negative trend in Africa.

Targeted reforms which are transformative in impact are feasible. Providing clean cooking fuels in Africa by 2030 will cost US$ 1.7 billion, compared to US$ 26 billion spent yearly on subsidizing climate-warming dirty fuels in countries. Against the scale of the challenge, progress remains slow and limited to mainstream environment and health interventions in national development planning. Opportunities for domestic and international financing are emerging, including innovative financial mechanisms that could be leveraged to support increased investment in ways that catalyse the achievement of the Sustainable Development Goals in countries.

Demonstrating economic benefits and costs remains an important step to reach effectively other sectors beyond health and environment. Even more critical is to translate economic awareness into strategic partnerships for increased resources. How to do this, in a way that wins for health, environment and economy— all together—is pivotal to achieve the sustainable development goals in Africa.

I. Introduction

Environment and health joint interventions are pivotal to development outcomes, touching the lives of all populations. These include provision of safe drinking-water and sanitation, clean air to breathe, safe food to eat, and housing as well as safe workplaces and vector control. The determinants of health are influenced by a host of conditions including: industrialization, urbanization, agriculture and food production, deforestation, education, employment and access to health-care services and population growth. All of these determinants of health outcomes are diversely affected by climate change.

The determinants remain critical for the protection of public health and the integrity of ecosystems. African governments therefore recognized and committed to address the interlinked challenges of health and environment through the adoption of the Libreville Declaration. They created the Health and Environment Strategic Alliance (HESA) as the platform for strengthening linkages in countries. It is now 10 years since the endorsement of the landmark framework. While progress has been made to implement the 11 agreed priorities, the scale of investment in preventive environment and health interlinked services lags behind significantly, compared to the needs in countries.

Consequently, the burden of disease attributed to the environment as well as the costs of degraded ecosystems remains significant, undermining the achievement of the Sustainable Development Goals. In the Region, WHO estimated that over a quarter of premature deaths and sickness is attributable to unhealthy environments. This exacerbates the already costly and double burden of communicable and noncommunicable diseases saddling health care systems in the Region. This is further compounded by the increased frequency of reported public health events in the Region, which in 2017 totalled 152 against an average of 100 per year (WHO, 2018f).

The economic costs - the explicit and implicit costs - of policy inertia remain invisible, even though the global burden of disease is grim and headline-grabbing. The inefficiencies of continuing to pursue a 'business as usual' approach of 'economic growth now and clean up later' are often not reflected in national development planning processes and overseas development assistance. The contributions of environment and health joint interventions to economic development of countries and achievement of the sustainable development agendas are underleveraged. In fact, economic data hide, undercount and externalize the costs of underinvestment. Information on economic benefits of actions remains fragmented and of limited quality to transform incentives of decision-makers in ways that support greater investment in critical health-enhancing preventive environment interventions. To stint on pollution control means spending more on hospitals down the road, for example. The guiding hypothesis for the report is that investment to prevent diseases upstream at their source, saves money, saves lives and creates wealth into the future.

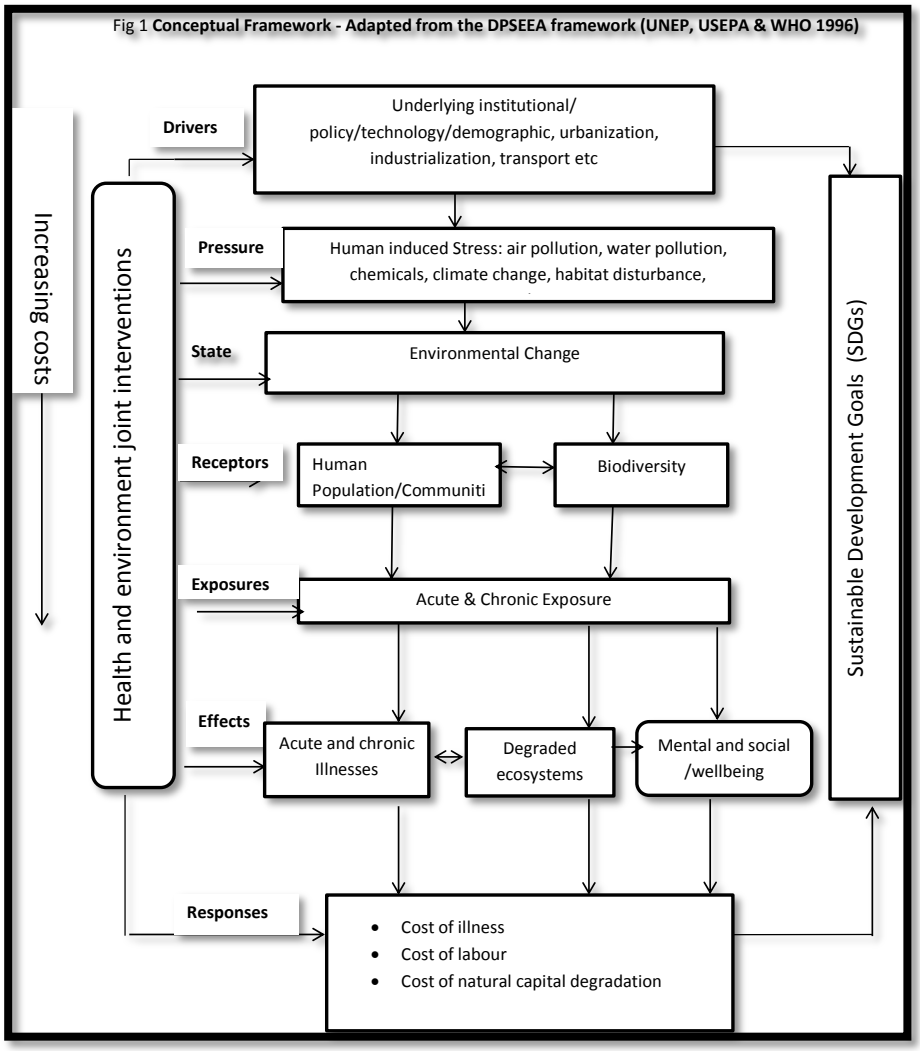
The paper builds on findings from existing literature and seeks to raise political awareness for action. It aims to evaluate the economic benefits and costs of inaction along the causal chain of environment-health-disease. It also seeks to analyse the potential efficiency and effectiveness gains of health and environment joint interventions to the economy. The target audiences are policy planners at macroeconomic decision-making level. In the spirit of intersectoral collaboration, the paper will contribute to the knowledge base for health and environment ministries to reach out strategically to finance, economy and planning ministries, for greater resource mobilization. The report assumes that a greater understanding and transparency of costs could create supportive politics and efficient policies for the effective implementation of the 11 priority actions of the Libreville Declaration in countries. The methodology used is qualitative and limited to a desk review.

The report is organized as follows: Section I introduces the report; Section II conceptualizes the costs of inaction; Section III analyses the different dimensions of costs; Section IV reviews the status of mainstreaming health and environment joint interventions; and Section V presents the conclusions.

II. Framing the costs of inaction

Primary prevention of environmental risk factors often is cheaper, efficient and effective than treating health effects. The costs of inaction are potential foregone benefits to the economy because of inadequate investment upstream to prevent environmental burden of diseases and ecosystem degradation at their source. The benefits reflect the costs avoided by addressing environmental determinants of health and ecosystem integrity through targeted interventions along the chain of cause and effect as shown in Fig 1. The costs of inaction are the growing and additional burden to economies in particular and sustainable development in general as a result of limited or suboptimal investment in environment and health critical preventive services to protect public health and maintain integrity of ecosystem.

Fig 1 **Conceptual Framework - Adapted from the DPSEEA framework (UNEP, USEPA & WHO 1996)**



The costs are significant, wide-ranging and complex. Inaction includes direct, indirect as well as tangible and intangible costs. The avoidable burden to the economy could be organized into cost of illness linked to the environment, loss of labour productivity and human capital, and depletion of natural capital. The cost of illness is the direct tangible cost of treatment of environment-related diseases in the health care systems. This cost captures the direct cost of hospitalization. It also includes intangible costs like loss of life years and quality of life (DALYs) and deaths. In effect, it is the cost of treating the number of people who fall ill in a year as a result of exposure to environmental hazards. The costs to labour are the indirect effects of hospitalization. It captures the diminished economic productivity from work days lost and income forgone by patients receiving treatment from avoidable diseases. It is also the diminished labour productivity and human capital for persons who are permanently disabled or who die prematurely due to exposure to environmental risk factors. In fact, it is income lost because of ill health and its consequences that prevent populations from

participating meaningfully in economically productive activities. The costs of natural capital depletion capture the economic and social effects of ecosystems degradation. They include financial losses incurred in treating polluted water for agriculture and fisheries as well as the cost of cleaning up toxic wastes.

Estimating the aggregate cost to the economy remains a complex exercise with a host of uncertainties. The costs vary across populations, communities, exposures, diseases, and economies, etc. Quantifying and interpreting the monetized value of benefits and costs require caution. Estimates involve uncertainties in etiological factors, discount rate and inflation, etc. Not all diseases can be quantified and monetized accurately, nor can a degraded ecosystem. Not every cost is captured by markets, for example, aesthetic, recreational and cultural costs incurred as a result of a degraded ecosystem.

It should be noted that the costs of inaction could be a policy choice. It does not necessarily equate to zero investment of policy actions. Often, there are some policies in place. The problem is how optimal they are in the 'business as usual' scenario. In particular, how do the costs of the suboptimal investment compare with the benefits over time and space? The costs of inaction grow over time, reflected partly in expenditure on avoidable chronic illnesses. The costs which could have been averted will add to the unavoidable costs of illnesses attributable to the environment. Not every cost of illness attributable to the environment can be completely eliminated. There are some residual illnesses or costs that may not be entirely prevented through environmental interventions. The unavoidable costs incurred through hospitalization will be further compounded by the growing marginal costs of inaction on the avoidable burden of illness. Time matters. There are some costs that are irreversible. For instance, damage to an ecosystem through accelerated extinction of species.

The interlinked relationships from environmental drivers to health effects as well as harm to ecosystems are complex, too. The cost of inaction varies over time and space as well as domains of interventions along the causal chain: drivers to effect as shown on Figure 1. Investment upstream on interventions to address drivers of environmental change before they become harmful yields the maximum returns and sustainable benefits. The drivers may include economic, political, social and institutional factors. Human activities including urbanization, population growth, transport, industry, agriculture as well as poverty remain important driving forces of environmental change. The driving forces and pressures they exert on the environment occur often outside the health and environment sectors, necessitating intersectoral approaches at all levels of governments for their sustainable management.

The driving forces may result in pressures on the environment. The actual pressure depends on a host of factors and forces from different economic activities including transport, energy, housing, agriculture and resource extraction. The health and environment indicators at this stage may include pollutants and wastes produced by consumption of leaded gasoline and leaded paint, greenhouse gases, DDT, availability of water resources per capita, sewage discharge and toxic wastes, e-waste, etc.

The state is the resultant quality of the environment. Some changes may be complex, affecting the whole ecosystem such as desertification, climate change and pollution. Some may be localized in nature, for example, contamination of local water supply, quality of air and water, etc. Indicators may include pollutant concentration, indoor air pollution levels, levels of pesticide residue in food, lead in air, mercury in water supply, etc.

The receptors are either human populations or biological diversity. The receptors interact with the state of the environment.

Nonetheless, the effects on health, well-being and ecosystems will depend on the level of exposure, time, settings and susceptibility of the receptors as well as social determinants. For instance, pollution level varies from place to place and over time as well as the behaviour of exposed populations. Since diseases

as well as damage to ecosystems are caused by a number of factors, it may be difficult to quantify the effects of one exposure among the many in the environment. Moreover, the receptors may be exposed to a range of pollutants that may not be fully quantified or known. An exposure is usually mediated by multiple pathways. In fact, multiple exposures may result in synergistic effects where the sum is greater than the individual effects. For example, the incidence of lead poisoning is exacerbated by malnutrition (Bithoney, 1986). Indicators may include the proportion of the population living in proximity to the air pollution source, the percentage of the population exposed to indoor air pollution, the proportion of the population with raised lead level in blood, the proportion of the population with access to safe water, the proportion with inadequate sanitation, population working on artisanal small-scale gold mining sites.

The health effects are complex. A long time may elapse between exposure and adverse health effects or damage to ecosystems. The ill health may be acute or chronic. Many factors influence the extent to which an environmental hazard translates into actual illness or premature death. It may depend on dose, duration, genetics and health care systems. Indicators include outbreaks of foodborne diseases, number of deaths attributable to poisonings, morbidity attributed to COPD, morbidity attributable to diarrhoea, etc.

Health and environment joint interventions are primarily preventive and address root causes. Fortunately, they are by nature far more affordable than the absence of action. In fact, a penny saved by avoiding investment in prevention along the causal chain is a pound spent downstream to treat diseases or rehabilitate damaged ecosystems. A cohesive environmental health system monitors and measures diseases, hazards, exposures, and health outcomes, while it can also collect data over time and present real-time data to quickly respond to emergencies and identify problems for programme planning.

The Libreville Declaration outlined 11 priority interventions to address the interlinked environment and health challenges in Africa in ways that are comprehensive, systematic and build institutions effectively. Some of the priority interventions include the establishment of health and environment strategic alliances as a basis for joint action and planning, achieving increased and balanced allocation of domestic resources for intersectoral health and environment programmes, developing national environmental health strategies, establishing integrated infrastructure for environment and health surveillance systems, developing partnerships and increased resource mobilization for joint interventions.

Reducing the costs of inaction by increasing investment upstream along the causal chain is critical to sustainable development. Health and environment joint interventions cut across all the three pillars of sustainable development: environment, society and the economy. The economic benefits of investment will catalyse efforts to achieve all the 17 SDGs.

The SDGs set out a comprehensive agenda to advance health, well-being and environmental sustainability. SDG 3, more specifically, targets healthy lives and the promotion of well-being. Achieving the Goal means more than just improving health care. It involves actions on key economic sectors, settings where people work, to address in a cost-effective manner the drivers of environmental change and ecosystems degradation. The areas include clean energy (SDG 7), climate change (SDG 13) hunger (SDG 2), decent work and economic growth (SDG 8), industry and infrastructure (SDG 9), sustainable cities (SDG 11), responsible consumption (SDG 12), life below water (SDG 14) and life on land (SDG 15).

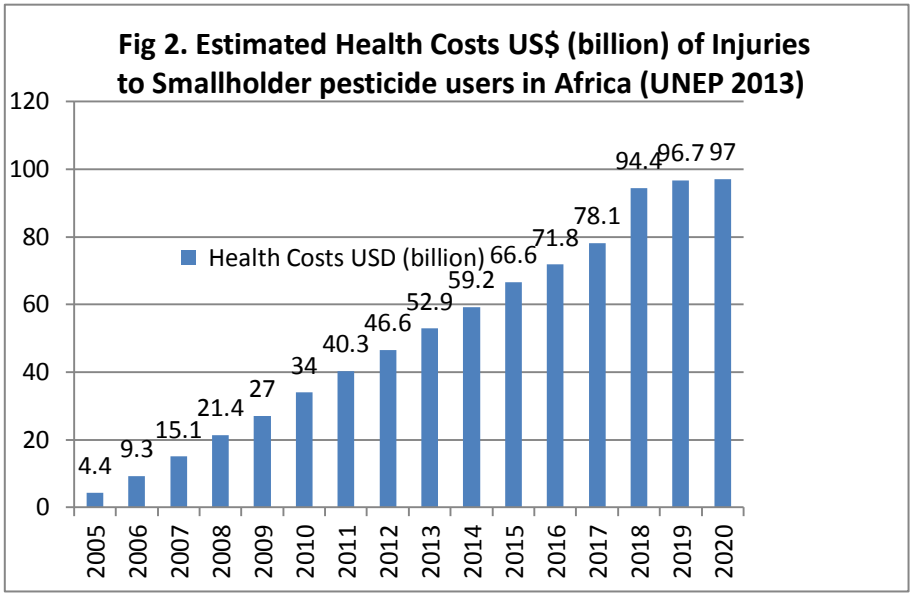
III. Economic burden of policy inaction

Premature deaths, diseases and degraded ecosystems caused or exacerbated by environmental drivers impose a significant burden on economies in Africa. The full costs of inaction are often hidden, undercounted and externalized. While it is difficult to put an exact figure on the range of costs, they add up significantly in the form of inefficiencies: costs of illness, labour productivity and human capital losses and depletion of the stock of natural capital. The economic benefits of taking action to control or prevent environment-related diseases and ecosystems harm upstream, outweigh the costs incurred downstream - treating diseases and restoring degraded ecosystems (The Lancet Commission, 2018).

a. Cost of illness

Overall health expenditure is rising faster in Africa than GDP growth, underscoring the scope for prevention. While significant progress has been made to reduce the burden of diseases in the Region over the past decade, addressing the risk factors influencing healthy life remains a key challenge to achieving universal health coverage in countries (WHO, 2018). Approximately 24% of the causes of ill health in Africa are attributable to the environment, compared to 21.8% for the rest of the world. The top risk factors are household air pollution, sanitation, ambient air pollution, water and occupational risks (World Bank, 2014a). In fact, on a per capita basis, the burden of deaths attributable to the environment is highest in Africa (WHO, 2016). The World Bank reckons that in the past two decades, total health expenditure per capita in Africa grew faster than GDP; 5% per year compared to 2% for GDP (World Bank, 2016b). The gap is projected to widen further, with rising levels of per capita health expenditure by 2030 (Dieleman, 2018). According to a recent pan-African survey, the majority of citizens are not willing to pay more taxes or user fees for health care even if service quality is improved, underscoring further the need for more efficient ways to reduce growing costs, including prevention (AFRO Barometer, 2016).

Government spending has however stagnated or increased very slowly in many countries against the scale needed to meet the SDGs. A significant part of health-care spending is out-of-pocket and on avoidable morbidities, crowding out already limited resources away from essential and basic health care and programmes. In some countries, malaria alone may account for as much as 40% of public health expenditure, 30% to 50% of inpatient admissions, and up to 50% of outpatient visits (RBM, 2009). Malaria alone in one study in Nigeria represents about 25% of hospital facility cost (Ezenduka & Falleiros, 2017). It has been estimated that treating preventable infectious diarrhoeal diseases consumes 12% of health care budgets (Alemu, 2017). Ambient air pollution is associated with increased hospital admissions and deaths from strokes (Galimanis, et al, 2009). Exposures to household air pollution remains the highest in the world in terms of their burden to health care systems, with lower respiratory infections



ranking as the number one killer in the Region, for which chronic obstructive pulmonary disease (COPD) is the common underlying risk factor(WHO 2018).

Pollution footprints continue to devastate ecosystems. There are over 50 000 tons of obsolete pesticides stockpiled across Africa, exposing communities and ecosystems to significant public health and environmental risks (World Bank, 2014). Many of them contain toxic chemicals such as Persistent Organic Pollutants (POPs) including DDT that bio-accumulate in living organisms and ecosystems resulting in health impacts. Africa generates over 174 million tons of solid wastes a year, but only collects 44% of the trash from littering in the environment, compared to 77% globally. Waste generation is growing faster than in any other Region and projected to triple by 2050 (World Bank , 2018).

Health costs from disruption of ecosystems could reach catastrophic levels. African countries are particularly vulnerable to epidemics and emergencies caused by diseases of animal and wildlife origins. At any given time, over 40 events are being monitored (WHO, 2018). The Ebola virus outbreak of 2014-2015 remains a costly reminder of the economic burden of underinvesting in global health security and the potential savings from strengthening systems for surveillance of health and environment interlinkages in countries. Over 11 316 deaths were recorded from Ebola during the 2014 epidemic in West Africa (WHO, 2016). In Sierra Leone, the outbreak disrupted the health care system, decreasing provision of essential health services by 23% (CDC, 2016). In Africa, it has been shown that a 14.7 million Euros investment in improvements to animal health through controlling contagious bovine pleuro-pneumonia will save 30 million Euros annually in losses from mortality and morbidity, leading to a net benefit of 30 million Euros annually (World Bank, 2012)**.** Yet only 22 of the 47 countries in the WHO African Region have completed joint external evaluations of their readiness to deal with public health emergencies of national and international concern, as required by the International Health Regulations (WHO, 2018).

The costs of underinvestment are catastrophic and are often borne disproportionately by vulnerable populations. The poor, women and children are very much exposed, with over 14 million new cases of health care impoverishment recorded yearly in countries (WHO, 2018). The costs of treatment of a cholera episode in Mozambique, for example, are estimated at US$ 47.2. This is more than 50% of the average monthly wage. One study showed that more than 27% of the patients borrowed to pay for their treatments, exacerbating even further their suffering and even impoverishing them with catastrophic out–of-pocket expenditure (Poulos, 2012). In children, early-life exposure to neurotoxic pollutants can impair their cognitive function and diminish their ability to concentrate (The Lancet Commission 2018). Domestic water carrying and firewood collection mainly performed by women and children in Africa, has also been related to spinal pain (Geere et al, 2010).

Preventing the risk factors at their origin saves money. While data is limited in the Region, the return on investment could be very significant. For every dollar spent on improved water supply services, the return on investment is about US$ 2 - over 100% (The Lancet Commission , 2018). UNEP estimates that injuries due to pesticide poisoning cost Africa US$ 52.9 billion in 2013. Without effective systems for the sound management of chemicals, the cost is projected to reach US$ 97 billion by 2020; see Fig 2 (UNEP, 2013). In Uganda, the national cost to develop a sound chemical management system including strengthening of the legal framework was estimated at (US$?) 17.5 million between the period 2010 to 2025 compared to the cost of injury which amounted to US$ 230 million in 2005 alone (NEMA, 2010). A study in Zambia showed that the implementation of integrated vector management substantially reduced the incidence of malaria including mortality and morbidity from 2003 to 2007 (Chanda, et al., 2008). In fact, over the long term, prevention of malaria through environmental management is cost effective. A control study on the cost-effectiveness of IVM interventions in Burkina Faso showed that the benefit and cost of actions was in a ratio of 2:1. In fact, average costs per household that received interventions was estimated at 2.4 Euros per year, contrasting with the 3.7 Euros spent monthly by households that did not

receive interventions to buy mosquito coils and insecticide sprays, which have their own limitations in terms of effectiveness (Oleskovmand, et al 2011).

Investment in environment and health information services yields sound returns on prevention. While climate variability and change continue to exacerbate disease outbreaks, investment in climate information services to manage health risks is cost effective. For instance, the use of climate information services to predict miningitis outbreaks in Burkina Faso has been shown to be cost effective with a ratio of US$ 23 per case averted and US$ 98 per death (Somda et al, 2010). The averted cost can also be in terms of preventing climate-related damages to health care systems. The World Bank reckoned that the costs of the 2008 cyclone landfalls on the health sector in Madagascar averaged US$ 10.3 million (World Bank , 2018). The global additional costs associated with three climate change-related diseases such as malaria, diarrhoea and malnutrition are projected to reach US$ 4-12 billion by 2030 and would fall disproportionately on African countries (Ebi, 2008).

Health is an important component of human capital (World Bank, 2018). Examples from within and outside the Region make the case even stronger. A study in the United States shows that for every US$ 1 spent to reduce lead hazards, the returns are up to 220 times greater, making it one of the single most cost-beneficial medical or public health interventions (Gould, 2009). And for leaded paint in particular, a study showed that for every dollar invested in prevention, the return is about US$ 12 to 155 for households (NEHPC, 2016). South Africa and other countries which have enforceable regulations on lead-based paints have successfully reduced the level of lead in children (WHO, 2010). Furthermore, a detailed analysis of the cost-effectiveness of providing child-resistant containers in 2006 showed that, as a means of preventing paraffin poisoning among children in South Africa, interventions had a cost-effectiveness ratio of US$ 3329 per death averted (Norton et al 2006).

Poison control facilities, pivotal institutions for integrated prevention and management of exposures to toxic chemicals, remain highly cost-effective investments in strengthening environment and health interlinkages. Patients exposed to chemicals low in toxicity will most likely present with minor or no symptoms and health sequelae. Unfortunately, and most often, these patients do not call a Poison Information Centre (PIC) for advice but rather seek direct medical assistance from a health care facility. This action contributes to unnecessary costs for the patient, the government and donors.

For example, thanks to the Centre Antipoison CAP in Algeria, only 27.2% of all the 3742 cases that were reported in 2017 by telephone to the centre were serious enough to be referred to hospitals (WHO, 2018d). The majority of the cases were of minor symptoms, with follow-up observations at home, thereby reducing avoidable costs to patients and the health care systems as well as saving limited clinical services for unavoidable care and treatment. In fact, in economic terms, a 2012 study of the cost benefits of poison control centres in the US showed a near 1:14 benefit for each dollar spent, amounting to an estimated saving of US$ 1.8 billion per year, as a result of avoided costs of hospitalization (Lewin Group , 2012) Yet, a self-assessment survey by AFRO in 2014 revealed that only 25% of Member States had poison control centres. Further, only 32% had developed chemical events surveillance capacity consistent with the IHR. In addition, only 38% of countries have legislation and policies on the sound management of chemicals (WHO, 2014).

b. Economic Productivity

Environment-related diseases undermine productivity, too. Besides the direct costs on hospitalization, the indirect economic and financial burden through income and time lost due to illness remains very significant. Access to basic sanitation presents clearly the wider dimensions of the costs of inaction. A study of 18 countries in Africa showed that about US$ 5.5 billion is lost each year including productivity losses, due to time spent practising open defecation (World Bank 2012a). Open defecation, practised by

the over 114 million population in the studied countries, accounted for losses of over US$ 2 billion (WSP, 2012). In fact, on average, over 2.5 days per capita are lost each year in finding private locations to defecate (World Bank 2012a). Put together with the costs of illness due to water-related diseases, the report estimated that the annual economic losses could approximate 1-2% of GDP. The true costs could even be higher if other costs are taken into consideration, such as tourism and trade. Meanwhile, a cost-benefit analysis of pesticide use in cotton plantations and the incidence of accidental acute poisonings in Zambia showed that over US$ 2.1 million is lost from sickness, 51% of which is foregone income through lost work days (Bwalya, 2010).

Health effects can last over a lifetime, with long-term labour market implications. For example, a long-term follow-up study of 144 children exposed to lead showed that elevated levels of blood lead concentration at age 11 years was associated with lower cognitive function and reduced socioeconomic status at age 38 years, with diminished intelligent quotient and downward social mobility (The Lancet Commission, 2018). Yearly, the cost of lead poisoning averages US$ 134.7 billion worth of economic losses, which approximates US$ 135 per capita (Attina & Trasande, 2013), compared to the US$ 297 per capita spent on health care services in the WHO African Region (WHO, 2018).

The costs extend into the wider economy, then often captured in labour statistics. The channels of transmission may include demand and supply sides of the economy. Meanwhile, the impact could be temporary or lasting. In Mozambique, for example, a model simulating the macroeconomic impacts of a severe cholera outbreak, projected that consumer spending resulting from lost tourist revenues could reach up to US$ 114 million over a two-year period (Oxford Economics, 2010). The impact on the labour market as a whole could cost up to 56 000 jobs. The report estimates that the overall costs to the economy could range between 2% and 2.5% of GDP in the first year following the outbreak and approximate US$ 252 million (Oxford Economics, 2010). For some sectors, like tourism, the impact may be temporary. For others such as food exports, the costs could be lasting.

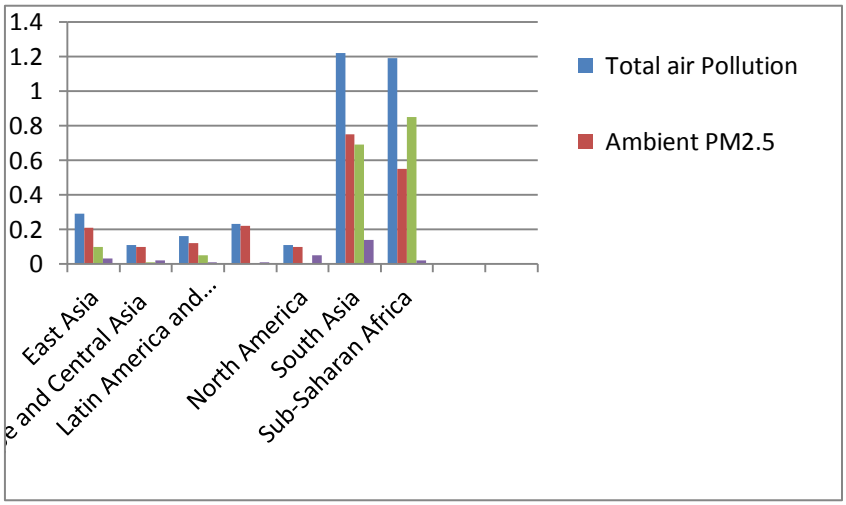


Figure 3 Annual Labor Income Losses from Air Pollution by Regions 2015. Source: World Bank, 2016

Air pollution, the single largest environmental risk factor to public health, imposes significant costs on productivity. The OECD has developed a model for estimating the market-based costs of outdoor air pollution that takes into account lost labour productivity, increased expenditure on health and diminished agricultural yields (OECD, 2016). In fact, a study in the US confirms the significant link between air pollution and labour productivity, showing that a 10 ppb change in average ozone exposure results in a significant and robust 5.5% change in agricultural worker productivity (Graff & Neidell, 2011). The WHO recently estimated that avoidable deaths due to air pollution account for over 981 000 deaths yearly in Africa. The World Bank reckons that the economic cost to the continent is about 3.8% in GDP growth, approximating US$ 114 billion a year. Again, the cost is expected to grow faster than GDP, if nothing else is done (World Bank, 2016a). The report further reckons that the costs of labour foregone by

exposures to PM2.5 particulate matter in Africa is about US$ 6.8 billion, and on a per capita basis, the highest in the world (see Figure 3).

Pollution affects the competiveness of urban spaces. How liveable cities are, increasingly is becoming a measure of economic competiveness - an indicator of attractiveness to employers and job seekers. A wide range of indices have emerged to compare cities on a range of economic indicators including severity of pollution. The Global Liveability Index of the Economist Intelligence Unit includes healthy environments as a measure of urban competitiveness. In its recent ranking of the 10 least liveable cities in the world, six are from Africa (EIU, 2018). WHO maintains an ambient air quality database that compiles data (PM10, and PM2.5) for 108 countries and 4300 cities, some of which are in Africa. In fact, in a recent survey, over 45% of 27 countries in the WHO Africa Region do not have ambient air pollution standards (Joss et al, 2017). The regional share represents the biggest across regions. And for those with standards, guidelines are limited to only a few pollutants, for example, 36% of the countries surveyed have standards in one and more pollutants. Furthermore, most standards are set at the upper end, weaker than those proposed by WHO guidelines.

Controlling pollution is cost effective. The economic benefits in terms of efficiency and productivity gains often significantly outweigh the costs. The Clean Air Act introduced by the United States Environmental Protection Agency to limit air pollution from 2004 and 2014, generated benefits between US$ 157 billion and US$ 777 billion (2010 prices) (The Lancet Commission, 2018). Costs of implementation were estimated to be in the range of US$ 37 billion and US$ 44 billion, with benefits outweighing costs by a ratio of at least 4 to 1 (World Bank, 2016). Of the overall benefits that accrued from pollution control, 93% was attributed to the EPA Clean Air Act (UNEP, 2018).

Meanwhile, improved sanitation investments yield high economic returns, too. For example, for every US$ 1 invested in sanitation, WHO estimates a nearly six-fold return as measured by lower health costs, increased productivity and fewer premature deaths (WHO, 2018c). A study of 18 countries in Africa, estimated that eliminating open defecation will require 23 million new toilets to be built and used (WSP 2012). However, a pour-and-flush toilet may require on average US$ 40-260 (Satterthwaite & McGranahan, 2005). A back-of-the-envelope calculation will approximate about US$ 920 million to US$ 6 billion in terms of aggregate costs. While the upfront cost may seem high, when compared to the annual losses of US$ 2 billion in health and productivity loses due to open defecation, the return on investment on improved sanitation services is very high over time.

Environmental management approaches yield significant economic payoffs. For instance, a longitudinal study, evaluating the effectiveness of IVM interventions for malaria control in the Zambian copperbelt between 1930 and 1950, reckoned that the colonial programme yielded enormous benefits in terms of productivity to the mineral sector. In fact, the studies estimated that over US$ 7.5 billion of additional revenue was saved due to averted illness costs and reduced absenteeism of mine workers (Utzinger, et al 2002).

c. Natural Capital Depletion

Assessing wealth through Gross Domestic Product (GDP), the aggregate national economic output, alone, remains insufficient as an accurate measure of viability of an economy. In fact, the true costs of depleting natural capital, an essential component of wealth for sustainable development, is rarely reflected or captured in economic statistics, including GDP. Development priorities in countries continue to put a greater premium on other forms of capital: financial, manufactured, social and human capital, all at the expense of natural capital. While this may grow the GDP per capita through much needed improved standards of living, it could also take away the wealth available to sustain standards of living into the future. The degradation of ecosystems with its ultimate consequences on public health undermines the capacity of the assets base to continue to produce wealth in the future.

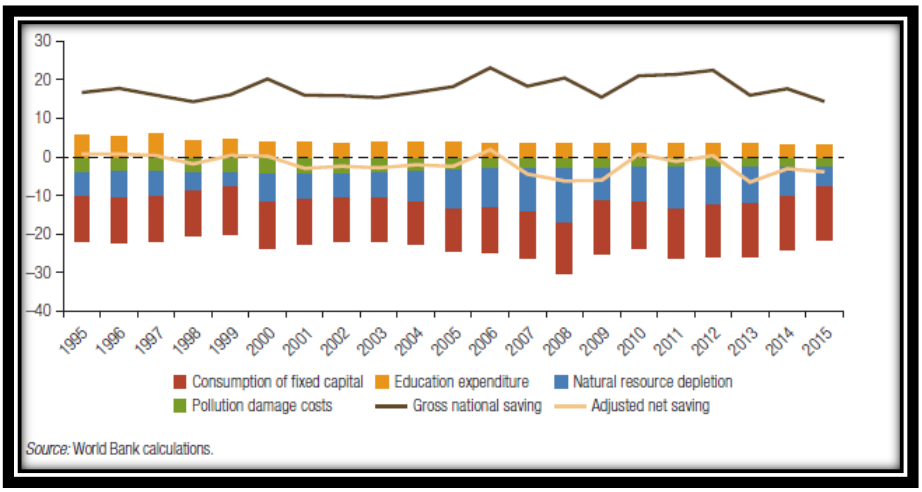


Figure 4: Trends in Adjusted Net Saving for sub-Saharan Africa 1995-2015

Africa is abundantly rich in natural resources - renewable and non-renewable. The Region is home to the world's largest arable landmass; second largest and longest rivers (the Nile and the Congo); and its second largest tropical forest (ECA, 2016). The total added value of its fisheries and aquaculture sector alone is estimated at US$ 24 billion ((AfDB, 2016). In addition, about 30% of all global mineral reserves are found in Africa. The continent's proven oil reserves constitute 8% of the world's stock and those of natural gas amount to 7%. Minerals account for an average of 70% of total African exports and about 28% of gross domestic product. Africa's 63 transboundary river basins cover 64% of the continent's land area, providing home to 77 % of the Region's population. In order to manage the nature and dynamics of sharing an important resource such as water among countries, there are 94 international water agreements in Africa (ECA, 2015).

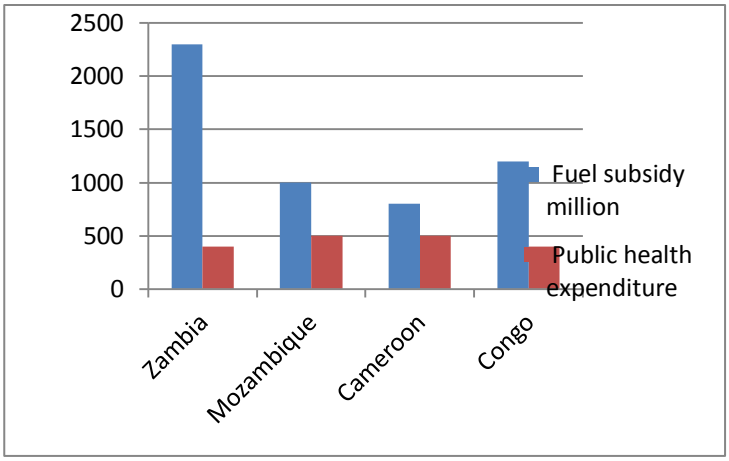


Figure 5 Fuel subsidies versus health care expenditure in selected countries (ECA, 2016)

Yet, many African countries are doing poorly in investing the wealth into the future. In a recent Yale University Index measuring ecosystems vitality versus environmental performance, African countries performed poorly (Yale University , 2018). The adjusted net savings, the portion of national income that reflects depletion of natural capital and damage costs of pollution, continue on a negative trend (World

Bank, 2018a). The World Bank reckons that Gross National Income has averaged 20% over the past decades (see Figure 4). However, when depreciation and depletion of stocks of natural capital as well as costs of pollution including investment in human capital and consumption are all counted, it turns negative. For example, land use changes are especially high in sub-Saharan Africa, accounting for 26% of the total global costs of land degradation. In fact, economic losses from land use changes amount to about 7% of Africa's GDP - the highest level in the world (Nkonya, et al., 2015).

The picture masks differences across countries. Resource-rich countries fare more poorly than resource-poor countries in creating wealth and saving natural capital for the future. A key issue in resource-rich countries is the run-away pressure on public finances through significant and costly subsidies to fossil fuels, which are inefficient, often regressive and harmful to the environment and public health. In 2015, the amount of fossil fuel subsidies distributed by sub-Saharan African countries was estimated at US$ 26 billion, down from US$ 32 billion in 2013 due to reform efforts and the falling price of fossil fuels (ODI, 2015). In fact, the IMF estimates that phasing out subsidies to fossil fuels would lead to a 23% reduction in climate-warming gases as well as a 63% decrease in worldwide deaths from outdoor fossil fuel air pollution (IMF, 2014).

Fuel subsidies, often poorly designed, benefit the rich more than the poor. While the case for ensuring access to modern energy services for all is recognized as a global priority, over 40% of subsidies on energy in Africa is captured by the richest 20%, compared to 8% for the bottom 20% of the population (Whitley & Laurie, 2015.). In fact, the IEA estimates that ensuring universal access to cleaner, health-friendly cooking fuels by 2030 would cost US$ 1.7 billion a year. This is far less than the US$ 26 billion spent yearly on subsidizing climate warming fuels by African countries. The IEA further projects that delivering universal energy access in sub-Saharan Africa requires an additional US$ 28 billion in annual investment over and above the level in the New Policies Scenario (IEA, 2017). The African Development Bank, furthermore, estimates that the cost of climate change adaptation for Africa is about US$ 20-30 billion a year over the next 20 years. In many resource-endowed countries, the amount of subsidies allocated to climate-warming fuels far exceeds expenditure on health care. See Figure 5 (ECA, 2016).

Making economies green saves money. Sustainable management of natural resources remains critical not only to protect ecosystems and public health but more so to enhance the assets base, transforming and diversifying economies in ways that make them more efficient and inclusive. Green investment to shift the economy away from fossil fuel dependency to renewable energies is critical. African countries are taking slow but promising steps. Although African energy intensity fell from 1990 to 2013, it remains the highest globally, at 2.6 times the world average in 1990 and 2.7 times the world average in 2013, which suggests that Africa can save huge amounts of energy by introducing more energy-efficient technologies (IEA, 2015). Yet in Kenya, for example, a recent modelling of the path towards a green economy showed that decoupling economic growth from resource intensity including carbon could add an additional 2% of GDP growth (ECA, 2016).

Diversifying the structures of economies remains a key development priority for African governments. Nonetheless, investment in health and environment linkages is a catalyst to innovate and transform economies in ways that are greener and sustainable. Current market signals have not been encouraging to resource-rich countries. The recent collapse of commodity prices and its financial implications underscore the need for diversifying the assets base of economies beyond over-dependence on depleting their stock of natural capital. Investment in health and environment provides the catalytic impetus for structural transformation, shifting economies away from carbon-based assets, towards investment in human and manufactured capital. In the context of the global climate goals, without diversification, African economies risk being burdened with stocks of stranded carbon assets. In fact, to achieve the climate target of 2 degrees, it is estimated that Africa will have to leave about 26% of its oil unburned, under the ground (Ekins, 2015). In fact, the unburnable carbon quantifies the disconnect between the current value of the

listed equity of global fossil fuel producers and their potential commercialization under a strict carbon budget constraint.

Prioritizing health-enhancing ecosystem services is an emerging and innovative source of income to countries. Market-based mechanisms are offering payments for climate stabilizing services to forest-rich countries, through avoiding/reducing emissions from deforestation and degradation (REDD+). REDD+ as a pioneering concept, works to change cost and benefits of land use investments in favour of valuing standing forests: more as stocks of stored carbon rather than wealth in the form of timber and potential farmlands. The total market for REDD + initiatives is estimated at US$ 17-33 billion per year (Eliasch, 2008). International public finance currently accounts for around US$ 3 billion per annum, including pledges made in the context of the UNFCCC as well as funding through other channels, such as the Global Environment Facility (GEF) and the Convention on Biological Diversity (Parker *et al*. 2012).

Besides the green economy, investment in health-supporting environmental actions remains key and pivotal to leveraging the full potential of the blue economy too. The health and environment strategic alliance provides a strategic framework for achieving Africa's development priorities. Sustainably managing the wealth of the seas and oceans is at the centre of the AU's Agenda 2063 which recognizes it as a catalyst for socioeconomic transformation. The potential for a blue economy is enormous. Globally, sales of marine-based pharmaceutical products amounted to US$ 2.4 billion in 2002 including cancer treatment compounds, antibiotics and antivirals, which were further estimated at about US$ 2.4 billion (ECA, 2015). Overall, the cost of uncollected plastics to marine health is estimated at US$ 13 billion a year to the world economy (UNEP, 2014).

IV. **Mainstreaming health and environment in development planning**

Mainstreaming environment and health interlinked priorities in development planning is pivotal to effectively minimize the costs of inaction in ways that catalyse the achievement of the SDGs in countries. It entails effectively integrating agreed priorities in planning and financial instruments as well as institutional arrangements and projects in ways that save money, create conditions for healthier lives, and sustain the foundation of wealth for the future.

a. National Development Planning

The Libreville Declaration has laid down a framework for national planning to address the interlinked challenges of environment and health in countries. The Declaration outlined 11 priority actions for countries including strategic, policy and institutional, operational, financial, research and monitoring and evaluation actions. Over the past decade, countries have made progress overall in implementing the agreed priorities.[1]

However, implementation remains patchy and weak on some key commitments. While there have been some projects and programmes, significant more efforts are needed to bring them together in an overarching focused strategy for strengthening environment and health interlinkages. In a recent self-assessment survey, only 11 countries reported that they have a national environmental health policy.[2] While most countries have integrated disease surveillance systems in place, very few have effectively linked them with their national environment surveillance systems. The lack of reliable routine data has been identified as one of the main overarching barriers for effective preventive public health action at country level. For example, according to the 2017 WHO World Health Statistics report, of the 194 World

[1] IMCHE3 (2018) **THE LIBREVILLE DECLARATION ON HEALTH AND ENVIRONMENT IN AFRICA:** ***10 Years On,*** *2008 – 2018.*

Health Organization (WHO) Member States, 42% have very low quality data or no data to report on how many of their citizens died in a given year, and what they died from (WHO, 2017).

Data that is available is often based on estimates from models, which remain limited for making national and context-based decisions on strategies to curb mortality and morbidity attributable to environmental determinants. Estimation is a temporary solution. In countries where there are no data, or the data are of poor quality, governments need to establish surveillance systems. Without an effective surveillance system, governments will not be able to determine who is affected in order to target their interventions, and they cannot measure the impact of their interventions (Bartolomeos, 2018).

The evaluation reports showed inadequate investment in joint interventions by the health and environment ministries. Funding remains sector-oriented, with most of the funds allocated to curative services in the health sector and to reactive and restorative programmes in the environment sector.

b. International Development Financing

The benefits of investments remain significant. However, international development finance has barely caught up to the scale of the challenge. On a per capita basis, overall development aid approximates US$ 40 (OECD, 2018), compared with US$ 135 per capita lost from lead poisoning in Africa. Annual global climate finance flows approximate US$ 331 billion out of which sub-Saharan Africa gets only about 4%.

While progress has been made with the creation of a global financial facility to address specific environmental challenges, allocation of resources has barely targeted environment and health interlinked priorities. For the over two dozen projects approved for Africa by the Green Climate Fund, only one has a specific component devoted to environment and health interlinked challenges (GCF, 2018).

Prioritization of environment and health interlinked challenges by multilateral development institutions remains suboptimal. In a recent internal review, the World Bank Group concludes that the magnitude of funding has not kept pace with the scale of pollution and health in countries. The report noted that while the Bank has provided sustained financing for wastewater infrastructure, it has consistently "missed opportunities to fight indoor and outdoor air pollution, which are in fact responsible for the highest share of deaths caused by pollution'' (World Bank, 2018b P Vii). According to the report, pollution priorities are often not reflected in Country Strategies even in countries with exceptional levels of pollution-related deaths.

c. Innovative Financing Instruments

Many countries are exploring and adopting innovative financing approaches including tapping into domestic and international financial markets. Green bonds for example, have been issued in three African countries to support health-enhancing environmental projects: South Africa, Nigeria and Kenya. The bonds have been issued by governments and the private sector. In South Africa, the City of Cape Town issued a highly subscribed US$ 84 million green bond, for which investors offered four times the amount needed to finance the city's water infrastructure. The maturity of the bond is over 10 years at an interest rate of 10.17% (Environmental Finance, 2018). Nigeria also recently issued a US$ 29 million green bond to invest in local solar and forest projects (Financial Times, 2018). The Federal Ministry of Environment has also developed guidelines on green bonds.

V. Conclusion

The Costs of Inaction report presents readily available, quantified and monetized data on the economic impacts of the suboptimal investment in environment and health interlinked priorities for achieving the Sustainable Development Goals in Africa.

It presents selected costs information along the entire causal chain of environment-health-disease, in view of raising political awareness of the economic benefits and effectively stimulating demand for scaled-up investment in critical environment and health services in countries.

The paper conceptualizes three dimensions of costs associated with environmental determinants of ill health, which are often undercounted, externalized and hidden in economic statistics: cost of illness, loss of productivity and depletion of natural capital.

While information remains patchy, incomplete and in many cases underestimated, the available data demonstrate the economic benefits of managing environmental determinants upstream, before they become costly and a growing burden on healthcare systems.

Despite the growing economic, social and environmental costs, governments and development partners continue to neglect environment and health interlinked priorities in development planning and implementation, with adverse implications for the achievement of development goals.

The report assumes that a greater understanding and transparency of the costs will make for supportive politics and better policies in countries, which are key to the effective implementation of the 11 priority actions of the Libreville Declaration.

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