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New and Emerging Environmental Threats to Human Health

Executive Summary

Whereas Africa continues to cope with traditional environmental risk factors to human health, the continent, in addition, now has to deal with new and emerging environmental challenges to public health, all in a context of strained health systems. Emerging issues are represented *inter alia* by persistent organic pollutants, electronic waste, radiation, new occupational risks, and climate change. Over the past 10 years, frequent outbreaks of emerging and re-emerging infectious diseases and mosquito-borne diseases have occurred in Africa. Electric and electronic waste (e-waste) is a fast-growing concern. There have been significant radiation incidents reported, and new and more toxic substances (dioxins, furans and heavy metals) are creating environmental and health problems and new occupational risks in Africa. The management of hazardous wastes must focus on environmentally sound treatment and/or long-term storage. A renewed and stronger commitment to the implementation of the Stockholm Convention on Persistent Organic Pollutants is needed. In Africa, decision-makers have not always been made aware of new or emerging environmental risks factors, due partly to insufficient environmental monitoring programmes. The awareness of the general public on specific risk factors has also remained low. Many African countries have developed emergency preparedness and response plans in the context of humanitarian responses to crises, with components that address outbreaks of infectious diseases. However, the management of new and emerging environmental risks factors has not been properly addressed. Governments may wish to consider including in their relevant activities the monitoring of new and emerging environmental threats; reviewing their emergency preparedness plans to ensure that the management of new or emerging environmental risks factors has been adequately addressed; developing and implementing awareness-raising campaigns on the most important risks factors; and undertaking community sensitization and education.

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Acronyms and Abbreviations

DDT	Dichlorodiphenyltrichloroethane
E-waste	Electric and electronic waste
IARC	International Agency for Research on Cancer
PCB	Polychlorinated biphenyl
POPs	Persistent organic pollutants
Ir	Iridium (atomic number 77)

Background

1. While Africa has to cope with traditional environmental risk factors to human health, is also has to face new and emerging environmental challenges to public health, all in a context of strained health systems. Climate change, which drives the epidemiological transition observed in emerging and reemerging infectious diseases, is only one of such threats. Other emerging issues include persistent organic pollutants, electronic waste, radiation, and new occupational risks.
2. New emerging environmental threats to the environment and human health may arise for a diversity of reasons. For instance, new products and materials manufactured through bio- and nanotechnologies may bring benefits, but also carry unanticipated risks to human health and the environment. There is growing scientific evidence of the risks from low-dose exposure to chemicals at certain vulnerable life stages, increasing levels of industrial effluents, new chemicals, changing ecosystems, and climate change. The publication of new scientific findings leads to a re-evaluation of risks. What is regarded as a new threat in one region of the world may not be so in another, and information sharing, using agreed and harmonized tools for assessment, is prerequisite to fully understanding the risks and applying preventive strategies successfully.
3. Over the past 10 years, frequent outbreaks of emerging and re-emerging infectious diseases have occurred in Africa, outbreaks characterized by high mortality rates. The most important ones have been Ebola, Marburg virus, and tuberculosis. The geographical distribution of mosquito-borne diseases seems to be expanding, as seen from the spread of the West Nile virus, Rift Valley fever, yellow fever and chikungunya, which have affected severely many African countries over the past 3 to 4 years. Avian influenza has also reached Africa.
4. Electric and electronic waste (e-waste) is a fast-growing concern. Whereas there is increasing demand for consumer electronics, the materials used in the manufacture of computers and similar devices may contain and release hazardous chemicals when disposed of. These include lead, tin, barium, beryllium, cadmium and mercury, which cause serious damage to the blood, neurological and reproductive systems. In many developing countries electronic devices are collected, manipulated and dismantled to extract valuable materials for resale (Takker, 2006). Dismantling e-waste is a relatively new phenomenon, resulting in individuals exposing themselves to toxic substances. Takker (2006) estimates that in India, without proper recycling, 315 million computers will release 550 million kg of lead, 900,000 kg of cadmium and 180,000 kg of mercury into the environment. In Africa, there is a lack of consolidated data on this new phenomenon.
5. Furthermore, new and even more toxic substances such as polychlorinated dibenzodioxins and dibenzofurans—one of the dioxins has been classified a human carcinogen by IARC—can be generated and released through improper disposal operations. Other practices that may generate high concentrations of dioxins and furans are thermal copper cable recycling, in which the plastic

coated cables are burned in the open air. Whereas the direct exposure to these chemicals may be localized, the entry of these persistent organic pollutants into the human food chain is of major concern.

6. The rapid growth of the information and communication technologies market is focused primarily on new niche products and the replacement of equipment. The replacement of portable computers and mobile telephones represents a fast-growing global problem of e-waste as a municipal waste stream. Uncontrolled burning, disassembly, and disposal of electronics in and next to water sources may cause environmental and health problems for those involved in the handling of the e-waste, or living close to where such waste is discarded.
7. Until recently, radiation incidents have not been a priority concern in Africa. However, in the past two years two incidents of significance have been reported: In August 2006, between Senegal and Côte-d'Ivoire, a radiological incident involving the transportation of gammagraphy equipment containing Ir-192 source; and in November 2007, in the Democratic Republic of Congo, the dumping of mining waste containing radioactive material into a river whose water is used for drinking/household needs by the local population. The extent to which radiological incidents may have occurred in Africa is not known with certainty.
8. Heavy metals such as mercury still have many applications, including their use in measuring devices (such as thermometers), electronic switches, lamps, cosmetics, artisanal mining and other industrial processes. Mercury and lead are used extensively in batteries. As heavy metals cannot be destroyed, the management of waste containing these must focus on environmentally sound long-term storage.
9. The Stockholm Convention on Persistent Organic Pollutants (POPs) came into effect in 2004, banning the use of 12 chemicals including DDT, PCBs, furans and dioxins. There are proposals for the Convention to be extended to cover 11 additional chemicals, some of which are still in use in Africa. African countries and other developing countries have initiated the development of national implementation plans. Their implementation largely depends on technical and financial assistance from developed countries. Four years after the entry into force of the Convention, 45 African countries have become parties with 20 completing the preparation of national implementation plans (<http://www.pops.int>). The full impact of the Convention on the reduction of POPs in African countries remains a challenge, and many POPs, such as DDT, continue to be used. The use of DDT for malaria control doubled in Africa between 2000 and 2006 (WHO, 2007), primarily because suitable and equally cost-effective alternatives are not available. A renewed and stronger commitment to the implementation of the Stockholm Convention on POPs is required.

10. New occupational risks have emerged in Africa as a result of the expansion in the production and use of chemical, electronic, bio- and nano-technologies. Furthermore, the liberalization of trade facilitates the transfer of technologies and chemicals, some of which are potentially hazardous, but this usually done without the necessary protective measures. This adds to the burden of traditional occupational health problems such as injury, respiratory diseases, dermatitis, and musculo-skeletal disorders. African workers now suffer increasingly from asthmatic conditions and psychological stress. Agriculture, mining, work in export processing zones, and child labour continue to be of particular concern.

2. Issues and challenges

11. In Africa, decision-makers have not always been made aware of new or emerging environmental risks factors. This is partly because environmental monitoring is yet to be routinely implemented. There is a need to leverage the environment sector's role and comparative advantage in the assessment and understanding of the root causes of emerging risk factors, and the identification of effective solutions for their containment, through maintaining the resilience of ecosystems to human pressure. Challenges include the low priority given to such issues on development agendas, inadequate scientific and analytical capacity in monitoring, assessing and reporting on environmental trends, lack of clear programmatic environmental agendas, and competing priorities related to current and traditional risk factors, among others.
12. The awareness of the general public on specific risk factors has remained low, including in occupational settings where standard protective measures against various forms of contamination, including radiation, are not applied consistently. Cultural and behavioural backgrounds, and poverty, lead to greater exposure of poor communities, exposing them to specific risks factors such as infectious diseases and hazardous waste.
13. Many African countries have developed emergency preparedness and response plans based on humanitarian actions in crisis situations, with components that address outbreaks of infectious diseases. Natural disasters have usually been considered under such plans. However, the management of new and emerging environmental risks factors has not been properly addressed.
14. Regarding emerging threats such as e-waste, the necessary assessments have so far remained limited to the quantification of the extent of the problem in order to propose the related interventions. Other potential hazards like radiation have been inadequately addressed in plans and interventions.

3. Proposed actions

15. The establishment by governments of intersectoral frameworks and mechanisms with their supporting technical committees will enable the systematization of environmental monitoring in Africa. Governments may wish to consider

- a) Including the monitoring of new and emerging environmental threats in their activities. While focussing in priority on current and traditional risk factors, the monitoring should also include the assessment of the potential and relative threats posed by new and emerging risks factors to public health.
- b) Reviewing their emergency preparedness plans to ensure that the management of new or emerging environmental risks factors have been adequately addressed.
- c) Developing and implementing awareness raising campaigns on the most important risks factors.
- d) Undertaking community sensitization and education activities, particularly in the areas most affected by specific risks, or targeting population groups that are most vulnerable.

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